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Fracturing Misconceptions: A History of Effective State Regulation, Groundwater Protection, and the Ill-Conceived FRAC Act

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FRACTURING MISCONCEPTIONS: A HISTORY OF EFFECTIVE STATE REGULATION, GROUNDWATER PROTECTION, AND THE ILL-CONCEIVED FRAC ACT

I. Introduction

Hydraulic fracturing is a safe, environmentally sound oil and gas recovery method. It is also essential to meeting America's growing demand for natural gas. Each year, there are approximately 35,000 wells completed using hydraulic fracturing, with nearly one million wells to date completed using hydraulic fracturing.[1] Hydraulic fracturing has allowed for the production of more than 600 trillion cubic feet of natural gas and 7 billion barrels of oil.[2]

The hydraulic fracturing process is effectively regulated by states, but there are efforts being made in the U.S. Congress to bring its regulation under the purview of the Safe Drinking Water Act.[3] By attempting to regulate hydraulic fracturing under this Act, the federal government will only serve to impose costly regulatory hurdles that will inhibit the development of the United States' vast reserves of natural gas trapped in shale and tight sand formations throughout the country. This proposed regulation is a one-size-fits-all approach, unnecessarily transferring to the federal government the regulation of an

[1] Press Release, Media Newswire, Obama Administration: No Documented Cases of Hydraulic Fracturing Contamination (Dec. 12, 2009), http://media-newswire.com/release_1107527.html.
[2] INDEP. PETROLEUM ASS'N OF AM., HYDRAULIC FRACTURING: EFFECTS ON ENERGY SUPPLY, THE ECONOMY, AND THE ENVIRONMENT (2008), http://www.energyindepth.co1`m/PDF/Hydraulic-Fracturing-3-E's.pdf.
[3] H.R. 2766, 111th Cong. (2009); S. 1215, 111th Cong. (2009).

industry practice that has been effectively regulated by states. Each state has a vested interest in the protection of its natural environment. To that end, they have been effectively regulating the oil and gas industry since the early twentieth century. The additional hurdle proposed before Congress is unnecessary and lacks an understanding of the technology and regulation concerning the development of the nation's indigenous hydrocarbon resources. Further, in a hearing before the Senate Committee on Environmental and Public Works, representatives from the Environmental Protection Agency testified that they had not heard of one case of ground water contamination due to hydraulic fracturing.[4] Imposing unnecessary federal regulations on a process that has a sixty-year history of effective state regulation would cause much of the domestic energy supply to remain unproduced, further increasing U.S. dependence on foreign sources of oil and natural gas. As US gas is developed, LNG and pipeline imports will decline.

A. What Is Hydraulic Fracturing?

In tight shale and tight gas sands formations, the recovery of oil and natural gas is expedited through the use of fractures—channels or cracks that exist in the formation.[5] Hydraulic fracturing improves the productivity of a well either by creating new fractures for hydrocarbons to pass through or through expansion of existing fractures.[6] Hydraulic fracturing utilizes the high pressure injection of water, sand, and proppants to enhance the permeability of subsurface rock in a rock formation that contains hydrocarbons.[7] Fracturing involves the targeting of formations and determining the desired length of the

[4] Press Release, Media Newswire, *supra* note 1.
[5] KATE VAN DYKE, FUNDAMENTALS OF PETROLEUM 162 (4th ed. 1997).
[6] *Id.* at 163.
[7] U.S. DEP'T OF ENERGY, OFFICE OF FOSSIL ENERGY NAT'L ENERGY TECH. LAB., MODERN SHALE GAS DEVELOPMENT IN THE UNITED STATES: A PRIMER 56 (2009) [hereinafter MODERN SHALE GAS].

fracture so as not to intrude on other formations or extend the fracture unnecessarily.[8] Understanding the rock strata to be fractured is critical to the success of the fracturing operation.[9] The fracturing fluids are pumped into the target formation at calculated pressures to generate cracks.[10] As the pressure builds from the injection, it permits the cracking of rock formations housing oil and natural gas.[11]

Drilling for oil and gas is a risky business. Drilling and production operations are incredibly expensive and capital-intensive. Technology and know-how in the oil business have been geared toward minimizing the risks associated with oil and gas drilling. Hydraulic fracturing is similarly risky. It is incredibly expensive to fracture an oil and gas well. If the fracture operations occur in the wrong part of the formation or in the wrong formation entirely, the well could turn up dry, meaning that there are no hydrocarbons to produce.[12] Further, if the fracture in the pay zone extends too far, there is a serious risk that water could migrate into the wellbore.[13] Most oil wells in America naturally produce more water than oil, so the influx of some water is almost always inevitable.[14] When too much water migrates into the wellbore, it is considered "watered out" and it is no longer economic to produce from the well.[15] With the economic risks of drilling augmented in hydraulic fracturing operations, operators are heavily incentivized not to do anything that will inhibit recouping the costs sunk in the wellbore. Not only do

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[8] *Id.*
[9] *Id.*
[10] *Id.*
[11] VAN DYKE, *supra* note 5, at 162-63.
[12] *Id.* at 120.
[13] NORMAN J. HYNE, DICTIONARY OF PETROLEUM EXPLORATION, DRILLING, AND PRODUCTION 563 (1990).
[14] E.J. Sullivan et al., Water Treatment Technology for Oil and Gas Produced Water, *in* Identifying Technologies to Improve Regional Water Stewardship: North-Middle Rio Grande Corridor: Proceedings 216 (Univ. of N.M. Apr. 21-22, 2004), *available at* http://www.unm.edu/~cstp/Reports/H2O_Session_4/4-5_Sullivan.pdf.
[15] HYNE, *supra* note 13, at 563.

operators not want to harm ground water for safety purposes, they also do not want to harm ground water because doing so can kill the well's economics.

B. Hydraulic Fracturing: A Game-Changer in Shale Resource Plays

Whereas oil can be recovered from shale formations, the real impact on the U.S. energy outlook has been in natural gas shale development.[16] There are many natural gas shale basins spread throughout the United States.[17] Advances in drilling technology, hydraulic fracturing, and high prices for natural gas and oil have encouraged the development of these shale "plays" across the United States.

In order to understand the importance of hydraulic fracturing, it is necessary to quantify the amount of gas that can be recovered using the process. In 2008, hydraulic fracturing allowed for the estimated recovery of 25 billion cubic feet of natural gas per day from unconventional gas resources.[18] Unconventional gas resources are those gas resources contained in tight gas formations, shale gas, gas hydrates, and coalbed methane.[19] By 2018, the amount of unconventional gas production in the U.S. is expected to be in the neighborhood of 40 billion cubic feet per day, much of that production coming from shale gas.[20] In 2008, the United States consumed 23 trillion

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[16] Gerard Wynn & Ben Hirschler, *DAVOS – Shale Gas Is U.S. Energy Game Changer – BP CEO*, REUTERS.COM, Jan. 28, 2010, http://www.reuters.com/article/idUSLDE60R1MV20100128.
[17] MODERN SHALE GAS, *supra* note 7, at 8 (stating that the East coast and Appalachia are dominated by Marcellus and Devonian shale gas basins; the southeast United States houses the Chattanooga, Conasaugam and Floyd-Neal shale gas basins; and the south-central United States is marked by the Fayetteville, Haynesville/Bossier, Woodford and Woodford/Carey, Barnett, Pearsall, and Bend shale gas basins).
[18] *Id.* at 9.
[19] MANUAL OF OIL AND GAS TERMS 1102 (13th ed. 2006) (definition of "unconventional gas").
[20] MODERN SHALE GAS, *supra* note 7, at 9.

cubic feet of gas.[21] Of the 23 trillion cubic feet of natural gas consumed, roughly 40% was provided for by production from unconventional gas sources.

It should be noted that these figures are not linear, meaning that not everything that is produced in the U.S. is consumed in the U.S., and not everything that is consumed in the U.S. is produced in the U.S. In 2008, the U.S. imported 3.98 trillion cubic feet of gas and exported one trillion cubic feet of gas.[22] These import and export numbers are small in comparison to what is produced and consumed domestically. The amount of natural gas imported is especially small when compared to imported crude oil.[23] The disparity between what is produced and consumed in terms of crude oil does not need to be discussed *ad nauseum.* What is interesting is the fact that the U.S. is resting on enough natural gas to meet demand for approximately 87 to 116 years.[24] Natural gas production really is a domestic treasure that should be utilized in order to keep the economy going, houses warm, and our nation secure.

As hydraulic fracturing processes improve and unconventional gas plays become more and more economic to develop, unconventional gas contributions to production and consumption will only increase. Therefore, the importance of hydraulic fracturing will only increase. Hydraulic fracturing is a key ingredient to a more secure and viable energy future for the U.S. For that reason it is a game changer that should be encouraged to develop.

II. The Environmental Debate

[21] U.S. Energy Info. Admin., Natural Gas Navigator, http://tonto.eia.doe.gov/dnav/ng/hist/n9140us2m.htm (last visited Dec. 16, 2009).
[22] U.S. Energy Info. Admin., U.S. Natural Gas Imports & Exports by State, http://tonto.eia.doe.gov/dnav/ng/ng_move_state_dcu_nus_a.htm (last visited Dec. 16, 2009).
[23] U.S. Energy Info. Admin, International Energy Outlook 2009: Chapter 3 – Natural Gas, http://www.eia.doe.gov/oiaf/ieo/nat_gas.html (last visited Apr. 19, 2010).
[24] MODERN SHALE GAS, *supra* note 7, at 9.

Hydraulic fracturing has recently come under attack because of reports of hydraulic fracturing fluid contaminating ground water sources. As with any industrial activity, there is the risk of environmental degradation. However, the oil and gas industry is keenly aware of the risks associated with production operations. With public scrutiny focused on the industry, it is increasingly aware and making efforts to minimize its environmental footprint.

On June 9, 2009 legislation was proposed in both the U.S. House of Representatives and the U.S. Senate to require regulation of hydraulic fracturing under the Safe Drinking Water Act.[25] The Fracturing Responsibility and Awareness of Chemicals (FRAC) Act of 2009 was introduced in the House by Colorado Representative Diana DeGette.[26] A Senate version of the bill was introduced on the same day.[27] DeGette has stated that the purpose of the bill is to close the affectionately titled "Halliburton loophole" in the Safe Drinking Water Act by requiring companies conducting fracturing operations to disclose the chemicals used in their fracturing operations.[28] The "loophole" DeGette is trying to close was created by an amendment to the Safe Drinking Water Act that was passed with the Energy Policy Act of 2005.[29] The Energy Policy Act amended the Safe Drinking Water Act by changing section 300h(d) to read as follows:

> The term "underground injection"--
> **(A)** means the subsurface emplacement of fluids by well injection; and
> **(B)** excludes--

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[25] H.R. 2766, 111th Cong. (2009); *see also* S. 1215, 111th Cong. (2009).
[26] H.R. 2766, 111th Cong.
[27] S. 1215, 111th Cong.
[28] David O. Williams, *DeGette, Polis Introduce FRAC Act Aimed at Closing Hydraulic Fracturing "Loophole,"* COLO. INDEP., June 9, 2009, http://coloradoindependent.com/30784/degette-polis-introduce-frac-act-aimed-at-closing-hydraulic-fracturing-loophole.
[29] Energy Policy Act of 2005, Pub. L. No., 109-58, § 322, 119 Stat. 594, 694 (codified in 42 U.S.C. § 300h(d)(1) (2005)).

> **(i)** the underground injection of natural gas for purposes of storage; and
> **(ii)** the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities.[30]

The environmental debate was further invigorated by a fracturing chemical spill by Cabot Oil and Gas Corporation in Pennsylvania. On September 16, 2009, two chemical spills took place in the town of Dimock, Pennsylvania, where Cabot was conducting drilling operations in the Marcellus shale.[31] The spills occurred because of failed pipe connections, which were reported to the Pennsylvania Department of Environmental Protection.[32] Altogether, close to 8000 gallons of the fracturing fluid containing the chemical LGC-35 CBM were spilled into a nearby creek.[33] The chemical is a potentially carcinogenic lubricant, but the concentrations of the chemical in the fracturing fluid were found to be so diluted that they were harmless, and the Pennsylvania Department of Environmental Protection found that there was no evidence of groundwater contamination from the spills.[34] As a result of the spills, Cabot Oil and Gas was fined $56,650 and ordered not to conduct any fracturing operations until the spill was cleaned up.[35] The ban imposed on Cabot was lifted on October 16, 2009, and Cabot has since resumed its fracturing operations.[36] While some residents view the fine as a "joke," the Pennsylvania Department of Environmental Protection thinks the fine and subsequent ban were enough to teach Cabot a lesson.[37] The state was quick to respond to the spill,

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[30] 42 U.S.C. § 300h(d)(1) (2006).
[31] Jon Hurdle, *Penn. Charges Cabot With Natgas Chemical Spills*, REUTERS.COM, Sept. 22, 2009, http://www.reuters.com/article/companyNews/idUKN2236809420090922.
[32] *Id.*
[33] *Id.*
[34] *Id.*
[35] Jon Hurdle, *Pennsylvania Fines Cabot Over Drilling Spills*, REUTERS.COM, Oct. 22, 2009, http://www.reuters.com/article/bondsNews/idUSN2245623220091022.
[36] *Id.*
[37] *Id.*

conducting tests on water wells. Those tests, as mentioned above, failed to show any contamination in the wells from the fracturing fluid spills.

Oil and gas operators drill with the utmost care and concern for the environment. With an eye toward responsible production of oil and natural gas, many operators have fracturing-appropriate operating procedures. Operators conducting fracturing operations do not go into a shale play blindly. Fracturing operations are designed based upon past experience and data on the formation that is being fractured.[38] Vast amounts of data are collected and analyzed in order to ensure optimal fracturing success. Further, a lot of time and money are expended in designing the fracture. Modeling programs allow geologists and engineers to modify and evaluate the design of the fracture treatment and to determine the desired height, length, and orientation of the potential fracture prior to operations beginning.[39] The purpose of this time-consuming process is to ensure that the fractures do not extend beyond the optimal zone of production and to ensure that the fractures do not grow out of the formation. If the fractures were to extend beyond the fractured formation, production from the fracture would be greatly reduced,[40] essentially forcing all the time and money spent on the development of the shale play into a dry hole. Before operations commence, operators also perform a series of tests to ensure that the well, well equipment, and hydraulic fracturing equipment are in good working order and will hold up to the pressures of the fracturing treatment.[41] Once the fractures are designed and thorough testing of the wellbore has been completed, the fracturing

[38] J. DANIEL ARTHUR ET AL., HYDRAULIC FRACTURING CONSIDERATIONS FOR NATURAL GAS WELLS OF THE MARCELLUS SHALE 9 (2008).
[39] *Id.*
[40] *Id.* at 10.
[41] *Id.* at 12.

treatment begins with the pumping of an acid treatment into the wellbore,[42] to clean out the wellbore and increase any permeability lost in the drilling process.[43] After the acid treatment, the "slickwater pad" is added to the wellbore.[44] The "slickwater pad" is a mixture of water and a lubricant designed to facilitate the movement of proppants through the wellbore.[45] The proppants aid in the fracturing by keeping the fractures open to allow for the recovery of oil, natural gas, and fracturing fluid.[46] After the slickwater pad is added, the first proppant sequence begins, with each subsequent frac stage implementing an increasingly coarser proppant particle.[47]

A. LEAF Takes on the EPA and the Safe Drinking Water Act

The Safe Drinking Water Act was passed by Congress in 1974 to protect the public health through the regulation of the nation's drinking water supplies.[48] The Safe Drinking Water Act requires the EPA to develop regulations for the underground injection of fluids in order to protect underground sources of drinking water (USDWs).[49] To implement the underground injection control program (UIC), the states are granted the authority to develop their own UIC programs in compliance with standards set by the Safe Drinking Water Act.[50] The specific requirements of the UIC programs are set out in 40 C.F.R. 144.1.[51]

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[42] *Id.*
[43] *Id.*
[44] *Id.*
[45] *Id.*
[46] Oil Gas Glossary, Propping Agent Definition, http://oilgasglossary.com/propping-agent.html (last visited Apr. 23, 2010).
[47] ARTHUR ET AL., *supra* note 38, at 12.
[48] EPA, Safe Drinking Water Act Basic Information, http://www.epa.gov/OGWDW/sdwa/basicinformation.html (last visited Dec. 14, 2009).
[49] EPA, Underground Injection Control Program Federal UIC Regulations, http://www.epa.gov/ogwdw000/uic/regulations.html#fed_reg (last visited Dec. 14, 2009).
[50] *Id.*
[51] 40 C.F.R. § 144.1 (2009).

Prior to 1997, the EPA operated under the understanding that hydraulic fracturing operations do not fall under the umbrella of underground injection control regulations.[52] The EPA viewed "underground injection" as injection where the primary purpose is the emplacement of fluids below the ground-surface, not for use in oil and gas recovery operations.[53] In *Legal Environmental Assistance Foundation v. EPA,* the Court of Appeals for the Eleventh Circuit addressed the issue of whether the EPA is legally required to regulate hydraulic fracturing under the underground injection control programs established pursuant to Part C of the Safe Drinking Water Act.[54] The EPA argued that hydraulic fracturing did not fall under the jurisdiction of the Safe Drinking Water Act because (1) the phrase "underground injection" was ambiguous; (2) Congress intended to exclude those wells whose primary purpose was not the emplacement of fluids underground; and (3) the EPA's interpretation of the statute was a permissible interpretation.[55] Legal Environmental Assistance Foundation (LEAF) argued that the EPA's interpretation of the statute must fail because it would render the UIC regulations inconsistent with the statute.[56] The source of the controversy was the use of hydraulic fracturing in Alabama for the recovery of coalbed methane.[57] Since 1980, several thousand coalbed methane wells have been drilled in Alabama.[58] The court concluded that hydraulic fracturing operations do constitute "underground injection" for the purposes of the Safe Drinking Water Act,[59] that the EPA's interpretation could not be "squared with the plain language of the statute and thus must fail," and that while the

[52] Legal Envtl. Assistance Fund v. EPA, 118 F.3d 1467, 1473 (11th Cir. 1997).
[53] *Id*.
[54] *Id.* at 1469.
[55] *Id.* at 1473-74.
[56] *Id.* at 1472.
[57] *Id.* at 1470.
[58] *Id.* at 1471.
[59] *Id.* at 1478.

courts will give the EPA broad discretion in making policy, the agency must bow to the will of Congress when it interprets legislation.[60]

Upon remand to the agency, the EPA began proceedings to repeal Alabama's UIC program for coalbed methane production.[61] Prior to the conclusion of the EPA proceedings, Alabama presented the EPA with a revised UIC program which the EPA subsequently approved.[62] LEAF petitioned the Eleventh Circuit for review again, but the court denied remand, upholding the EPA's approval of Alabama's revised UIC program under section 1425 of the Safe Drinking Water Act.[63]

B. Disclosure of Chemicals Used in Fracturing as Called for in the DeGette FRAC Act

The bread and butter issue surrounding the chemicals used in hydraulic fracturing is whether or not the chemicals contaminate water supplies. Historically, oil and gas operators have been protected from the disclosure of the chemicals used in hydraulic fracturing due to trade secret concerns.[64] The specific make-up of the chemicals used in fracturing in particular is considered proprietary information and should be protected.[65]

The FRAC Act seeks to amend section 300h(b)(C) of the Safe Drinking Water Act by adding the following language to the section:

> including a requirement that any person using hydraulic fracturing disclose to the State (or the Administrator if the Administrator has primary enforcement responsibility in the state) the chemical constituents (but not the proprietary chemical formulas) used in the fracturing process.[66]

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[60] *Id.*
[61] Legal Envtl. Assistance Fund v. EPA, 276 F.3d 1253, 1256 (11th Cir. 2001).
[62] *Id.* (stating that the EPA approved the revised UIC program under § 1425 of the Safe Drinking Water Act).
[63] *Id.* at 1256.
[64] Abrahm Lustgarten, *Environmental Concerns Surround Chemicals Used in Natural Gas Development*, GOV MONITOR, Oct. 5, 2009, http://thegovmonitor.com/world_news/united_states/environmental-concerns-surround-chemicals-used-in-natural-gas-development-8335.html.
[65] *Id.*
[66] H.R. 2766, 111th Cong. § 2(b)(1) (2009); S. 1215, 111th Cong. §2(b)(1) (2009).

The FRAC Act amends section 300h further by adding to 300h(b) subpart (4) to section to read:

> **(4)** The State (or Administrator) shall make the disclosure or chemical constituents referred to in subparagraph (C) of paragraph (1) available to the public, including a posting of the information on an appropriate Internet website. ***In addition, whenever the State or the Administrator, or a treating physician or nurse, determines that a medical emergency exists and the proprietary chemical formulas or specific chemical identity of a chemical used in hydraulic fracturing is necessary for emergency first-aid treatment, the person using hydraulic fracturing shall immediately disclose the proprietary chemical formulas or the specific chemical identity of a trade secret chemical to the State, the Administrator, or that treating physician or nurse, regardless of the existence of a written statement of need or a confidentiality agreement.*** The person using hydraulic fracturing may require a written statement of need and a confidentiality agreement as soon thereafter as circumstances permit.[67]

The FRAC Act also adds inclusive language as to what constitutes underground injection. Where the Energy Policy Act of 2005 exempted the injection of fracturing fluids from the underground injection requirements of the Safe Drinking Water Act, the FRAC Act proposes to include hydraulic fracturing fluids, essentially making the holding in the first LEAF case federal law.

In anticipation of the FRAC Act, or perhaps to neutralize its effects, many oil and gas operators are already moving to disclose the chemicals they use in fracturing operations. In October 2009, Aubrey McClendon, president and CEO of Chesapeake Energy, and John Pinkerton, chairman and CEO of Range Resources, Inc., both called for the oil and gas industry to disclose the chemicals used in their respective hydraulic fracturing jobs.[68] McClendon stated that the oil and gas industry needed to "demystify" hydraulic fracturing and to "disclose the chemicals [the industry is] using and search for

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[67] H.R. 2766, 111th Cong. § 2(b)(2).

[68] Katie Howell, *Spills, Looming Regulations Spur Natural Gas Industry Toward Disclosure*, N.Y. TIMES, Oct. 1, 2009, http://www.nytimes.com/gwire/2009/10/01/01greenwire-spills-looming-regulations-spur-natural-gas-ind-5759.html?pagewanted=all.

alternatives to the chemicals [the industry is] using."[69] Pinkerton has also asked well operators to disclose the chemicals used in fracturing jobs that are conducted on behalf of Range Resources, stating that the confidentiality agreements that the operators impose are unacceptable.[70] Schlumberger, an oil field services company, has also called for its suppliers to disclose the chemicals used in the fracturing solutions the company gets from its suppliers.[71] Environmental groups, such as the Natural Resources Defense Council, have welcomed this industry call for disclosure but qualifies that welcoming tone with the stern reminder that this disclosure is long overdue.[72]

While disclosure of the chemicals appears innocuous on its face, there is cause for operators to approach disclosure with caution. If the FRAC Act simply called for the chemicals used in hydraulic fracturing, that would be the end of the discussion. Instead, the FRAC Act includes a provision that calls for the disclosure of the proprietary chemical formulas as well.[73] The FRAC Act does allow for the operator to request a confidentiality agreement when the formulas are disclosed,[74] but the wording of the proposed change leaves much to interpretation. The FRAC Act reads: "The person using hydraulic fracturing may require a written statement of need and a confidentiality agreement as soon thereafter as circumstances permit."[75] This language would seem to assuage the fears of operators that their proprietary chemical formulas might become public, but there appears to be a disconnect in the timing of the disclosure of the chemical formulas and the time when an operator can submit a written request for the

[69] *Id.*
[70] *Id.*
[71] *Id.*
[72] *Id.*
[73] H.R. 2766, 111th Cong. § 2(b)(2) (2009); S. 1215, 111th Cong. § 2(b)(2) (2009).
[74] H.R. 2766, 111th Cong. § 2(b)(2); S. 1215, 111th Cong. § 2(b)(2).
[75] H.R. 2766, 111th Cong. § 2(b)(2); S. 1215, 111th Cong. § 2(b)(2).

confidentiality agreement. Under the FRAC Act, when the State, Administrator or a medical official establishes that a medical emergency exists, the operators *shall* disclose the chemical formulas *immediately.*[76]

The language that a confidentiality agreement can be signed "as soon thereafter as circumstances permit"[77] is cold comfort. The FRAC Act effectively places the cards in the hands of the Administrator of the EPA, the State, or a medical official in determining the disclosure of the fracturing chemical formulations. The language of the Act implies that while the operator may require a statement of confidentiality, the timing of the confidentiality agreement and the signing of the confidentiality agreement are at the discretion of regulating officials or the persons asked to sign the confidentiality agreement. In a perfect world, this would not be much of a concern; everyone would cooperate and the process would be smooth and seamless. The ambiguity in the timing requirement for the confidentiality agreement leaves a gaping hole allowing for proprietary information to be leaked to outside sources. The axiom "Two people can keep a secret if one of them is dead" rings true here. The operator could hand over the chemical formulas to the authorities in the event of a medical emergency, but what keeps the information safe between disclosure and the signing of the confidentiality agreement? While there might be an argument for an implied obligation to keep the information confidential, that argument would most likely prove fruitless, given the medical emergency that called for disclosure of the formula and the public's interest in knowing the effects of the chemicals that supposedly caused the medical emergency.

[76] H.R. 2766, 111th Cong. § 2(b)(2); S. 1215, 111th Cong. § 2(b)(2).
[77] H.R. 2766, 111th Cong. § 2(b)(2); S. 1215, 111th Cong. § 2(b)(2).

The FRAC Act also places no limitations on or even defines what will be considered a "medical emergency." If this issue were to be disputed in court after the Administrator of the EPA, or some other entity authorized by the Act, made a determination that a medical emergency existed, it would be very hard to challenge that determination. Based upon *Chevron USA v. Natural Resources Defense Council,*[78] the Court will ask if Congress spoke directly to the issue being disputed by requiring the agency to act in a certain way, or where Congress has not directly spoken to the question at issue or there is ambiguity, then the court will ask whether or not the agency's response is a permissible construction of the statute.[79] When considering the agency's interpretation of a vague statute, the courts will look at the nature of the statute and whether or not the statute dealt with an issue that was technical and complex, the agency considered the problem in a detailed and reasoned fashion, and whether or not the agency's interpretation involved reconciling conflicting policies.[80] The judicial review of the agency action is very deferential, given the scope of the authority granted to it by Congress and the agency's expertise on the subject matter. Also, there is concern as to level of deference that will be shown to a medical professional who makes the determination that a "medical emergency" exists. The proposed legislation seems to be very broad on the medical professional's level of discretion. That broadness is quite possibly an intentional design of the drafters of the proposed legislation. Basically, as long as the agency's interpretation of the statute is reasonable, it will be upheld. Under *Chevron,* if the EPA or a medical professional determined that there was a "medical emergency," then that determination would stick with the force of law.

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[78] Chevron, U.S.A. v. Natural Res. Def. Council, 467 U.S. 837 (1984).
[79] *Id.* at 838.
[80] *Id.* at 844, 845.

III. Environmental Footprint of Hydraulic Fracturing – Methods, Chemicals, and State Regulatory Response

With the exception of coalbed methane, the producible portions of unconventional gas plays lay several thousands of feet below the ground surface.[81] For example, the pay zones for the Barnett shale is between 6200 and 8500 feet; the ground water is in the 1000 foot range, just below the surface.[82] In the Haynesville shale, the pay zone is between 10,500 and 13,500 feet, again well below the groundwater zones.[83] Again, a lot of time and resources are expended in the design of the fracture zone prior to the commencement of fracturing operations. Similar geologic situations exist in the other shale plays across the United States. For example, the Marcellus shale play has a pay zone at a depth of approximately 4000 to 8500 feet with groundwater resources being approximately 850 feet below the surface.[84] The Woodford shale play has a pay zone depth of approximately 6000 to 11,000 feet with groundwater situated approximately 400 feet below the ground surface.[85] Oil and gas operators have a huge incentive to make sure that the well does not infringe upon groundwater – in other words, money. Should the well make contact with groundwater and cause a significant influx of water, the well could "water out" and cease to be economic to produce.

A. Drilling for Oil and Gas While Protecting Groundwater Resources

The drilling of an oil and gas well is focused not only on the recovery of oil and gas but on the protection of groundwater resources. The drilling of an oil or gas well

[81] Chesapeake Energy, Barnett Shale Hydraulic Fracturing Fact Sheet (July 2009), http://www.askchesapeake.com/Barnett-Shale/Multimedia/Brochures/Barnett%20Hydraulic%20Frac_FactSheet.pdf.
[82] *Id.*
[83] Chesapeake Energy, Haynesville Shale Hydraulic Fracturing Fact Sheet (Oct. 2009), http://www.chk.com/Media/HaynesvilleMediaKits/Haynesville_Hydraulic_Fracturing_Fact_Sheet.pdf.
[84] MODERN SHALE GAS, *supra* note 7, at 17.
[85] *Id.*

involves many interconnected steps. While the steps are common to all oil and gas well drilling operations, there are certain aspects of the construction process that deserve greater attention given their importance in hydraulic fracturing. Of those steps set out above, drilling the well, logging the hole, running casing, cementing the casing, logging the well, perforating the well, and monitoring well performance and integrity are all critically important to the success of subsequent hydraulic fracturing operations.

Drilling an oil or gas well is done in stages.[86] The actual drilling of the hole is accomplished through the use of the drill string, which is made up of the drill bit, drill collars, and the drill pipe.[87] When drilling an oil or gas well, the drill bit is cooled and lubricated through the use of drilling mud. Drilling mud is a fluid that is circulated down the drill string and back up the annulus, or the space between the drill string and the sides of the wellbore that is being drilled.[88] The drilling mud is a water based solution that is a mixture of water, clays, fluid loss additives, density control additives, and viscosifiers.[89] Drilling mud is also used to circulate drill cuttings to the surface, control formation pressure, help evaluate the formation, and keep formation fluids out of the wellbore via hydrostatic pressure.

As the drilling progresses, layers or stages of casing are added to the hole. Casing is heavy steel pipe used to seal off the drilling and formation fluids from migrating and to keep the wellbore from caving in.[90] The design and selection of the casing is very important for the drilling and production stages of a well's life.[91] The casing must be

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[86] AM. PETROLEUM INST., API GUIDANCE DOCUMENT HF1: HYDRAULIC FRACTURING OPERATIONS – WELL CONSTRUCTION AND INTEGRITY GUIDELINES 4 (2009) [hereinafter GUIDANCE DOCUMENT].
[87] *Id.* at 4.
[88] *Id.*
[89] *Id.*
[90] MANUAL OF OIL AND GAS TERMS, *supra* note 19, at 131, 132 (definition of "casing").
[91] GUIDANCE DOCUMENT, *supra* note 86, at 4.

designed to withstand the various pressures and forces that will be encountered as the well is drilled.[92] The casing is a key part of the well structure, ensuring the success of the well by supporting the structure of the wellbore and protecting it from zonal migration of any drilling fluids, ground water, and hydrocarbons.[93]

B. Chemical Constituents of Fracturing Fluid

In addition to the structural and mechanical safeguards in place in hydraulic fracturing operations, the chemicals used in fracturing are relatively safe given their diluted nature, when used in conjunction with sand and water. According to the Department of Energy and the Groundwater Protection Council, 99.51% of the fluid used in hydraulic fracturing is composed of water and sand.[94] The other 0.49% is made up of chemicals that are found in everyday household items, many of which are ingested or used as make-up.[95] There is no one-size-fits-all approach to the formulation of the fracturing fluid; the fluid will be made up to suit the formation that is being fractured.[96] Not all the chemicals will be used at the same time. It is common for service companies performing fracturing operations to omit one or more of the chemicals listed for another listed chemical.[97]

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[92] *Id.*
[93] *Id.*
[94] MODERN SHALE GAS, *supra* note 7, at 62.
[95] *Id.* at 63 (diluted acid – swimming pool chemical and cleaner; biocide – disinfectant used to sterilize medical and dental equipment; breaker – bleaching agent in detergent and hair cosmetics; corrosion inhibitor – used in pharmaceuticals, acrylic fibers, plastics; crosslinker – laundry detergent, hand soaps, and cosmetics; friction reducer – water treatment, soil conditioner, make-up remover, laxatives, and candy; gel – cosmetics, toothpaste, sauces, baked goods, ice cream; iron control – food additive; KCl – low sodium table salt substitute; oxygen scavenger – cosmetics, food and beverage processing, water treatment; pH adjusting agent – washing soda, detergents and soaps, water softener, glass and ceramics; proppant – drinking water filtration, play sand, concrete, brick mortar; scale inhibitor – automotive antifreeze, household cleaners, deicing agent; surfactant – glass cleaner, antiperspirant, hair color).
[96] *Id.* at 62.
[97] *Id.*

The chemicals used in hydraulic fracturing need to be given context. Any substance, no matter how innocuous it may seem, is potentially harmful. Further, the concentrations of the chemicals used in hydraulic fracturing are so diluted that any potential harm is greatly mitigated. For example, hydrochloric acid is the single largest liquid component used in hydraulic fracturing.[98] The acid is a diluted acid solution, meaning that it is 85% water and 15% acid prior to being further diluted with the water and sand in the fracturing fluid.[99] What's more, as the fracturing stages are completed, the chemicals are still further diluted. The chemicals will be in their highest concentration at the beginning stages of the fracturing process and in their most diluted at the end of the fracturing process. Because the chemicals are diluted so much and are in such small concentrations to begin with, they pose very little to no risk to ground water.

While the concentrations of the chemicals used in hydraulic fracturing are benign, one might raise the question of what happens to the chemicals when the fracturing process is complete. The chemicals have three options: they can be recycled, left in the fracture, or disposed of. The Ground Water Protection Council estimates that anywhere between 30% and 70% of the fracturing chemicals are returned to the surface through the wellbore.[100] The remaining percentage is left in the fracture. The unrecovered fracturing fluids are typically trapped in the fractured formation through mechanisms such as pore storage and stranding behind healed fractures, separating the chemicals from ground water.[101] The vertical distance between the fracture zone and ground water sources, the

[98] *Id.* at 64.
[99] *Id.*
[100] OFFICE OF FOSSIL ENERGY, NAT'L ENERGY TECH. LAB., U.S. DEP'T OF ENERGY, STATE OIL AND NATURAL GAS REGULATIONS DESIGNED TO PROTECT WATER RESOURCES 1, 23 (2009) [hereinafter STATE OIL AND NATURAL GAS REGULATIONS].
[101] *Id.*

presence of other, impermeable geologic formations between the fracture and ground water sources also serve to prevent migration of the fracturing fluid. The chemicals, if they come up, are then either stored or recycled. Recycling will, of course, further dilute the chemicals. If the chemicals are disposed of, the most common method of disposal is via an EPA classified Underground Injection Control well.[102]

When handled properly the chemical concentrations used in hydraulic fracturing do not pose an environmental threat to ground water or the public at large. The bigger concern would be that little caveat "when handled properly."

Just like any chemical, much hinges upon the manner in which it is handled. Chlorine is an important purifier of our water supply, but it can be deadly when handled improperly. A water treatment facility can cause a disaster by mishandling chlorine. Similarly, hydraulic fracturing relies on many chemicals that could be potentially hazardous but are not dangerous when handled safely. Further, once the fracturing fluid is in the ground, some of it will come up and some will remain in the fracture. That should not cause alarm due to the fact that the trapped chemicals will not be going anywhere and the chemicals are safely sequestered by casing and impermeable geological barriers.[103] Further, the chemicals used in fracturing the formation that do not travel back up to the surface through fluid circulation are geologically stuck in place and will not migrate any further, remaining isolated from groundwater resources.[104] Also, the chemicals that do come back up and are either disposed of in underground storage areas isolated from ground water sources in compliance with state and Federal UIC guidelines,

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[102] *Id.*
[103] GUIDANCE DOCUMENT, *supra* note 86.
[104] EPA, EVALUATION OF IMPACTS TO UNDERGROUND SOURCES OF DRINKING WATER BY HYDRAULIC FRACTURING OF COALBED METHANE RESERVOIR 4-15 (2004).

some fluids are recycled and reused, some fluids are treated and disposed of onsite where permitted by state law, and some fluids are even treated and disposed of in wastewater facilities so long as the treatment and disposal does not violate drinking water standards.[105]

C. State Regulatory Response to Hydraulic Fracturing

Contemporary state oil and gas regulations prohibit harm to the natural environment.[106] At one time, however, regulations aimed at protection were not prevalent. From the first oil well in 1859 until the 1930s, there was little state regulation of the oil and gas industry.[107] In fact, the majority of well construction operations were geared not toward the protection of the environment, but to the protection of the asset—the oil and gas reservoir.[108] Water was not something to protect, but was something to be protected from; water was the enemy.[109] During this infancy of the oil and gas industry, operators thought that the royalties they paid landowners adequately compensated for any damage done to the ground water or the surface by oil and gas operations.[110] The damage to the surface was considered to be a necessary evil inherent in the oil and gas production process.[111]

As drilling and production increased through the first three quarters of the twentieth century, landowners and regulators became increasingly aware of the environmental impact caused by the under-regulation of the of the oil and gas industry. Given states' interest in the protection of their respective natural environments and their historical

[105] STATE OIL AND NATURAL GAS REGULATIONS, *supra* note 100, at 23.
[106] *Id.* at 6.
[107] *Id.* at 13.
[108] *Id.* at 12.
[109] *Id*.
[110] *Id*.
[111] *Id.* at 14.

familiarity with the production of oil and gas, states took up the effort to ensure the protection of the natural environment while not hindering the development of oil and natural gas. Oil producing states have since developed a legal infrastructure that ensures environmental protection in conjunction with the development of oil and natural gas. The state approach has been tailored to fit the situational needs of the various states. Because of this tailoring, added levels of federal oversight would be superfluous to what states have already implemented. Further, by adding increased federal regulation, the states and the American taxpayer will have to foot the bill for the lost revenue. It is estimated that increased federal regulation proposed under the FRAC act would cost states $505 million in foregone state income taxes and will cost the federal government $1.2 billion in foregone federal income tax.[112] Overregulation of the oil and gas industry proposed in the FRAC Act actually does more harm than good, especially where there has been no documented case of water contamination in over one million fractured wells.

Below is a summary of oil and gas production regulations in some of the oil and gas producing states. The summary will address the issues of groundwater protection, casing procedures and requirements, and cementing.

1. Alabama

Alabama created the State Oil and Gas Board, vesting in the board the charge of preventing waste and promoting the conservation of oil and gas while ensuring the protection of the environment and the correlative rights of owners.[113] The oil and gas board has broad statutory authority to promulgate and enforce rules and regulations to

[112] Energyindepth.com, New Regulations Will Cost Americans Energy, Revenue, Jobs, http://www.energyindepth.com/PDF/Fact%20Sheet-BRIEF-econ-impact.pdf (last visited Apr. 23, 2010).
[113] Geological Survey of Ala.: Ala. State Oil and Gas Bd., http://www.gsa.state.al.us/ogb/ogb.html (last visited Dec. 14, 2009).

ensure the conservation and proper development of Alabama's oil and natural gas resources.[114]

As the LEAF case suggests, the majority of the hydraulic fracturing in Alabama occurs in coalbed methane development. To address the issues that arise with the production of hydrocarbons from coal seams, the state has passed regulations specific to the production of coalbed methane. The state of Alabama's Oil and Natural Gas Board has the authority to shut down any drilling or production operation for failure to comply with any Board rule.[115] In addition to that broad authority, any operator producing from coalbed methane shall conduct all oil and gas operations in a manner so as to prevent the pollution of all freshwater resources[116]; all freshwater that is of present or probable future value shall be confined to the water-bearing strata, and the water shall be adequately protected.[117] Each coalbed shall be hydraulically fractured so as not to endanger any underground source of drinking water.[118] Operators shall certify that the proposed fracturing will not occur in an underground source of drinking water with evidence to support the certification.[119] For wells that are being fractured, before any fracturing operations may commence, the fracturing operation must be approved by the Supervisor of the Oil and Gas Board and each well shall be fractured in a way so as not to cause damage to water bearing strata.[120] Further, if the fracturing results in any irreparable damage to the well, the well shall be properly plugged and abandoned.[121] In addition to the fracturing requirements, the operator shall case and cement all wells with a sufficient

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[114] *Id.*
[115] ALA. ADMIN. CODE r. 400-1-1-.11 (2000).
[116] *Id.* r. 400-3-4-.02.
[117] *Id.*
[118] ALA. ADMIN. CODE r. 400-3-8-.03(1) (2003).
[119] *Id.* r. 400-3-8-.03(3).
[120] ALA. ADMIN. CODE r. 400-3-4-.07 (2000).
[121] *Id.* r. 400-3-4-.07.

number of casing strings necessary to prevent the contamination of freshwater bearing strata, support unconsolidated sediments, and to control formation pressure and fluid.[122] The casing used by the operator shall meet American Petroleum Institute standards and shall be reinforced with standard cement that is mixed with water of adequate quality so as not to degrade the setting properties of the cement.[123]

2. New York

The State of New York sits atop a large portion of the very productive Marcellus shale formation. The New York Department of Environmental Conservation (DEC) has had the exclusive authority to regulate the development of oil and gas since 1981.[124] In 1992, New York commissioned the drafting of a generic environmental impact statement (GEIS) to address the DEC's regulations of oil, gas, underground gas storage and solution mining wells of any depth, brine disposal, and stratigraphic and geothermal wells deeper than 500 feet.[125] The 1992 GEIS concluded that the issuance of standard, individual oil or gas well drilling permits issued for anywhere in the state, when no other permits are involved, does not have a significant environmental impact.[126] However, the GEIS did find that the drilling of a oil or gas well within 1000 feet of a municipal water supply well was always a significant event requiring a supplemental environmental impact statement addressing the ground water hydrology, potential environmental

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[122] *Id.* r. 400-3-4-.09(1).
[123] *Id.* r. 400-3-4-.09(2).
[124] Div. of Mineral Res., N.Y. Dep't of Envtl. Conservation, Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Regulatory Program 1-5 (Sept. 2009), ftp://ftp.dec.state.ny.us/dmn/download/OGdSGEISFull.pdf [hereinafter Draft SGEIS].
[125] N.Y. Dep't of Envtl. Conservation, Generic Environmental Impact Statement on the Oil, Gas and Solution Regulatory Program (GEIS), http://www.dec.ny.gov/energy/45912.html (last visited Apr. 23, 2010).
[126] Draft SGEIS, *supra* note 124, at 3.

impacts, and mitigation measures.[127] The 1992 GEIS further found that the drilling of oil and gas wells between 1000 and 2000 feet of a municipal water supply well may be a significant event requiring a site specific environmental assessment and a state environmental quality determination (SEQR).[128] The SEQR requires the state to consider the environmental factors associated with oil and gas drilling in the early planning stages of actions that are directly undertaken, funded, or approved by local and state agencies.[129]

On September 30, 2009 the DEC issued its draft supplemental generic environmental impact statement (DSGEIS) for the potential natural gas drilling activities in the Marcellus shale.[130] The DSGEIS outlines safety measures, protection standards, and mitigation strategies that operators would have to follow to obtain drilling permits.[131] The findings of the SGEIS will be applied to the reviewing and processing of permit applications in the deep, low-permeability formations of the Marcellus shale.[132]

The process envisioned in New York's EIS process emphasizes the importance of studying the potential impacts that drilling and hydraulic fracturing in the Marcellus shale could have. The draft SGEIS is indicative of a state effort to look at an issue that is unique to the state. The EIS process in New York is the product of robust state regulations aimed at the protection of the natural environment and the responsible development of New York's natural gas resources. The EIS process is generally

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[127] Div. of Mineral Res., N.Y. Dep't of Envtl. Conservation, Findings Statement (Sept. 1, 1992), http://www.dec.ny.gov/docs/materials_minerals_pdf/geisfindorig.pdf.
[128] *Id.*
[129] *Id.*
[130] N.Y. Dep't of Envtl. Conservation, Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Regulatory Program, http://www.dec.ny.gov/energy/58440.html (last visited Apr. 23, 2010).
[131] *Id.*
[132] Draft SGEIS, *supra* note 124, at 1.

applicable to all oil and natural gas operations in New York but is flexible enough to allow for exceptions to the general rules as dictated by the circumstances in the field.

3. North Dakota

The North Dakota Industrial Commission Division of Oil and Gas regulates the production of oil and gas in North Dakota.[133] The purpose of the Division of Oil and Gas is to ensure the development of North Dakota's oil and gas to the fullest extent possible for the benefit of the state of its inhabitants.[134] To that end, the North Dakota Industrial Commission Division of Oil and Gas has passed various rules regarding the production of oil and gas. To protect freshwater sources and oil- and gas-bearing formations, North Dakota requires that all oil, gas, and water strata above a producing zone be sealed off and separated from the other strata in order to prevent the contents of the various strata from migrating.[135] Like Alabama, North Dakota also requires that all fresh water of present or probable value be confined to its respective strata and shall be adequately protected by methods approved by the Industrial Commission, and special precautions are to be taken to protect artesian water sources.[136] North Dakota further requires that all wells drilled for oil, natural gas, or injection purposes shall be completed with strings of casing which shall be properly cemented at sufficient depths to adequately protect and isolate all formations containing water, oil, or gas or any combination of water, oil, or gas.[137] Further, surface casing must be allowed to stand under pressure until the cement

[133] NDIC Oil & Gas Division Home Page, https://www.dmr.nd.gov/oilgas/ (last visited Dec. 14, 2009).
[134] *Id.*
[135] N.D. ADMIN. CODE 43-02-03-20 (1992).
[136] *Id.*
[137] N.D. ADMIN. CODE 43-02-03-21 (2009).

has reached a compressive strength of 500 psi; production and intermediate casing shall be new or reconditioned pipe that has been previously pressure-tested to 2000 psi.[138]

4. Oklahoma

The State of Oklahoma began regulating the production of oil and gas in 1914 through the Oklahoma Corporation Commission.[139] In 1915, the Oklahoma Legislature passed the Oil and Gas Conservation Act, expanding the role of the Commission to include the protection of the rights of all parties entitled to share in the benefits of oil and gas production.[140] In addition to the protection of correlative rights, today's Corporation Commission is also responsible for ensuring environmental protection in oil and gas operations.[141] To achieve adequate protection of the natural environment while encouraging development of oil and gas, the state of Oklahoma has enacted regulations affecting the drilling and completion of oil and natural gas wells. Oklahoma requires that surface casing be run and cemented from the bottom to the top of the casing with a minimum setting depth, which is the greater of either ninety feet below the surface or fifty feet below the base of treatable water.[142] The state further requires that an operator shall run and cement the surface casing string before drilling the well more than 250 feet below the base of the treatable water[143], and the surface casing has to be steel casing.[144] When the casing has been run and cemented, the operator shall pressure-test the installed casing for thirty minutes at a minimum pressure which is the lesser of the surface gauge

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[138] *Id.*
[139] Oklahoma Corporation Commission History, http://www.occ.state.ok.us/Divisions/COMM/commission-history.htm (last visited Dec. 14, 2009).
[140] *Id.*
[141] *Id.*
[142] OKLA. ADMIN. CODE § 165:10-3-4(c)(1) (2009).
[143] *Id.* § 165:10-3-4(c)(5).
[144] *Id.* § 165:10-3-4(c)(7)(D).

pressure equal in psi to 0.2 of the length of the casing in feet or 1500 psig to ensure the integrity of the casing and cement.[145]

5. Pennsylvania

Pennsylvania holds a special place in the history of the oil and gas industry. It was in Titusville, Pennsylvania that Edwin L. Drake discovered "rock oil" in 1859.[146] Today, Pennsylvania remains important to the domestic oil and gas industry, but not for its rock oil. Instead, Pennsylvania is important because it holds a vast amount of natural gas locked in the state's portion of the Marcellus shale.

Pennsylvania's Department of Environmental Protection established the Bureau of Oil and Gas Management to oversee statewide oil and gas conservation and environmental programs designed to facilitate the safe exploration, development and recovery of Pennsylvania's oil and gas reservoirs in a manner that will protect Pennsylvania's natural resources and the environment.[147] To help meet these goals, Pennsylvania has enacted regulations aimed at achieving the complementary goals of effective production and environmental protection. When drilling a well, the operator shall install casing that can withstand the effects of pressure, tension, and prevent the burst and collapse of the hole during the installation of the casing, cementing and subsequent drilling and producing operations.[148] The operator shall equip the casing string with appropriate equipment to center the casing through the hole in fresh groundwater zones.[149] When cementing the casing in place, the operator shall use cement

[145] *Id.* § 165:10-3-4(g).
[146] DANIEL YERGIN, THE PRIZE 27 (1990).
[147] Pa. Dep't of Envtl. Prot., Bureau of Oil & Gas Management Home Page, http://www.dep.state.pa.us/dep/deputate/minres/OILGAS/oilgas.htm (last visited Dec. 14, 2009).
[148] 25 PA. CODE § 78.84(a) (1989).
[149] *Id.* § 78.84(b).

that will resist degradation by the chemical and physical conditions in the well.[150] The goal of the casing and cementing operations is to accomplish effective well control at all times, prevent the migration of gas or other fluids into sources of fresh groundwater, prevent pollution or diminution of fresh groundwater, and to prevent the migration of gas or other fluids into coal seams.[151] Further, when an operator is drilling through fresh groundwater zones, the operator shall do so with diligence and as efficiently as practical in order to minimize drilling disturbance and commingling of groundwater zones.[152]

6. Texas

The State of Texas has been regulating the oil and gas industry through its Railroad Commission of Texas since the 1910s.[153] The Railroad Commission considers the protection of the environment and the preservation of individual property rights to be its two main objectives.[154] To that end, the State of Texas has passed regulations aimed and protecting groundwater in the development of oil and natural gas. Texas requires that upon the abandonment of an oil or gas well, the surface casing is to be left in place in order to protect freshwater sands.[155] Further, whenever hydrocarbons are encountered in any well drilled for oil or gas, the fluid shall be confined to its original stratum until it can be produced and utilized without waste.[156] Each stratum shall be protected from water infiltration and wells may be drilled deeper after encountering the hydrocarbon fluids if drilling is done with diligence and any encountered fluids are confined to their original

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[150] *Id.* § 78.85(a).
[151] *Id.* § 78.81(a).
[152] *Id.* § 78.81(b).
[153] STATE OIL AND NATURAL GAS REGULATIONS, *supra* note 100, at 13.
[154] R.R. Comm'n of Tex., History of the Railroad Commission, http://www.rrc.state.tx.us/about/history/index.php (last visited Dec. 14, 2009).
[155] 16 TEX. ADMIN. CODE § 3.15 (1986).
[156] 16 TEX. ADMIN. CODE § 3.7 (1976).

strata and protected upon the completion of the well.[157] Texas also requires the use of steel casing that is cemented and hydrostatically tested.[158]

7. Wyoming

In July of 2009, the state of Wyoming enacted drilling and production rules specifically for hydraulic fracturing.[159] The rules require that information be given to the Supervisor of the Oil and Gas Conservation Commission pertaining to a drilling plan, including any other information that may be required by the Supervisor.[160] Operators have been informed by Oil and Gas Conservation Commission staff to include detailed information regarding hydraulic fracturing in the application for the permit to drill.[161] The rules also set out that approval of the Supervisor must be sought prior to the fracturing of a well.[162] The notice must include the depth of the perforations, the source of water and/or the trade name of fluids used in fracturing, the types of proppants used, and the estimated pump pressure.[163] Upon the completion of the fracturing, a report on the operation shall be filed with the Supervisor of the Oil and Gas Conservation Commissioner.[164] The report shall be a detailed accounting of the work performed.[165] Further, all surface casing shall be run to reach a depth below all known or reasonably estimated utilizable domestic fresh water supplies.[166]

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[157] *Id.*
[158] 16 TEX. ADMIN. CODE § 3.13 (2003).
[159] State of Wyoming Hydraulic Fracturing Rules and Regulations, http://wogcc.state.wy.us/State_of_Wyoming_Hydraulic_Fracturing_Rules_and_Regulations.pdf (last visited Apr. 23, 2010).
[160] WYO. ADMIN. CODE ch. 3, § 14.2(d) (2009).
[161] State of Wyoming Hydraulic Fracturing Rules and Regulations, *supra* note 159.
[162] WYO. ADMIN. CODE ch. 3, § 14.2(d).
[163] *Id.*
[164] *Id.*
[165] *Id.*
[166] *Id.*

D. One-Size-Fits-All Does Not Work

In addition to the technical considerations of well drilling as discussed earlier, states play an essential role in the development of oil and natural gas. The FRAC Act is a "one-size fits all" approach to regulation. That approach does not take into consideration the geologic and economic realities facing the states that have been regulating oil and gas production for three-quarters of a century. Because of the states' knowledge of their respective geologies and their history of effective regulation, the states have a greater breadth and depth of knowledge on oil and gas regulation than the federal government. "Regulating oil and gas exploration and production activities, including hydraulic fracturing, has traditionally been the province of the states, which have had effective programs in place for decades."[167] Therefore, the regulation of the oil and gas industry generally and hydraulic fracturing specifically is best left in the hands of states and not the U.S. E.P.A.

IV. Conclusion

On January 26, 2009, President Obama stated: "It will be the policy of my administration to reverse our dependence on foreign oil, while building a new energy economy that will create millions of jobs."[168] Unconventional gas and oil represent a giant leap forward in the goal of reducing U.S. dependence on foreign oil. Unfortunately for the President's policy goals, there are efforts being made in the Congress that would undermine his call for energy independence. The FRAC Act, through its misguided and unnecessary proposed regulations of hydraulic fracturing under the Safe Drinking Water

[167] Interstate Oil & Gas Comm'n, Groundwork, http://groundwork.iogcc.org/ (quoting Victor G. Carrillo, Chairman, R.R. Comm'n of Tex.) (last visited Mar. 1, 2010).
[168] President Barack H. Obama, Remarks on Energy (Jan. 26, 2009), *available at* http://www.gpoaccess.gov/presdocs/2009/DCPD200900019.pdf.

Act, will only increase our dependence on foreign sources of oil and natural gas. The oil and natural gas trapped in shales, and other unconventional sources of natural gas would remain stranded because of the added regulatory hurdles that the FRAC Act seeks to impose on the domestic oil and gas production.

Natural gas in particular is a necessary component of a "clean energy future," if the U.S. is to reduce its greenhouse gas emissions through reduced use of coal to generate electricity. Without access to the vast amounts of natural gas currently locked in shale and other unconventional gas formations, a "clean energy future" would remain a pipe dream. Progress cannot be made without access to the oil and natural gas indigenous to the United States. Hydraulic fracturing is one key to accessing the nation's energy potential and moving the nation forward on the path toward a clean energy future.