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Fracking Secrets: The Limitations of Trade Secret Protection in Hydraulic Fracturing

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Fracking Secrets: The Limitations of Trade Secret Protection in Hydraulic Fracturing

ABSTRACT

Hydraulic fracturing is a drilling technique used to increase resource production in which specially blended liquid mixtures are pumped into oil and gas wells under high pressure causing underground rock formations to crack and open up. Oil and gas companies have traditionally protected the composition of these proprietary liquids through state-level trade secret laws. Opponents of hydraulic fracturing have argued for federal regulation of the process and claimed that trade secret protection is simply a way for oil and gas companies to withhold the identity of the chemicals used. Oil and gas companies are at risk of losing the economic protection of their proprietary mixtures due to the lack of uniformity of state-level trade secret laws and increased disclosure requirements in certain areas. This Note recommends that full-blown federal regulation is not necessary to protect these interests and would be overly burdensome on the industry, and that oil and gas companies should use patents to protect their investments in hydraulic fracturing liquids.

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Hydraulic fracturing, also known as “fracking,” is a drilling process that stimulates wells to maximize resource extraction.¹ Since its introduction in the 1970s, fracking has become a widely used technique for accessing unconventional sources of oil and gas, and has consequently produced a surge in domestic natural-resource production in the United States.² Other recent technological developments in the field of drilling, such as horizontal drilling,³ have—in combination with fracking—made many shale formations that were formerly either physically or economically impossible to access now available for exploitation.⁴ Protecting fracking and other proprietary drilling technologies pose important questions about trade secret protections.

Many proponents, especially those within the oil and gas industry, praise the enormous potential economic benefits of widespread fracking.⁵ A 2002 US geological survey estimated that the Marcellus Shale Formation, located in eastern North America and extending throughout much of the Appalachian Basin, held 30.7

1. Travis Van Ort, *Hydraulic Fracturing Additives: A Solution to the Tension Between Trade Secret Protection and Demands for Public Disclosure*, 4 KY. J. EQUINE, AGRIC. & NAT. RESOURCES L. 439, 439 (2012).

2. See John D. Furlow & John R. Hays, Jr., *Disclosure with Protection of Trade Secrets Comes to the Hydraulic Fracturing Revolution*, 7 TEX. J. OIL GAS & ENERGY L. 289, 296 (2011–2012); Van Ort, *supra* note 1, at 440.

3. *Horizontal Drilling*, SCHLUMBERGER OILFIELD GLOSSARY, <http://www.glossary.oilfield.slb.com/en/Terms.aspx?LookIn=term%20name&filter=horizontal> (last visited Feb. 9, 2013) (“Because a horizontal well typically penetrates a greater length of the reservoir, it can offer significant production improvement over a vertical well”).

4. Furlow & Hays, *supra* note 2, at 296.

5. Reid Porter, *Hydraulic Fracturing Legislation Approval Ensures Better Energy Future for North Carolina*, AM. PETROLEUM INST. (July 3, 2012), <http://www.api.org/news-and-media/news/newsitems/2012/jul-2012/hydraulic-fracturing-legislation-approval-ensures-better-energy-future-north-carolina.aspx>.

trillion cubic feet (tcf) of natural gas,⁶ while more recent studies expanding on this survey have determined that the number could be as high as 500 tcf of natural gas—an extremely lucrative ceiling for natural gas development.⁷ One state’s valuation of this resource puts natural gas at \$3.93 billion per tcf, which makes the potential value of the Marcellus Shale Formation approximately \$120 billion.⁸

Despite the opportunities for economic growth, however, there has been widespread public outcry because of fracking’s potentially harmful environmental and health impacts.⁹ This outcry focuses on the chemical additives that are injected into the well during the fracking process.¹⁰ These chemicals help open, and keep open, fissures in the shale formations, allowing for a greater volume of oil and gas flow.¹¹ The main controversy over this practice is concern that the fracking fluids will escape into underground aquifers and contaminate drinking-water supplies.¹² Despite this concern, state-level trade secret laws have enabled oil and gas companies to avoid disclosing the chemical formulas of their fracking fluids to the public.¹³

This Note examines the tensions between the use of trade secrets in the development of domestic energy resources and the need for public disclosure of fracking additives that potentially present environmental and health risks. Part I discusses the circumstances driving the pursuit of unconventional sources of oil and gas and the potential economic benefits of accessing these reserves. Part II discusses the merits of public disclosure and evaluates the virtues of state-level trade secret law used to protect the chemical composition of fracking fluids. Part III examines the existing regulatory framework governing fracking and the holes within that framework. Part IV analyzes the problem of using state-level trade secrets to protect these chemical formulas within the current state and federal regulatory frameworks. Finally, Part V concludes that Congress does not need to

6. TIMOTHY CONSIDINE, *THE ECONOMIC IMPACTS OF THE MARCELLUS SHALE: IMPLICATIONS FOR NEW YORK, PENNSYLVANIA, AND WEST VIRGINIA*, AMERICAN PETROLEUM INSTITUTE (2010), available at <http://www.api.org/~media/Files/Policy/Exploration/API-Economic-Impacts-Marcellus-Shale.pdf>.

7. See *Get the Facts on Hydraulic Fracturing*, INDEP. OIL & GAS ASS’N, <http://www.iogany.org/files/HydraulicFracturingQ&A.pdf> (last visited Jan. 12, 2013).

8. See *Estimated Marcellus Shale Natural Gas Value: Garret County, Maryland*, MD. DEP’T ENV’T, http://www.mde.state.md.us/programs/Land/mining/marcellus/Documents/Economic_Value_Estimates.pdf (last visited Sept. 20, 2013).

9. See Furlow & Hays, *supra* note 2, at 291–92.

10. See *id.* at 314 (noting that the “most contentious” issue is whether the fluids that are injected into the wells could migrate into drinking water supplies and present health risks).

11. *Id.* at 294–95.

12. *Id.* at 314.

13. See *id.* at 306.

eliminate the disclosure and permitting exceptions for oil and gas companies in existing federal environmental regulations and suggests that oil and gas companies use patents to protect their proprietary fracking fluids and embrace the rapidly developing state-level fracking disclosure laws.

I. THE NATURAL GAS BOOM IN NORTH AMERICA

A. Economic Impact

Historically viewed as a cost-prohibitive natural resource due to the lack of an efficient means of production, shale gas has come to the forefront of the domestic-energy revolution with the advancement of drilling technologies over the past few decades.¹⁴ Increasing demand and lagging supply have made the exploration and production of domestic shale gas economically viable.¹⁵ The predominant method for accessing natural gas in “shale plays”¹⁶ is the process known as “slickwater” fracking.¹⁷ In 1997, Mitchell Energy successfully used the slickwater process paired with horizontal drilling, and for the first time, a company proved that “commercial exploitation of US shale gas plays was possible.”¹⁸

Natural gas has become vital to the US economy, providing roughly one quarter of the nation’s energy.¹⁹ Greater availability of natural gas presents significant potential economic benefits, and because it is a cleaner-burning fossil fuel, it will likely garner greater support from the clean-energy community than traditional fossil fuels

14. See HALLIBURTON, U.S. SHALE GAS: AN UNCONVENTIONAL RESOURCE. UNCONVENTIONAL CHALLENGES. 1 (2008), available at http://www.halliburton.com/public/solutions/contents/shale/related_docs/H063771.pdf.

15. See *id.*

16. “Shale play” is an industry term used to describe an area located in a shale formation in which hydrocarbon accumulations or prospects exist. *Play Definition*, SCHLUMBERGER OILFIELD GLOSSARY, <http://www.glossary.oilfield.slb.com/en/Terms/p/play.aspx> (last visited Feb. 8, 2013) (“[S]hale gas plays in North America include the Barnett, Eagle Ford, Fayetteville, Haynesville, Marcellus, and Woodford, among many others. Outside North America, shale gas potential is being pursued in many parts of Europe, Africa, Asia, and South America.”).

17. See Furlow & Hays, *supra* note 2, at 294–95 (“In contrast to traditional low-volume fracturing methods used for decades to stimulate conventional oil and gas fields, the slickwater fracturing method involves pumping a high volume of chemically treated frac fluid under high pressure down a wellbore.”).

18. Furlow & Hays, *supra* note 2, at 296.

19. Hannah Wiseman, *Trade Secrets, Disclosure, and Dissent in a Fracturing Energy Revolution*, 111 COLUM. L. REV. SIDEBAR 1, 3 (2011).

like coal.²⁰ The prospect of inexpensive natural gas provides positive outlooks for job creation and economic growth for many states that are still feeling the effects of a poor national economy.²¹ For example, shale gas developments created a consumer surplus from natural gas in excess of \$100 billion to the US economy in 2010.²² Using current consumption rates, a conservative estimate for the amount of natural gas that is available for domestic production projects the natural gas supply will last ninety years, while more optimistic estimates more than double that figure.²³ Therefore, if the United States maintains its shale gas production, then there will be enormous long-term economic benefits.²⁴ These long-term economic benefits include adding jobs to struggling economies, increasing federal and state revenues, and increasing household incomes.²⁵

Fracking's development and widespread adoption has drastically changed the US energy landscape.²⁶ Increasingly efficient fracking processes and new methods of drilling drove the natural gas boom.²⁷ The increase in domestic energy production led the US Energy Information Administration to predict that by 2035 the net import share of total US energy consumption will be down to only 13 percent, compared to 29 percent in 2007.²⁸

B. The Fracking Process

The potentially enormous economic benefit from shale gas is possible because of the unique process of hydraulic fracturing. Drilling companies inject large volumes of water mixed with chemical

20. See Clifford Krauss & Eric Lipton, *The Energy Rush: After the Boom in Natural Gas*, N.Y. TIMES (Oct. 20, 2012), www.nytimes.com/2012/10/21/business/energy-environment/in-a-natural-gas-glut-big-winners-and-losers.html.

21. See *id.*

22. *Id.*

23. See Furlow & Hays, *supra* note 2, at 297–98.

24. See Jim Efstathiou, Jr., *Fracking Boom Seen Raising Household Incomes by \$1,200*, BLOOMBERG (Sept. 3, 2013, 11:01 PM), <http://www.bloomberg.com/news/2013-09-04/fracking-boom-seen-raising-household-incomes-by-1-200.html>.

25. See *id.* (stating that in 2012, the energy boom supported 2.1 million jobs, added nearly \$75 million in federal and state revenues, and increased household incomes by more than \$1,200).

26. See Furlow & Hays, *supra* note 2, at 297–300.

27. See *id.*, at 296 (discussing Mitchell Energy's use of the modern hydraulic fracturing in the late 1990's); Wiseman, *supra* note 19, at 3 (discussing the perfection of the hydraulic fracturing method in the 1990s by oil and gas companies).

28. Furlow & Hays, *supra* note 2, at 298 (citing U.S. ENERGY INFO. ADMIN., *AEO2012* EARLY RELEASE REVIEW 8 (2012), available at <http://www.eia.gov/forecasts/aeo/er/pdf/0383er%282012%29.pdf>).

additives to increase the well's pressure and stimulate production.²⁹ This injection fractures tightly formed shale rock formations around the wells, which increases the volume of natural gas and oil that is able to flow into the well.³⁰ This fracking fluid is composed of three constituent parts: the base fluid, the proppant, and the chemical additives.³¹ The base fluid is usually water and composes 90 percent of the total volume of fluid used during the process.³² The proppant makes up the majority of the remaining 10 percent.³³ Sand is a common proppant used to hold open the fissures that result from fracturing shale formations, though some companies use specially engineered particles.³⁴ Finally, the smallest but most controversial constituent components of the fluid's volume are the chemical additives.³⁵

Each chemical additive serves a specific purpose in making the wells more efficient.³⁶ The purposes of these additives vary widely, but they are primarily used to increase productivity and ensure the stability of the well.³⁷ Many of the hundreds of chemical additives used during the fracking process pose health risks to humans.³⁸ These chemicals range from harmless additives to substances that, in sufficient doses, could result in serious human-health effects.³⁹ Naturally, then, the public has an interest in knowing more about the chemicals used in fracking operations.⁴⁰

29. Wiseman, *supra* note 19, at 3.

30. *Id.* at 294.

31. Furlow & Hays, *supra* note 2, at 302.

32. *Id.*

33. *Id.* at 303 (stating that it is typically 9.5 percent of the total volume).

34. *Id.* (noting proppants in the form of "specially engineered proppants, such as resin-coated sand or high-strength ceramic materials, are also in wide use").

35. *Id.*

36. *See id.* (stating that chemical additives serve a "specific engineered purpose").

37. *See id.* at 303–04.

38. *See id.* at 311.

39. *See* DIV. OF MINERAL RES., N.Y. STATE DEPT OF ENVTL. CONSERVATION, DRAFT SUPPLEMENTAL GENERIC ENVIRONMENTAL IMPACT STATEMENT ON THE OIL, GAS AND SOLUTION MINING REGULATORY PROGRAM 5-61 to 5-65, 5-101 to 5-110 (2009), *available at* <ftp://ftp.dec.state.ny.us/dmn/download/OGdSGEISFull.pdf>. For example, the additive category of glycols, when ingested, "adversely affect[s] the kidney[s] and [reproductive systems] in laboratory animals," *id.* at 5-62, while the category amides causes damage to the central nervous system if ingested in sufficient quantities, *id.* at 5-63.

40. *See* Mike Soraghan, *Hydraulic Fracturing: Two-thirds of Frack Disclosures Omit 'Secrets,'* ENERGYWIRE (Sept. 26, 2012), <http://www.eenews.net/public/energywire/2012/09/26/1> ("It's outrageous that citizens are not getting all the information they need about fracking near their homes . . .").

II. TRADE SECRET PROTECTION

Oil and gas companies claim trade secret protection for at least one chemical in 65 percent of their regulatory disclosures.⁴¹ The Texas Administrative Code, as an example of state trade secret protection, defines a trade secret as “[a]ny formula, pattern, device, or compilation of information that is used in a person’s business, and that gives the person an opportunity to obtain an advantage over competitors who do not know or use it.”⁴² The Texas Railroad Commission, the state organization that regulates oil and gas drilling, considers six factors in granting a claim for trade secret protection:

- (A) the extent to which the information is known outside of the company;
- (B) the extent to which it is known by employees and others involved in the company’s business;
- (C) the extent of measures taken by the company to guard the secrecy of the information;
- (D) the value of the information to the company and its competitors;
- (E) the amount of effort or money expended by the company in developing the information; and
- (F) the ease or difficulty with which the information could be properly acquired or duplicated by others.⁴³

From a policy perspective, a drilling company puts millions of dollars into the research and development of fracking fluids to maximize production.⁴⁴ Forcing disclosure of those “secret recipes” would produce a windfall for other companies and cost the disclosing company much of the economic advantage that its research produced.⁴⁵ Allowing others to reap the benefits of a competitor’s efforts diminishes the original innovator’s incentive to invest in the development of these formulations.⁴⁶ Oil and gas companies claim that public disclosure would allow their competitors to use reverse engineering to determine the composition of fracking fluids and free ride off of their efforts, depriving companies of the economic

41. *See id.*

42. 16 TEX. ADMIN. CODE § 3.29(a)(26) (2013).

43. *Id.* § 3.29(a)(26)(A)–(F).

44. Soraghan, *supra* note 40; Furlow & Hays, *supra* note 2, at 306 (“Energy companies have invested millions of dollars into research to develop formulas specifically tailored to different formations and even fields within formations.”).

45. *See* Soraghan, *supra* note 40; Furlow & Hays, *supra* note 2, at 306.

46. *See* Furlow & Hays, *supra* note 2, at 306, 319.

benefits that flow from developing proprietary technologies.⁴⁷ Since disclosure would create a free-rider problem, drilling companies argue that this will also hinder future efforts to develop new fracking fluids—if there is no profit to be made, there is no reason to invest.⁴⁸ Additionally, because different geological formations require different mixtures and processes to make wells produce more efficiently, these secret recipes take time and money to perfect and therefore have substantial economic value.⁴⁹

Industry representatives maintain that trade secret protections still allow for sufficient public disclosure.⁵⁰ The Vice President of the Petroleum Association of Wyoming noted that even if a company's chemical additives gain trade secret status, the company must still send general identifying information about the chemicals to state regulators.⁵¹ The Association contends there is no need for public disclosure because state regulators can sufficiently protect the public from fracking's potential health risks.⁵² Therefore, the disclosure of only general identifying information properly informs state regulators and puts them on notice of potential risks, but does not go so far as to destroy the competitive advantage of investing in proprietary fracking fluids.⁵³ However, "[t]he secrecy exercised to protect [drilling companies'] proprietary mixtures has fed increased speculation and suspicion about what the fluids contain."⁵⁴

A senior staff attorney at Earthworks, an environmental advocacy group,⁵⁵ stated that companies seeking trade secret protection have sent "generic filings" that stated little economic justification for applying trade secret protection.⁵⁶ Keeping with Texas as an example, well operators must submit a Chemical Disclosure Registry Form (the Form) that discloses "each additive

47. *Id.* at 333 (competitors use reverse engineering by taking the chemicals that were disclosed and developing their own manner and method to produce, mix, and prepare a similarly efficient blend).

48. Soraghan, *supra* note 40.

49. Furlow & Hays, *supra* note 2, at 306.

50. See Jennifer A. Dlouhy, *Environmentalists Challenge Trade Secret Protections for Hydraulic Fracturing*, FUELFIX (Mar. 26, 2012, 7:29 PM), <http://fuelfix.com/blog/2012/03/26/environmentalists-challenge-trade-secret-protections-for-hydraulic-fracturing>.

51. *Id.*

52. *See id.*

53. Furlow & Hays, *supra* note 2, at 306 (stating that companies do "not expect that information to be generally known or readily available to [its] competitors, customers, or even most of its employees. Rather, the information is likely protected and known only to a limited number of [its] employees").

54. *Id.*

55. See About Earthworks, EARTHWORKS, <http://www.earthworkSACTION.org/about> (last visited Sept. 20, 2013).

56. Dlouhy, *supra* note 50.

used in the hydraulic fracturing treatments and the trade name, supplier, and a brief description of the intended use or function of each additive in the hydraulic fracturing treatment(s).⁵⁷ To receive trade secret protection on its chemical components, the drilling company must indicate on the Form that it is making a trade secret claim.⁵⁸ If a chemical ingredient, the concentration of a chemical ingredient, or both are determined to be entitled to trade secret protection, then the company can withhold this information.⁵⁹ After an oil and gas company claims trade secret protection on the Form, which is given a presumption of validity, an eligible person may challenge the claim of entitlement to trade secret protection for any chemical ingredient in the hydraulic fracturing treatment.⁶⁰ When the Office of the Attorney General of Texas receives a challenge, it determines whether the information is entitled to trade secret protection.⁶¹

Texas regulations require disclosure of the chemical family associated with the ingredient and disclosure of the properties and effects of the chemical.⁶² This gives regulators a general idea of the potential health problems that could arise if there were a chemical spill or underground water contamination.⁶³ However, general identifying information may not be sufficient to determine what safeguards must be put in place or what responses should be taken in the event of a spill.⁶⁴ Opponents of fracking argue that states should not grant trade secret protection and should prioritize public safety over the economic interests of drilling companies by requiring extensive disclosure.⁶⁵

Currently, no nationally adopted method exists for public disclosure of the chemicals associated with fracking and their potential health impacts.⁶⁶ Existing environmental statutes that require disclosure demonstrate the importance of public awareness of

57. See 16 Tex. Admin. Code §3.29(c)(2)(A)(ix) (establishing time constraints for completion forms).

58. See *id.* § 3.29(c)(2)(C).

59. See *id.* § 3.29(e)(2).

60. See *id.* § 3.29(f).

61. See *id.* § 3.29(f)(1), (5).

62. See Furlow & Hays, *supra* note 2, at 334.

63. See *id.*

64. See *supra* notes 37–41 and accompanying text (discussing the variety of health effects caused by the chemical additives).

65. See Soraghan, *supra* note 40 (stating that a report compiled by the Natural Resources Defense Council criticized the ease with which many state officials are granting trade secret protection and the lack of comprehensive review).

66. See Rebecca Jo Reser & David T. Ritter, *State and Federal Legislation and Regulation of Hydraulic Fracturing*, in 57 THE ADVOCATE: STATE BAR LITIGATION SECTION REPORT 31, 33 (2011).

industrial activity that could cause environmental and human-health damage.⁶⁷ Critics of fracking argue that protecting proprietary information undermines drilling companies' claims that they are being upfront about the nature of the chemicals and the potential health risks that fracking poses.⁶⁸

A. *The Need for Public Disclosure*

In the early stages of environmental regulation, Congress used "private attorney general provisions" to bolster enforcement, which enabled citizens to sue for certain environmental violations.⁶⁹ Additionally, the Administrative Procedure Act requires federal agencies to make use of notice-and-comment rulemaking to thoroughly involve the citizenry in regulation development.⁷⁰ Private attorney general provisions and notice-and-comment rulemaking reflect a desire for an informed citizenry that is able to influence industrial activity.⁷¹ Therefore, an initial step to ensure a balance between industry and public interests is to create a level informational playing field.⁷² The use of trade secret protection for the chemical makeup of fracking fluids only engenders more public distrust and hinders local governments' collective ability to effectively and democratically balance economic growth with public health and well-being.⁷³

When drilling companies claim trade secret protection for their fracking formulas, they deprive the public of information essential to evaluating potential health risks and determining what steps are necessary to ensure their safety.⁷⁴ Moreover, some experts believe that expanding the public disclosure of chemical additives will incentivize oil and gas companies to develop safer alternatives.⁷⁵ It is important to understand which specific chemicals are used in fracking fluids because they vary widely depending on the specific well and shale formation.⁷⁶ For example, most of the general information that drilling companies provide describe chemicals in general terms, such

67. See Wiseman, *supra* note 19, at 1–2.

68. See Soraghan, *supra* note 40.

69. Wiseman, *supra* note 19, at 1 & n.1 (internal quotation marks omitted) (stating that the Clean Water Act allows "any citizen" to bring a claim for certain violations).

70. See Administrative Procedure Act, 5 U.S.C. § 553 (2012).

71. See Wiseman, *supra* note 19, at 1.

72. See *id.* at 12–13 (concluding that without sufficient information the public's effort to participate in policy dialogue will be pointless).

73. See *id.* at 8–9 (discussing the shortcomings of current disclosure requirements of drilling companies and the desire for more information by the public).

74. See *id.*, at 10.

75. See, e.g., *id.*

76. Furlow & Hays, *supra* note 2, at 306; Wiseman, *supra* note 19, at 11.

as “friction reducer” or “clay stabilizer.”⁷⁷ These generic disclosures suffer from multiple infirmities.⁷⁸ First, they make the chemicals seem deceptively benign to the layperson.⁷⁹ Second, the disclosures overgeneralize, as one type of friction reducer likely has different chemical properties from the next, and thus they potentially pose very different public-health risks.⁸⁰

Furthermore, there is evidence that the lists of chemical additives that drilling companies disclose are not always accurate or complete.⁸¹ For example, after a fracking fluid spill occurred at a well site in Pennsylvania, the environmental investigation determined that the chemicals on site did not match the chemicals that the company had disclosed.⁸² This suggests additional steps are still needed to ensure the accurate disclosure of chemical additives.⁸³ The Environmental Protection Agency (EPA) took an initial step in September 2010 when it sent a letter to nine natural-gas companies asking them to disclose the chemical constituents of their fracking fluids.⁸⁴ The EPA’s goal was to complete a comprehensive study on the potential public-health and drinking-water safety implications of fracking.⁸⁵ But information regarding the likelihood of groundwater contamination will not be available from the study, since the EPA has made participation in the study voluntary, and no gas company has yet been willing to partner with the EPA to test groundwater around a well site.⁸⁶ With federal agencies and the public pushing drilling companies toward disclosure, companies may choose to voluntarily disclose information—and to do so on their own terms.⁸⁷

77. See Wiseman, *supra* note 19, at 10–11.

78. See *id.* at 10–11.

79. See *id.* at 4 (noting that such chemicals range from benign household substances to dangerous doses of highly concentrated chemicals).

80. See DRAFT SUPPLEMENTAL GENERIC ENVIRONMENTAL IMPACT STATEMENT ON THE OIL, GAS AND SOLUTION MINING REGULATORY PROGRAM, *supra* note 39, at 5-61 to 5-65 (discussing the various health impacts of fracking fluid additives).

81. See Wiseman, *supra* note 19, at 11.

82. *Id.*

83. See *id.* (arguing that the public needs to know the identification of individual chemical components).

84. Press Release, Env’tl. Prot. Agency, EPA Formally Requests Information from Companies About Chemicals Used in Natural Gas Extraction (Sept. 9, 2010), *available at* <http://yosemite.epa.gov/opa/admpress.nsf/d0cf6618525a9efb85257359003fb69d/ec57125b66353b7e85257799005c1d64!opendocument>.

85. Wiseman, *supra* note 19, at 2.

86. See Kevin Begos, *EPA’s Fracking Study May Dodge Water Contamination Frequency Issue*, HUFFINGTON POST (Jan. 6, 2013, 11:19 AM), http://www.huffingtonpost.com/2013/01/06/epa-fracking-study-water-contamination_n_2420786.html.

87. See David Blackmon, *Harvard’s Frack Disclosure Study Earns an ‘F’*, FORBES (Apr. 25, 2013, 2:23 PM), <http://www.forbes.com/sites/davidblackmon/2013/04/25/harvards-fracfocus->

B. FracFocus

Drilling companies have attempted to calm the public outcry surrounding the use of chemical additives in the fracking process through a voluntary disclosure system called FracFocus.⁸⁸ The Ground Water Protection Council and Interstate Oil and Gas Compact Commission manages this national online fracking registry.⁸⁹ The purpose of the website is to provide factual information about fracking operations and allow operators to voluntarily disclose information regarding their activities in certain regions.⁹⁰ This is a positive first step in response to the public outcry, but so far it has not been substantial enough to meet the demands of fracking's opponents.⁹¹ One main concern with FracFocus's voluntary disclosure process is that it still allows companies to withhold proprietary information.⁹² For example, Hess Corporation fracked a well on December 16, 2012 in Belmont County, Ohio; the information disclosure form lists "mixture of Surfactants" as a trade secret and does not disclose the chemical composition of the additive.⁹³ FracFocus will not achieve widespread acceptance until there are greater incentives for companies to volunteer this information or, alternatively, consequences for nondisclosure.⁹⁴ Insufficient voluntary disclosure may lead individuals to turn to public regulation to protect their interests, a system also without much promise.⁹⁵

study-grades-an-f/ (discussing how the study found FracFocus disclosures to still be limited by the drilling companies).

88. See *About Us*, FRACFOCUS, <http://fracfocus.org/welcome> (last visited Feb. 11, 2013).

89. *Id.*

90. See *id.*; Furlow & Hays, *supra* note 2, at 317–18.

91. Van Ort, *supra* note 1, at 456.

92. *Id.*

93. *Find a Well*, FRACFOCUS, <http://www.fracfocusdata.org/DisclosureSearch/MapSearch.aspx> (search "State" for "Ohio"; then search "County" for "Belmont"; then search "Wells in County" for "Capstone Holdings 2H-9"; then search "Operator" for "Hess Corporation") (last visited Feb. 20, 2013).

94. See Van Ort, *supra* note 1, at 456 (discussing how FracFocus will not gain public support until the disclosure regime is backed by the force of law); David Blackmon, *Harvard's Frack Disclosure Study Earns an 'F,'* FORBES (Apr. 25, 2013, 2:23 PM), <http://www.forbes.com/sites/davidblackmon/2013/04/25/harvards-fracfocus-study-grades-an-f/> (discussing how the study found FracFocus to be ineffective disclosure regime).

95. See discussion *infra* Part III.

III. CURRENT REGULATORY FRAMEWORK

The current regulatory framework protecting the public from fracking's potential risks is inadequate.⁹⁶ Currently no federal regulatory program is designed to regulate fracking operations.⁹⁷ Two main federal statutes are in place to protect drinking water: the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA).⁹⁸ Additionally, a few other environmental regulations could potentially cover fracking operations, at least in part.⁹⁹

A. Safe Drinking Water Act

The SDWA vests primary enforcement responsibilities in the states, consistent with their traditional roles regulating land use and water management.¹⁰⁰ The portion of the SDWA relevant to fracking prohibits the “underground injection” of fluids without a permit.¹⁰¹ The EPA establishes minimum requirements for state “Underground Injection Control” (UIC) programs, which include “inspection, monitoring, recordkeeping, and reporting requirements.”¹⁰² “[T]he state[s] [have] the primary enforcement responsibility for granting UIC permits and ensuring that underground injection of fluids does not endanger underground sources of drinking water”¹⁰³ In 2005, the Energy Policy Act amended the SDWA definition of “underground injection” to *exclude* underground injection of fluids or propping agents, other than diesel fuels, in fracking activities related to oil, gas, or geothermal-production activities.¹⁰⁴ The change essentially exempts fracking companies from compliance with UIC programs because their fracking fluids no longer require a permit.¹⁰⁵

The only potential source of regulatory authority remaining in the SDWA lies with the EPA's emergency powers.¹⁰⁶ Section 1431 of the SDWA gives the EPA the power to issue emergency orders if a

96. See generally Reser & Ritter, *supra* note 66 (discussing various federal regulations that contain exemptions for hydraulic fracturing).

97. *Id.*

98. See Safe Drinking Water Act, Pub. L. No. 93-523, 88 Stat. 1660 (1974) (codified as amended at 42 U.S.C. § 300f *et seq.* (2012)); Clean Water Act of 1977, 33 U.S.C. §§ 1251-1387 (1977), amended by 33 U.S.C. §§ 1281-1285, 1311-1387 (1987).

99. See *infra* Parts IIIA-E.

100. Furlow & Hays, *supra* note 2, at 343.

101. Reser & Ritter, *supra* note 66, at 31-32.

102. *Id.* at 31.

103. *Id.* (citing 42 U.S.C. § 300h(b)(1)(B) (2012)).

104. 42 U.S.C. §300h(d)(1)(B)(ii).

105. See Reser & Ritter, *supra* note 66, at 31.

106. *Id.* at 35.

contaminant in an underground source of drinking water may present an “imminent and substantial endangerment to the health of persons.”¹⁰⁷ Even though this power could prove beneficial in certain circumstances (e.g., after identifying the contamination of a drinking-water source), its use is limited and does not protect water supplies prior to the observance of negative human-health effects.¹⁰⁸ Because of the potentially catastrophic effects of undetected water contamination, the SDWA does not have the regulatory force necessary to ensure proper protection.¹⁰⁹

B. Clean Water Act

“The [CWA] prohibits the discharge of pollutants [from] ‘point sources’ into the ‘waters of the United States’ unless the discharge complies with [certain] requirements.”¹¹⁰ Much like the SDWA, the CWA recognizes the practical restrictions on enforcing regulations by setting up a permitting program.¹¹¹ Under the CWA, the EPA regulates the indirect disposal of fracking wastewater into sewer systems flowing through Publicly Owned Treatment Works (POTW), which discharge directly into the waters of the United States.¹¹² Also like the SDWA, the CWA delegates primary authority to the states to implement and monitor the permitting programs.¹¹³ The main problem with using the CWA to regulate fracking operations is the restriction on the EPA’s jurisdictional authority to regulating only the “waters of the United States.”¹¹⁴ This means the actual discharge of fracking wastewater is the only action potentially subject to regulation.¹¹⁵ The primary concern, however, is the contamination from the wells themselves—whether because of faulty construction or negligent operation—when companies inject the chemicals underground and not necessarily the disposal of the wastewater.¹¹⁶

107. See 42 U.S.C. § 300i(a) (2012).

108. See Reser & Ritter, *supra* note 66, at 31–32 (stating that the fracking exclusion to UIC programs has increased public scrutiny and resulted in federal legislation proposals in the House and Senate).

109. See *id.* (discussing the exemptions in the SDWA that do not require companies engaged in hydraulic fracturing operations to obtain permits).

110. *Id.* at 32 (footnote omitted).

111. See *id.*

112. *Id.*

113. See *id.*

114. The definition of “waters of the U.S.” is at 40 C.F.R. 122.2 (2013).

115. See Reser & Ritter, *supra* note 66, at 32 (stating that the CWA covers the disposal of “flow-back” water or wastewater and not the actual underground injection of the fluid).

116. See Van Ort, *supra* note 1, at 441–44 (arguing that the public has a legitimate cause for fear with regard to underground water contamination).

Therefore, the CWA is unlikely to have any significant impact because its focus is not on the underground aquifers that provide drinking water.¹¹⁷

C. Waste Management Statutes

The Resource Recovery and Conservation Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) indirectly affect fracking operations, since they deal only with waste management.¹¹⁸ RCRA is a typical command-and-control statute that regulates “hazardous waste” from cradle to grave.¹¹⁹ RCRA gives the EPA the authority to regulate hazardous waste according to stringent standards and procedures.¹²⁰ However, under the identification of waste provision of RCRA, the waste generated from oil and gas operations is not subject to federal hazardous waste regulation.¹²¹ Therefore, even though the EPA can regulate many of the chemicals that are used during the fracking process if they were used in other contexts, they are exempt when in the context of fracking operations.¹²²

CERCLA establishes a strict-liability scheme for financing large-scale environmental clean-ups.¹²³ CERCLA grants authority to the EPA and state governments to expend funds to cleanup contaminated sites and creates a “Superfund” to finance the expenses of the government’s remedial actions.¹²⁴ Most importantly, CERCLA allows the government or other private parties to sue potentially responsible parties and hold them strictly liable for the release or threatened release of a hazardous substance.¹²⁵ Unlike RCRA, this statute does not *prevent* pollution, but instead provides a comprehensive scheme for the clean-up of historical environmental

117. Cf. Reser & Ritter, *supra* note 66, at 31–32 (stating that the CWA regulates the discharge of pollutants into “waters of the United States” and not that of underground injection).

118. See *id.* at 32–33 (RCRA regulates the handling of hazardous waste and CERCLA regulates environmental cleanup matters).

119. See Resource Conservation and Recovery Act of 1976, 42 U.S.C. §§ 6921–6934 (2012); *Hazardous Waste Regulations*, U.S. ENVTL. PROTECTION AGENCY (last updated Dec. 10, 2012), www.epa.gov/epawaste/laws-regs/regs-haz.htm.

120. See Reser & Ritter, *supra* note 66, at 32.

121. *Id.* (citing 42 U.S.C. § 6921(b)(2)(A) (2012)).

122. See *id.*

123. See *id.*

124. See *id.* at 32–33.

125. Parties falling within one of the categories of “covered persons” defined in section 107(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 § 107(a)(1)–(4), 42 U.S.C. § 9607(a)(1)–(4) (2000), are typically referred to as “potentially responsible parties.”

contamination.¹²⁶ Even though the oil and gas industry receives another partial exemption because of the definition of “hazardous substance”—it excludes “petroleum, including crude oil . . . , natural gas, [and] natural gas liquids”—the question of whether CERCLA exempts fracking fluids from clean-up liability is unresolved.¹²⁷ Moreover, the EPA has used its authority under section 104(e) of CERCLA to investigate water possibly contaminated with fracking fluids.¹²⁸ Even though CERCLA may help pay for property damage or cover liability from health-related damages, it does not assist in the prevention of damage or water contamination.¹²⁹

D. National Environmental Policy Act

The National Environmental Policy Act (NEPA), established in 1969, is an information-based regulatory program that requires government organizations to “consider” the environmental impacts of federal agency actions through environmental impact statements (EIS).¹³⁰ The Energy Policy Act of 2005, however, created a “rebuttable presumption” that oil and gas operations would likely fall under a “categorical exclusion” to the normal procedural requirements.¹³¹ This presumption shifted the burden from the government showing that oil and gas activities would not harm the environment to the public showing negative environmental effects.¹³² But information asymmetries ensure that the public does not have the information required to rebut this presumption.¹³³ This burden shift requires the public to demonstrate “extraordinary circumstances warranting a full NEPA review.”¹³⁴ If the chemical components used

126. Cf. Reser & Ritter, *supra* note 66, at 32.

127. See *id.* at 33 (noting that “hazardous substance” in CERC is much larger in scope than “hazardous waste” in RCRA).

128. See *id.*

129. See *id.*

130. See National Environmental Policy Act of 1969, 42 U.S.C. § 4332 (2012); see also Daniel R. Cahoy, Joel Gehman & Zhen Lei, *Fracking Patents: The Emergence of Patents as Information Containment Tools in Shale Drilling*, 19 MICH. TELECOMM. & TECH. L. REV. 279, 313 (2013) (noting that NEPA “established a national framework for protecting the environment by requiring all branches of the government to properly consider any actions which may significantly affect the environment”).

131. Cahoy, Gehman & Lei, *supra* note 130, at 313 (citing Energy Policy Act of 2005, Pub. L. No. 109-58, § 390, 119 Stat. 594 (2005)).

132. *Id.*

133. See David B. Spence, *Federalism, Regulatory Lags, and the Political Economy of Energy Production*, 161 U. PA. L. REV. 431, 507 (2012) (suggesting that lower resources and information asymmetries can impede the ability to monitor or regulate companies).

134. Cahoy, Gehman & Lei, *supra* note 130, at 313 (internal quotations omitted).

in fracking fluids remain secret, it is unlikely the public will be able to meet this high evidentiary burden.¹³⁵

E. Fracturing Responsibility and Awareness of Chemicals Act

Because of the lobbying efforts of many environmental groups, Congress first introduced the Fracturing Responsibility and Awareness of Chemicals Act (FRAC Act) in 2009 and re-introduced it in 2011. If enacted, it would create two methods of regulating fracking operations not currently in place.¹³⁶ First, the Act would repeal the exception applied to fracking operators with regard to states' UIC programs so that it would include "the underground injection of fluids or propping agents pursuant to [fracking] operations related to oil, gas, or geothermal production activities."¹³⁷ Consequently, the oil and gas developers planning to use fracking techniques would have to obtain a UIC permit prior to pursuing any operations, by demonstrating that their fracking operations would not endanger drinking-water supplies.¹³⁸ Second, the FRAC Act would require the well operator to disclose the specific chemical constituents of its fracking fluid, which then would be available to the public.¹³⁹ The FRAC Act would require a company to disclose a "list of chemicals intended for use, . . . including chemical constituents of mixtures, . . . material data sheets when available, and the anticipated volume of each chemical" prior to conducting any fracking operations.¹⁴⁰ The Act would continue to respect trade secret protection over proprietary information, except for emergency situations in which they are required to disclose to the government agency, though not the public, upon request.¹⁴¹

135. RENEE LEWIS KOSNIK, EARTHWORKS & OIL & GAS ACCOUNTABILITY PROJECT, THE OIL AND GAS INDUSTRY'S EXCLUSIONS AND EXEMPTIONS TO MAJOR ENVIRONMENTAL STATUTES 16 (2007) ("Section 390 has significantly hampered the opportunity for public involvement in major oil and gas activities in contravention to the original intentions of NEPA by allowing federal agencies to permit oil and gas operations more easily without having to consider or address the concerns of nearby landowners."), available at http://www.shalegas.energy.gov/resources/060211_earthworks_petroileumexemptions.pdf.

136. Fracturing Responsibility and Awareness of Chemicals (FRAC) Act of 2011, H.R. 1084, 112th Cong. (2011); see Reser, *supra* note 66, at 33.

137. Reser & Ritter, *supra* note 66, at 33 (internal citations omitted).

138. Fracturing Responsibility and Awareness Act (FRAC Act), H. R. 1084, 112th Cong. § 2(b) (2011); FRAC Act, § 587, 112th Cong. § 2(b) (2011).

139. *Id.*

140. *Id.*

141. *Id.*

IV. HOLES IN STATE-LEVEL TRADE SECRET AND FEDERAL PROTECTION

A. *Filling in the Gaps*

State-level trade secret protection promotes economic development at the cost of public involvement and safety, while a federal regulatory program would promote public safety at the price of stifling economic development.¹⁴² The best legal solution would strike a balance between the economic interests of oil and gas companies, who receive the concentrated benefit of natural-resource extraction, and the public, which bears the majority of the risk.¹⁴³ This situation exemplifies a classic collective action problem, common among environmental issues, where public information is low and negative externalities are high.¹⁴⁴ The “precautionary principle” presents one approach to determining how to achieve the proper balance.¹⁴⁵ This approach has been influential in legal systems all over the world, and it can be a particularly useful reference point when dealing with environmental concerns and developing technologies.¹⁴⁶

The precautionary principle’s essential premise is that the economic burden of protective legislation should be placed on those entities that create potential risks to the public.¹⁴⁷ It requires regulation of activities, even if no actual risk has yet been realized—adopting a “better-safe-than-sorry” mentality.¹⁴⁸ Many commentators have argued for approaches to fracking that embody the precautionary principle.¹⁴⁹ The precautionary principle encourages stronger regulations, and those who argue for these solutions propose a large federal regulatory program that places heavy burdens on oil and gas companies, despite the fact the EPA has not yet made any determinations regarding the risks of fracking operations.¹⁵⁰ Critics of

142. See discussion *supra* Parts II, III.

143. See generally Robert V. Percival, *Environmental Legislation and the Problem of Collective Action*, 9 DUKE ENVTL. L. & POL’Y F. 9, 25 (1998) (discussing the collective action difficulties with regard to environmental legislation).

144. See *id.*

145. See Cass R. Sunstein, *Beyond the Precautionary Principle*, 151 U. PA. L. REV. 1003, 1003 (2003).

146. See *id.* at 1003, 1007 (stating how there are “echoes” of the precautionary principle in American law).

147. See *id.* at 1003–04 (stating that the precautionary principle advocates for no action to be taken until the activity in question has been unambiguously proven to be safe).

148. *Id.*

149. See Van Ort, *supra* note 1, at 453 (“The wisest way to regulate disclosure is to have the federal government, specifically the EPA, promulgate the rules . . .”).

150. See Van Ort, *supra* note 1, at 453–55 (discussing the aspects of a federal regulatory program).

the precautionary principle observe that it may deprive entire municipalities and many of their citizens from significant “opportunity benefits.”¹⁵¹ The shortcomings of the precautionary principle show that the potential risks of fracking do not warrant full-blown federal regulation; rather, there must be room for the public to receive these opportunity benefits.¹⁵² With regard to fracking, some of these opportunity benefits include adding jobs to struggling economies and increasing state revenues and household incomes.¹⁵³

B. Shortcomings of Trade Secret Protection

State-level trade secret protection is one of the primary protections for drilling-fluid technology, but it is detrimental to public involvement and a relatively inefficient protector of proprietary information.¹⁵⁴ Using trade secret law to protect the chemical mixtures used in the fracking process is beneficial only to the extent that the unique aspects of the mixture’s composition remain confidential.¹⁵⁵ Hundreds of thousands of dollars are put into developing an individual mixture,¹⁵⁶ and companies argue that without some form of protection, the companies will lose money on their investments, thus decreasing incentives to improve the fracking process.¹⁵⁷ On its face, this makes sense; without a high expected return, companies have no reason to make that initial investment.¹⁵⁸ The level of trade secret protection varies across the states, weakening the protective effect of trade secrets.¹⁵⁹

Companies cannot receive the full benefit of trade secret protection in a state with the most industry-friendly laws because trade secret law in the least industry-friendly state will ultimately

151. Cass R. Sunstein, *Throwing Precaution to the Wind: Why the ‘Safe’ Choice Can Be Dangerous*, BOSTON.COM (July 13, 2008), http://www.boston.com/bostonglobe/ideas/articles/2008/07/13/throwing_precaution_to_the_wind.

152. See *id.* (“But there are always risks on both sides of a decision; inaction can bring danger, but so can action. Precautions, in other words, themselves create risks—and hence the principle bans what it simultaneously requires.”).

153. See Efstathiou, *supra* note 24.

154. See Van Ort, *supra* note 1, at 440 (stating that relying on state standards could destroy companies’ trade secret protection if any one state requires too much information to be disclosed).

155. *Id.* at 452.

156. See Soraghan, *supra* note 40 (“Halliburton Co. said it spent ‘tens of millions of dollars’ across five years researching new fracturing fluids. . . . ChemEOR . . . spent more than \$400,000 on [one fracking composition].”).

157. See Furlow & Hays, *supra* note 2, at 333.

158. See *id.*

159. See Van Ort, *supra* note 1, at 452.

determine the national level of protection.¹⁶⁰ Large shale formations span several states, and if public pressure in one of these states is successful in forcing the hand of state legislatures to require extensive disclosure, it will destroy the claim for trade secret protection in every state where the drilling companies are using these chemical mixtures.¹⁶¹ Therefore, once the trade secret becomes public knowledge in one state, it stops being a secret, and the drilling companies can no longer resist disclosure.¹⁶²

Trade secret law has further shortcomings regarding the potential negative environmental and health impacts of fracking.¹⁶³ The obvious concern about affording trade secret protection to these chemical formulas is that it prevents the public from knowing what chemicals are being injected into the ground and potentially reaching its drinking water.¹⁶⁴ When fracking has the potential to affect such a large number of people, it seems unwise to give the industry the complete benefit of the doubt.¹⁶⁵ A better balance of interests is necessary.

C. Shortcomings of a Federal Regulatory Program

Analyzing the FRAC Act is the best way to demonstrate the shortcomings of a federal regulatory program for fracking operations.¹⁶⁶ This proposed federal regulation would impose unnecessarily burdensome restrictions on drilling companies, and the drilling companies have quickly voiced their opposition to the regulation.¹⁶⁷ For instance, the American Petroleum Institute claims that the regulation will increase production costs by over \$100,000 per

160. *Id.*

161. RESTATEMENT (THIRD) OF UNFAIR COMPETITION § 39 cmt. f. (1995) ("Information that is generally known or readily ascertainable through proper means . . . by others to whom it has potential economic value is not protectable as a trade secret.").

162. See *supra* text accompanying note 39.

163. See Mark Jaffe, *Drillers Claim "Trade Secrets" When They Don't Reveal Chemicals in Fracking Fluid*, DENVER POST (Dec. 4, 2011, 1:00 AM), http://www.denverpost.com/ci_19461782 (discussing the impacts of not knowing what is in fracking fluids).

164. See Van Ort, *supra* note 1, at 439.

165. Dan Vergano, *Natural Gas Gold Rush: Is Your State Next?*, USA TODAY (July 2, 2012), <http://usatoday30.usatoday.com/news/nation/story/2012-05-29/fracking-environment-gas/55845708/1> (stating that in 2010 the U.S. had 510,000 natural gas wells and at least 20 states have shale gas wells).

166. See *supra* text accompanying notes 73–78.

167. See Abrahm Lustgarten, *FRAC Act—Congress Introduces Twin Bills to Control Drilling and Protect Drinking Water*, PROPUBLICA (June 9, 2009, 11:31 AM), <http://www.propublica.org/article/frac-act-congress-introduces-bills-to-control-drilling-609>.

well, which costs can already run at approximately \$8 million in certain parts of the United States.¹⁶⁸

One implication of regulating fracking operations under the SDWA is that it would open up these operations to the citizen-suit provisions under section 1449 of the SDWA.¹⁶⁹ The FRAC Act would require the disclosure of chemical components in fracking fluids, but the “Confidential Business Information” exception restricts the disclosure of proprietary information.¹⁷⁰ Recent regulatory developments in shale-heavy states, where effective, further support the argument against adopting a national regulatory response.¹⁷¹

Another problem with having a federal regulatory program for fracking operations is the administrative burden it would place on the EPA and the excessive cost to drilling companies.¹⁷² Myriad wells are drilled every year throughout the country, and documenting and monitoring each of these wells would be an enormous undertaking.¹⁷³ Furthermore, the diverse land-use and water laws throughout the many states hosting fracking operations would make it extremely difficult for one agency, especially one as underfunded as the EPA, to gather and manage all the information necessary for a successful program.¹⁷⁴ Even without a federal regulatory scheme, however, many states are beginning to limit the use of trade secret-style

168. *Id.*; Jared Anderson, *How Much Does a Shale Gas Well Cost? 'It Depends'*, CNBC (Aug. 8, 2013, 8:08 AM), <http://www.cnbc.com/id/100946625> (stating that wells drilled in the Haynesville Shale with a 4,000 foot lateral and a 10,500 foot vertical can cost \$8 million).

169. MARY TIEMANN & ADAM VANN, CONG. RESEARCH SERV., R41760, HYDRAULIC FRACTURING AND SAFE DRINKING WATER ACT REGULATORY ISSUES 26 (2013).

170. SCHOOL OF INTERNATIONAL AND PUBLIC AFFAIRS, COLUMBIA UNIVERSITY, THE FRAC ACT: THE FRACTURING RESPONSIBILITY AND AWARENESS OF CHEMICALS ACT OF 2011, at 13 (2011), available at <http://mpaenvironment.ei.columbia.edu/sitefiles/file/Summer%2011%20reports/The%20FRAC%20Act.pdf>; see also Furlow & Hays, *supra* note 2, at 317 (discussing the implications of the FRAC Act).

171. See Cahoy, Gehman & Lei, *supra* note 130, at 314 (“Within the past two years, the states of Wyoming, Arkansas, Louisiana, Texas, Colorado, North Dakota and Pennsylvania all have adopted new regulations related to hydraulic fracturing.”).

172. See Spence, *supra* note 133, at 507 (suggesting that federal government actors are less equipped to balance the costs and benefits of fracking than local government actors); Lustgarten, *supra* note 167.

173. See Furlow & Hays, *supra* note 2, at 324 (“Between January 2008 and December 2011, the RRC [Railroad Commission of Texas] issued 3,956 permits for drilling in the Eagle Ford Shale.”).

174. See Reser & Ritter, *supra* note 66, at 33–35 (discussing fracking exemptions from Texas water law); Lauren Morello et al., *Republicans Gut EPA Climate Rules, Slash Deeply Into Climate Research, Aid and Technology Programs*, N.Y. TIMES (Feb. 14, 2011), <http://www.nytimes.com/cwire/2011/02/14/14climatewire-republicans-gut-epa-climate-rules-slash-deep-87716.html>.

exceptions as a source of withholding chemical formulas.¹⁷⁵ Therefore, following developments in state regulatory requirements, patent protection could provide a superior long-term option for drilling companies to benefit from their research and development efforts.¹⁷⁶

Although some drilling companies use patents to protect their chemical formulas, this occurs less frequently than trade secret protection due to the time and cost to obtain a patent.¹⁷⁷ While the process of using patents in lieu of trade secret protection will be more time consuming and expensive for the companies, patents will preserve the economic benefits of these chemical mixtures and still allow for public disclosure.¹⁷⁸ Because the details of patents are publicly accessible, the public will be better able to voice its concerns by educating itself about the contents of fracking fluids and its potential risks.¹⁷⁹ Considering the lessons of the precautionary principle, a slightly more time- and capital-intensive process is well worth the private costs to provide substantial public benefits.¹⁸⁰

V. ACHIEVING THE PROPER BALANCE WITH PATENT PROTECTION

The economic protection of patents will encourage private investment in fracking fluids, and the patent system will provide a nationally uniform system of protection.¹⁸¹ Patents will also give companies peace of mind in that their research and development efforts will be profitable for as long as the patent is valid, without ignoring the interests of the public.¹⁸² Patents cover “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.”¹⁸³ Patents must also be novel and nonobvious.¹⁸⁴ A chemical additive used for the fracking

175. See Furlow & Hays, *supra* note 2, at 320–43 (discussing the details of Texas HB 3328 and its potential impact on hydraulic fracturing disclosure requirements within the state of Texas).

176. See 35 U.S.C. § 154 (a)(2) (2012) (stating patents maintain their exclusivity protection for twenty years).

177. Cahoy, Gehman & Lei, *supra* note 130, at 290 (noting that the number of patents filed for hydraulic fracturing operations has increased in recent years, but is still much lower than the number of trade secret requests).

178. See Wiseman, *supra* note 19, at 12.

179. See Cahoy, Gehman & Lei, *supra* note 130, at 293–94 (stating that “patents are published, and always have been”).

180. See discussion *infra* Part V.

181. See 35 U.S.C. § 261 (2012) (stating that the exclusive right to a patent can be conveyed to any part or all of the United States).

182. See Cahoy, Gehman & Lei, *supra* note 130, at 295–96 (stating that the purpose of a patent “is to forestall competition and enable monopoly profit taking” for a certain period).

183. 35 U.S.C. § 101 (2012).

184. 35 U.S.C. §§ 102, 103 (2012).

process would likely qualify as a composition of matter, and as long as the company developed a mixture that was a new combination of chemical components and sufficiently different from existing formulas, it would satisfy the novel and nonobvious requirements.¹⁸⁵ The patent system serves as a motivation to innovate as well as a means to widely disseminate information.¹⁸⁶ It accomplishes two main goals in the context of fracking: It provides public disclosure of the chemical constituents in fracking fluids, and it protects incentives for companies to continue to develop safer and more efficient chemical solutions.¹⁸⁷

A. Disclosure

Sunlight is truly the best disinfectant,¹⁸⁸ and using patents to protect fracking fluids will allow the public to access information on the chemicals involved.¹⁸⁹ Citizens will know more about the risks, and this knowledge will allow them to pressure local governments to passing appropriate regulations to safeguard public health and well-being.¹⁹⁰ Greater public visibility will engender trust, as industry favoritism is less likely when there is no informational asymmetry between the public and the companies.¹⁹¹ A system that discloses sufficient information would enable those most qualified and most interested to assess the costs and benefits of fracking, rather than putting in place a national regulatory program that would be less responsive to the specific economic and health concerns of smaller political subdivisions.¹⁹² Using patents to protect fracking fluids

185. See *Gibson v. Mattox*, Civ. A. No. 05-0601-WS-C, 2006 WL 3421244, *1 (S.D. Ala. Nov. 27, 2006) (discussing inventorship dispute over patent for chemical formula used to treat “dry gas pipe or processed fluid pipe lines that are susceptible to the build up of iron sulfide deposits, by complexing iron sulfide found in these pipe lines” and not disputing patentable nature of such formula).

186. See *Frequently Asked Questions*, WORLD INTEL. PROP. ORG., http://www.wipo.int/patentscope/en/patents_faq.html (last visited Sept. 22, 2013).

187. See discussion *infra* Parts V.A, V.B.

188. Louis Grumet, *Sunlight is the Best Disinfectant*, CPA JOURNAL (Dec. 2003), available at <http://www.nysscpa.org/cpajournal/2003/1203/nv/nv2.htm> (discussing the famous quote by former U.S. Supreme Court Justice Louis Brandeis referring to the benefits of openness and transparency).

189. See Cahoy, Gehman & Lei, *supra* note 130, at 293–94 (stating that “patents are published, and always have been”).

190. See Percival, *supra* note 143, at 14 (discussing the results of public pressure in enacting federal environmental laws).

191. See *id.* at 25 (discussing the limitation of special interest deals as a result of openness in the legislative process).

192. The Safe Drinking Water Act uses state-level entities to control the permitting program. See, e.g., 42 U.S.C. § 300h(b)(1)(B) (2012) (stating that the company applying for an underground injection permit must satisfy the state officials).

places the burden of making proper disclosures on the party receiving the economic benefits rather than an underfunded environmental agency.¹⁹³

Once a company files a patent and the composition of the additives becomes public information, public concern will likely build against those fracking fluids that pose the greatest risk.¹⁹⁴ This public pressure will likely influence local and state governments to regulate the more dangerous fracking fluids with a heavy hand and influence drilling companies to focus on developing safer fluids.¹⁹⁵ When a company discloses the chemical constituents, it removes the public's informational disadvantage and allows the public to focus on producing protective legislation, if necessary.¹⁹⁶

Those oil and gas companies who choose to patent early will be well positioned to protect their economic investments with their patents, contrasted with those companies who would no longer have the benefit of trade secret protection.¹⁹⁷ Further, it is possible that companies that patented their fracking fluids could bring infringement claims against their competitors, assuming the competitor had not been using this trade secret formula for a sufficient period prior to the patent being filed.¹⁹⁸ This should incentivize drilling companies to pursue patenting their chemical formulas as early as possible, which will further promote disclosure.¹⁹⁹ This two-step process makes the use of patents more attractive to both the public and to drilling companies.²⁰⁰

193. See Cahoy, Gehman & Lei, *supra* note 130, at 292–93 (stating that in exchange for the economic benefit of a patent the patentee must disclose the information).

194. Knowing the identities of the chemicals and their human-health effects will combine with the fears of aquifer and groundwater pollution to create a larger outcry. See Carrie Tait & Shawn McCarthy, *Fear of Fracking: How Public Concerns Put an Energy Renaissance at Risk*, GLOBE AND MAIL, <http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/fear-of-fracking-how-public-concerns-put-an-energy-renaissance-at-risk/article535092> (last updated Sept. 6, 2012).

195. CERCLA, for example, was enacted in response to the fear created from previous environmental disasters, such as the Love Canal in New York and the Valley of the Drums in Kentucky. See Laurencia Fasoyiro, *In Consideration of "Disposal" of Waste in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Texas Solid Waste Disposal Act (TSWDA)*, 12 TEX. TECH. ADMIN. L.J. 303, 303–04 (2011).

196. See Wiseman, *supra* note 19, at 4 (suggesting that public access to information can bring about "quality participation").

197. See *supra* Part IV.B.

198. See 35 U.S.C. § 273 (2012) (allowing for a defense to a patent infringement claim if commercial use of the patented material was one year prior to the filing of the patent and was done in good faith).

199. The earlier a company can patent their fracking fluid, the less likely another entity will be able to make a section 273 commercial prior-use-defense claim. See *id.*

200. See *supra* notes 181–187 and accompanying text (stating that patents protect economic investment for the companies and also disclose sufficient information for the public).

B. Development of Better Fracking Fluids

Patents provide incentives for companies to continue to innovate and develop new fracking fluids.²⁰¹ For a fracking fluid to receive patent protection it must be “novel,”²⁰² so drilling companies will need to develop new and unique chemical compositions in their fracking fluids in order to receive this protection.²⁰³ Novelty is not required for a trade secret.²⁰⁴ Therefore, multiple drilling companies may use nearly identical fracking fluids under a trade secret regime.²⁰⁵ If novelty is not required, then a likely result is that drilling companies have no incentive to develop their own unique fracking formulas; their motivation would be to simply find out what the competition is using and profit from others’ efforts.²⁰⁶ The incentive to innovate provided by patents is threatened when there is no guarantee of stopping infringement, because the economic advantage of the patent is partially determined by the exclusivity of the fracking fluid’s use.²⁰⁷ At first glance, state-level trade secret protection, which is cheaper and more expeditious than patenting fluids, seems like the better route for drilling companies.²⁰⁸ However, inconsistent disclosure requirements from state to state threaten the stability of trade secret protection and could have catastrophic effects on a company which is forced to disclose a proprietary formula in one state.²⁰⁹

An additional advantage of patenting fracking fluids, and further motivation for companies to develop safe and effective solutions, is companies’ collective ability to profit from selling licenses to use their fracking formulas.²¹⁰ State legislatures are requiring increasing levels of disclosure (and therefore increasing the likelihood

201. See Cahoy, Gehman & Lei, *supra* note 130, at 282.

202. *General Information Concerning Patents: Novelty And Non-Obviousness, Conditions For Obtaining A Patent*, USPTO.GOV, http://www.uspto.gov/patents/resources/general_info_concerning_patents.jsp (last modified Apr. 11, 2012).

203. *Id.* (“If the invention has been described in a printed publication anywhere in the world, or if it was known or used by others in this country before the date that the applicant made his/her invention, a patent cannot be obtained.”).

204. See, e.g., *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 476 (1974) (also noting that there is minimal novelty to trade secrets, because “that which does not possess novelty is usually known”).

205. Wiseman, *supra* note 19, at 7.

206. See *supra* Part V.B.

207. See *supra* text accompanying note 202 (discussing the incentive to patent).

208. See Restatement (Third) of Unfair Competition § 39 (1995).

209. See Van Ort, *supra* note 1, at 452–53 (noting that “[f]ull public disclosure, however, would destroy protection,” and therefore there is no incentive to invest and use trade secrets if they can so easily be destroyed).

210. See Cahoy, Gehman & Lei, *supra* note 130, at 289–90.

of detecting patent infringement), which may provide further incentive to develop more effective fracking fluids.²¹¹ Those companies holding patents could require their competitors to pay for a license to experiment with their fracking fluids.²¹² This makes patents appealing in two distinct ways.²¹³ First, the fact that drilling companies will be able to profit from their unique fracking fluids beyond their wells provides a greater economic incentive to continue rigorously investing in research and development.²¹⁴ Second, the fact that companies will be able to experiment with other companies' fracking fluids, though at a cost, will likely have the effect of creating even more effective and safe solutions.²¹⁵ Further, it is possible that state regulations will favor the safest disclosed fracking fluids, which makes developing safer solutions even wiser.²¹⁶ Drilling companies want the most cost-effective solutions, those that both increase production and decrease potential liability.²¹⁷ Combining the interests of the industry as a whole with those of the state regulators will expedite the progress of safety in fracking.²¹⁸

Two arguments are commonly made against using patents: lack of enforceability and the inability to research the effects of the patented material in real-world situations (i.e., using the disclosed information to conform the use of the chemicals to safe activities).²¹⁹ Once a patent is issued, the chemical formula becomes public,²²⁰ and the economic advantage of a patent extends only as far as compliance and enforceability.²²¹ Therefore, competitor companies could illegally use this published chemical formula immediately after disclosure and

211. See *id.* at 282. *But cf.* Van Ort, *supra* note 1, at 452–55, 453 n.106 (arguing that enforceability concerns decrease the utility of patenting fracking fluids).

212. See, e.g., Cahoy, Gehman & Lei, *supra* note 130, at 289 (noting that in the mid 1900s Stanolind Oil & Gas Company granted Halliburton Oil Well Cementing Company a license to use their original fracking process).

213. See *supra* text accompanying notes 215–18.

214. See Cahoy, Gehman & Lei, *supra* note 130, at 322 (explaining how licenses could provide economic benefit to the patentee, while still allowing them to control the use and dissemination of the information).

215. See *id.* at 295 (discussing the motivations to develop better fracking and drilling techniques).

216. See *id.*

217. See *id.*

218. See *supra* Part V.B.

219. See Van Ort, *supra* note 1, at 446 (“The company that created the formula would have no way of detecting infringement . . .”); see also Cahoy, Gehman & Lei, *supra* note 130, at 282 (“When reproduction or use of the patented invention is necessary to understand how it impacts the rest of the world, patent rights can actually serve as a barrier.”).

220. See Cahoy, Gehman & Lei, *supra* note 130, at 293–94.

221. See Van Ort, *supra* note 1, at 446 (arguing that patents are not economically viable due to enforceability concerns).

could put it to use before the original company was finished with the initial well.²²² By decreasing the economic benefits of developing new fluids, drilling companies may have less incentive to invest heavily in research and development.²²³ Furthermore, it seems necessary to presume that other drilling companies will act legally and ethically to gain a competitive advantage by developing new chemical mixtures.²²⁴ Patent infringement would be nearly impossible to detect because companies could not determine whether competitors use their patented formulas.²²⁵ But this enforceability concern has been given too much weight, because developing new fracking fluids still has value, even assuming infringement, and fracking fluids are efficient only on particular geological formations.²²⁶

While patents present certain enforceability concerns that are not present with trade secrets, patents are still preferable for several reasons.²²⁷ First, patenting the chemical mixtures used during fracking does not require competitors to completely comply for the new chemical mixtures to maintain their economic benefit.²²⁸ Generally, patents are only useful if they are not being used in competitors' products;²²⁹ however, even assuming other drilling companies do not comply, these chemical formulas will still provide enormous economic benefits to drilling companies.²³⁰ The purpose of developing different chemical mixtures for the fracking process is to make specific wells more productive;²³¹ therefore, the motivation behind developing more efficient wells does not decrease simply because the chemical formulas provide somewhat less of a competitive advantage.²³² A drilling company will want the most cost-effective well possible, and with the level of investment that goes into resource extraction it is unlikely that a large drilling company will simply stop trying to develop ways to make more money from each well.²³³

222. See *id.*

223. Taking away the economic benefits of patents will alter the incentive structure of the system. See Cahoy, Gehman & Lei, *supra* note 130, at 282 (stating that the patents system and the economic advantages that come with it provide an incentive to innovate).

224. See Van Ort, *supra* note 1, at 446.

225. See *id.*

226. See Furlow & Hays, *supra* note 2, at 306 (stating that energy companies use many different chemical mixtures depending on the geological characteristics of the well).

227. See *infra* text accompanying notes 228–32, 234–41.

228. See *supra* Part I (discussing the economic benefit of developing more efficient wells).

229. See Cahoy, Gehman & Lei, *supra* note 130, at 295–96.

230. See *supra* Part II (discussing the economic benefit of more efficient fracking fluids and wells).

231. See Furlow & Hays, *supra* note 2, at 302–05.

232. See *supra* Part II.

233. See *supra* Part II.

Second, patents will still prove useful in protecting drilling companies' economic interests.²³⁴ The chemical formulas the companies develop depend on the geological characteristics of the particular shale formation,²³⁵ which means that fewer drilling companies will be able to benefit from the research and development efforts of others.²³⁶ A drilling company that develops a particular formula for a particular well does not need to worry about a nationwide free-rider problem where each competitor can make profitable use of their chemical formula on all of its wells.²³⁷ For example, if Company A is performing resource extraction in the Eagle Ford Shale Formation in Texas, it will need to develop a certain mixture of chemical additives and a unique process for that formation, while Company B drilling into the Marcellus Shale Formation in Pennsylvania will need to develop a completely different mixture and method for extraction.²³⁸

Third, once many companies begin disclosing their formulas, it will be easier to require disclosure and monitoring of others. Once the industry has companies willing to disclose, those companies previously unwilling will likely feel pressure to change. This change will make policing patent infringement much easier. In addition, the fact that fracking formulas are specific to certain shale formations will make the monitoring of other companies more manageable and will make it easier for companies to bring patent infringement claims.²³⁹ A drilling company that develops a certain formula need only consider those companies that are operating in similar conditions to ensure there is no patent infringement.²⁴⁰ The fact that drilling companies need only consider a fraction of their competitors' operations will make it easier to discover patent infringements and protect the economic advantage of the fluids.²⁴¹

234. See *supra* text accompanying notes 235–39.

235. See Furlow & Hays, *supra* note 2, at 306 (discussing the unique composition developed by a drilling company).

236. See *id.*

237. See *supra* text accompanying note 238.

238. See OFFICE OF FOSSIL ENERGY & NAT'L ENERGY TECH. LAB., U.S. DEP'T OF ENERGY, MODERN SHALE GAS DEVELOPMENT IN THE UNITED STATES: A PRIMER 62 (2009) [hereinafter MODERN SHALE GAS DEVELOPMENT], available at <http://www.gwpc.org/sites/default/files/Shale%20Gas%20Primer%202009.pdf> (stating that fracking fluids will vary depending on the formation and on the individual well).

239. See *supra* text accompanying note 240.

240. See MODERN SHALE GAS DEVELOPMENT, *supra* note 238, at 61–63 (explaining how the composition of fluids will vary).

241. But cf. Van Ort, *supra* note 1, at 446 (discussing enforceability concerns with patenting fracking fluids).

The short-term and long-term impacts on water and public health resulting from fracking are still uncertain;²⁴² so, it is necessary to balance the public-health concerns against the economic interests of the drilling companies.²⁴³ Trade secrets protect industry while definitely undermining public confidence and potentially threatening public safety.²⁴⁴ Therefore, even though patents may provide less of an absolute competitive advantage for the individual corporations, they result in a more balanced approach that protects the interests of all parties.²⁴⁵

VI. CONCLUSION

The proliferation of fracking as a method of extracting nonconventional oil and gas has come at a time when many regions of the country are in need of economic support. Consequently, many of these regions have been lax in placing regulatory burdens on drilling companies.²⁴⁶ But over the past few years, many states have responded to the public outcry with state-wide legislation that requires larger amounts of disclosure of the materials used in the fracking process.²⁴⁷ Because of the developing nature of the state-level fracking regulations, a federal regulatory regime would be an unnecessary intrusion into the management of traditional state powers of land use and water management.²⁴⁸

Many of the state regulations will focus on disclosure as a means of regulating fracking operations.²⁴⁹ This will substantially lessen the availability of trade secret protection. For this reason, patents will be essential to the preservation of the economic advantages of the research and development of fracking fluids. Patents provide a balanced approach to the fracking revolution,

242. See Cameron Jefferies, *Unconventional Bridges Over Troubled Water - Lessons to be Learned from the Canadian Oil Sands as the United States Moves to Develop the Natural Gas of the Marcellus Shale Play*, 33 ENERGY L.J. 75, 104–05 (2012).

243. See Wiseman, *supra* note 19, at 9–11 (discussing how the lack of information available to the public due to trade secrets prevents the public from fully protecting their interests).

244. See *id.*

245. See *supra* Part V.

246. See Van Ort, *supra* note 1, at 447–51 (discussing the varying levels of enforcement in different states).

247. *Id.* at 440.

248. See Spence, *supra* note 133, at 479, 490 (discussing issues traditionally covered by state regulations).

249. See, e.g., Sharon Bernstein, *California Law to Regulate Fracking Signed by Governor*, REUTERS (Sept. 20, 2013, 8:42 PM), <http://www.reuters.com/article/2013/09/21/us-usa-california-fracking-idUSBRE98K00C20130921> (discussing the recent fracking regulations in California).

allowing both disclosure to the public and economic benefits to drilling companies.

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