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HYDRAULIC FRACTURING AND CHEMICAL DISCLOSURE: WHAT YOU DO NOT KNOW COULD HURT YOU!

*Chris Boling**

In the last five years, the oil and gas industry has dramatically changed due to a process known as hydraulic fracturing. When used in conjunction with horizontal drilling, hydraulic fracturing has made it economically feasible to access vast domestic reserves of natural gas. Recently, hydraulic fracturing has come to the forefront of media and political debate. Environmental groups, investigative journalists, and even filmmakers have engendered public scrutiny of both the negative environmental effects of hydraulic fracturing operations and the perceived deficiencies in regulatory oversight of the practice. One of the most controversial issues surrounding hydraulic fracturing is the extent to which the composition of fluids used in hydraulic fracturing treatments should be disclosed. In the past two years, state legislators and regulators have worked diligently to enact new laws and regulations governing disclosure of hydraulic fracturing fluids in response to this issue. This Note addresses the current controversy surrounding the disclosure of hydraulic fracturing fluids and critiques how some states have responded. Further, this Note proposes a "model" regulation that strikes a balance between environmental concerns and industry needs while incorporating the favorable aspects of current state regulations.

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I. INTRODUCTION

In a time of widespread political and economic instability abroad, reliance on foreign energy must be reexamined. Every year, the United States spends hundreds of billions of dollars on imports of foreign oil.[1] Although the United States is the third largest producer of crude oil, in 2011 forty-five percent of the petroleum used in the United States was imported.[2] Such a reliance on foreign sources of energy not only decreases U.S. energy security but also contributes to the multibillion-dollar trade deficit and diverts much needed investment dollars that could otherwise be used to stimulate the domestic economy.[3] A recent surge in domestic natural gas production has emerged as a possible solution that could help us regain our energy independence.

Over the past three years, the face of domestic production of natural gas has changed significantly. In the summer of 2008, the price of oil was climbing, as was the domestic demand for energy. Amid concerns of a perceived shortage of natural gas in the United States, the price spiked to just over $13 per thousand cubic feet (mcf).[4] Prices subsequently dropped from these record highs and began to stabilize in the summer of 2009,[5] about the same time that the Potential Gas Committee published a report that reflected a thirty-five percent increase in domestic natural gas reserves as a result of increased production from shale formations.[6] A little less than a year following the publication of this report, the U.S. Energy Information Administration (EIA) stated that at the current growth

1. NEELESH NERURKAR, CONG. RESEARCH SERV., R41765, U.S. OIL IMPORTS: CONTEXT AND CONSIDERATIONS 8 (2011).

2. *Energy in Brief: How Dependent Are We on Foreign Oil?*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/energy_in_brief/foreign_oil_dependence.cfm (last updated July 31, 2012).

3. GROUND WATER PROT. COUNCIL & ALL CONSULTING, MODERN SHALE GAS DEVELOPMENT IN THE UNITED STATES: A PRIMER 4 (2009), http://fossil.energy.gov/programs/oilgas/publications/naturalgas_general/Shale_Gas_Primer_2009.pdf.

4. *2008 Natural Gas Historical Prices/Charts*, TRADINGCHARTS.COM, http://futures.tradingcharts.com/historical/NG/2008/0/continuous.html (last visited Nov. 1, 2011).

5. *2009 Natural Gas Historical Prices/Charts*, TRADINGCHARTS.COM, http://futures.tradingcharts.com/historical/NG/2009/0/continuous.html (last visited Mar. 23, 2013)

6. Jad Mouawad, *Estimate Places Natural Gas Reserves 35% Higher*, N.Y. TIMES, June 17, 2009, at B1.

rate of domestic natural gas production, U.S. imports of natural gas would decrease from thirteen percent in 2008 to six percent in 2035,[7] and the United States may even be able to establish itself as a significant energy exporter.[8] In October 2011, the cost of the same mcf of natural gas was approximately $4,[9] and more recently, the price has dropped below $3.[10]

The extraction method energy companies utilize to achieve such domestic feats—hydraulic fracturing—has been at the forefront of media and political debate. Although the legal challenges to the adequacy of laws regulating hydraulic fracturing began in the mid-1990s,[11] the issue really began to draw publicity when the Energy Policy Act of 2005 expressly exempted hydraulic fracturing from regulation under the Safe Drinking Water Act (SDWA).[12] Since then, environmental groups,[13] investigative journalists,[14] and even filmmakers[15] have engendered public scrutiny of both the negative environmental effects of hydraulic fracturing operations and the perceived deficiencies in regulatory oversight of the practice.

In June 2009, legislation was introduced in both the House of Representatives and the Senate (the "FRAC Act") that would regulate hydraulic fracturing under the Safe Drinking Water Act.[16] This bill also, for the first time, recognized the need for a more effective system of disclosing the chemical makeup of the fluids used

7. U.S. ENERGY INFO. ADMIN., DEP'T OF ENERGY, DOE/EIA-0383, ANNUAL ENERGY OUTLOOK 74 (2010), *available at* http://www.eia.gov/oiaf/aeo/pdf/0383%282010%29.pdf.

8. *Id.*

9. *2011 Natural Gas Historical Prices/Charts*, TRADINGCHARTS.COM, http://futures.tradingcharts.com/historical/NG/2011/0/continuous.html (last visited Nov. 1, 2011).

10. *2012 Natural Gas (Globex) Historical Prices/Charts*, TRADINGCHARTS.COM, http://futures.tradingcharts.com/hist_NG_.html (last visited Mar. 1, 2012).

11. *See, e.g.*, Legal Envtl. Assistance Found., Inc. v. U.S. Envtl. Prot. Agency, 118 F.3d 1467 (11th Cir. 1997).

12. Energy Policy Act of 2005, Pub. L. No. 109-58, § 322 (codified at 42 U.S.C. § 300h(d)(1) (2006)).

13. *See, e.g.*, AMY MALL ET AL., DRILLING DOWN: PROTECTING WESTERN COMMUNITIES FROM THE HEALTH AND ENVIRONMENTAL EFFECTS OF OIL AND GAS PRODUCTION (2007), *available at* www.nrdc.org/land/use/down/down.pdf.

14. *See, e.g.*, Abrahm Lustgarten, *Officials in Three States Pin Water Woes on Gas Drilling*, PROPUBLICA (Apr. 26, 2009, 8:00 AM), www.propublica.org/article/officials-in-three-states-pin-water-woes-on-gas-drilling-426.

15. *See, e.g.*, GASLAND (HBO 2010).

16. H.R. 2766, 111th Cong. (2009); S. 1215, 111th Cong. (2009).

in hydraulic fracturing ("Frac Fluid").[17] Since then, Frac Fluid disclosure has developed into one of the central issues surrounding hydraulic fracturing.

The FRAC Act has been fervently opposed by the natural gas industry ("Industry"), which sees federal regulation as overreaching and unnecessary.[18] However, effective regulation of hydraulic fracturing operations, whether at the federal or state level, is essential to ensure public trust and acceptance of the process and to rehabilitate the Industry's somewhat maligned image. Thus, a middle ground must be found to alleviate the pressures facing the industry and reassure an understandably concerned public.

Over the past two years, state legislators and regulators have worked diligently to enact new laws and regulations in response to the Frac Fluid disclosure issue.[19] In September 2010, Wyoming took the first step toward a state-by-state regulatory scheme by passing a hydraulic fracturing disclosure regulation.[20] Since then, states such as Arkansas,[21] Texas,[22] Pennsylvania,[23] Montana,[24] and more recently Colorado[25] have passed their own versions of Frac Fluid disclosure regulations. While these regulations represent a significant step in the right direction, they are not all "created equal," and several have significant shortcomings.

This Note addresses the current controversy surrounding the disclosure of hydraulic fracturing fluids and critiques what certain states have done in response. Further, in order to strike a balance between the environmental groups and the Industry, this Note will propose a "model" regulation that takes all of the favorable aspects of current state regulations into account. Part II provides an overview

17. H.R. 2766, 111th Cong. § 2(b) (2009); S. 1215, 111th Cong § 2(b) (2009).

18. SIERRA CLUB ATLANTIC CHAPTER, HYDRAULIC FRACTURING AND THE FRAC ACT: FREQUENTLY ASKED QUESTIONS 3 (2011), *available at* newyork.sierraclub.org/documents/FRACACT_FACTS_3_11.pdf.

19. Blaine D. Edwards et al., *Hydraulic Fracturing: Protecting Against Legal and Regulatory Risk*, OIL & GAS J., Aug. 1, 2011, at 4.

20. *See* WYO. OIL & GAS CONSERVATION COMM'N, OPERATIONAL RULES ch. 3, § 45 (2010), *available at* http://soswy.state.wy.us/Rules/RULES/7928.pdf.

21. ARK. OIL & GAS COMM'N, GENERAL RULES & REGULATIONS r. B-19 (2011), *available at* http://www.aogc.state.ar.us/OnlineData/Forms/Rules%20and%20Regulations.pdf.

22. TEX. NAT. RES. CODE ANN. § 91.851 (West 2011).

23. 25 PA. CODE § 78.122 (2011).

24. 16 Mont. Admin. Reg. 1687 (Aug. 25, 2011).

25. COLO. CODE REGS. § 404-1:205A (2012).

of hydraulic fracturing, describes the various chemical additives that are being pumped into the ground by the oil and gas industry, and includes a discussion of how the issues surrounding hydraulic fracturing came about.

Part III looks at the various components of an effective Frac Fluid disclosure regime and, in essence, provides a rubric by which to analyze current state efforts to regulate the disclosure of Frac Fluids. It then addresses the strengths and weaknesses of the various disclosure approaches taken by current state regulations.

Part IV then takes the same guidelines for disclosure and formulates a "model" regulation that attempts to find a balance between full disclosure (satisfying environmental groups and the public) and protection of legitimate trade secrets (satisfying the Industry). Finally, Part V concludes that a state-level "model" regulation would not only achieve one of the primary advantages of federal regulation, uniformity, but would also accomplish the extremely difficult feat of satisfying both the Industry and environmental groups.

II. BACKGROUND

A. What Is Hydraulic Fracturing?

Although the public became aware of it only recently, hydraulic fracturing is a process that has been in use for over sixty years.[26] However, only in the past decade has it been used in conjunction with horizontal drilling to release natural gas trapped in shale formations.[27] The combination of these two techniques has led to "higher success and recovery rates, reduced cycle times, lower costs, and shorter times required to bring new shale gas production to market."[28] Just over ten years ago, shale gas made up one percent of America's gas supplies;[29] today, it makes up twenty-five percent.[30]

26. *The Facts About Fracking*, WALL ST. J. (June 25, 2011), http://online.wsj.com/article/SB10001424052702303936704576398462932810874.html.

27. *Id.*

28. *See* U.S. ENERGY INFO. ADMIN., *supra* note 7, at 70, 72.

29. *The Facts About Fracking*, *supra* note 26.

30. *Id.*

Since shale formations have very low permeability,[31] in order to extract natural gas from shale, the Industry must create "artificial permeability" by pumping high volumes of Frac Fluids down the well to induce small cracks in the rock.[32] Hydraulic fracturing allows for the flow of hydrocarbons by either creating new fractures or expanding existing ones.[33] Approximately 98%–99.5% of the fluid that is pumped underground in a hydraulic fracturing treatment consists of water and a "proppant"—usually sand.[34] The "proppant" is added to the hydraulic fracturing fluid to prop open the newly created fractures and facilitate the flow of gas to the well bore.[35] The current debate concerning the composition and disclosure of Frac Fluids focuses on the remaining 0.5%–2% of the fluid.

Various chemical additives, both designed to perform specific functions in the hydraulic fracturing process and tailored to the unique geological attributes of the stimulated shale formation, compose the remaining portion of the Frac Fluid.[36] Depending on the petrophysical[37] and geochemical qualities of the shale formation, between three and twelve additives are used in varying concentrations.[38] Each additive is made up of a variety of chemical constituents that contribute to its specific, engineered purpose.[39] Table 1 provides a list of additives used in a sample Frac Fluid and their functions. For instance, the friction reducer allows the Frac Fluid to be pumped to the target formation at a higher rate and with less pump pressure.[40] While the function of the additives stays the same, the chemical constituents used, and the concentrations in

31. "Permeability" is a measure of a particular rock formation's ability to allow fluids (both liquids and gases) to flow through it. *Schlumberger Oilfield Glossary*, SCHLUMBERGER, http://www.glossary.oilfield.slb.com/Display.cfm?Term=permeability (last visited Jan. 3, 2013).

32. *See* GROUND WATER PROT. COUNCIL & ALL CONSULTING, *supra* note 3, at 56.

33. *See* CHESAPEAKE ENERGY, HAYNESVILLE SHALE HYDRAULIC FRACTURING FACT SHEET (2012), at 1, *available at* http://www.chk.com/media/educational-library/fact-sheets/haynesville/haynesville_hydraulic_fracturing_fact_sheet.pdf (last visited Jan. 3, 2013).

34. *What's in Hydraulic Fracturing Fluid?*, ABOUT NATURAL GAS, http://www.aboutnaturalgas.com/content/technology-and-process/hydraulic-fracturing-fluid (last visited Jan. 3, 2012).

35. CHESAPEAKE ENERGY, *supra* note 33.

36. *See* GROUND WATER PROT. COUNCIL & ALL CONSULTING, *supra* note 3, at 61.

37. "Petrophysical" refers to properties that pertain to fluid behavior within the shale formation (e.g., porosity, permeability, etc). *Schlumberger Oilfield Glossary*, *supra* note 31.

38. *See* GROUND WATER PROT. COUNCIL & ALL CONSULTING, *supra* note 3, at 61.

39. *See id.*

40. *Schlumberger Oilfield Glossary*, *supra* note 31.

which they are used, vary depending on the supplier of the additive and the needs of a given well.[41] This proprietary chemical makeup of each additive is precisely what service companies have been reluctant to divulge.[42]

TABLE 1. ADDITIVES AND THEIR PURPOSE[43]

Additive	Purpose
Acid	Helps dissolve minerals and initiate cracks in the rock
Biocide	Eliminates bacteria in the water that produce corrosive byproducts
Breaker	Breaks down the gelling agent after the proppant is delivered
Clay Stabilizer	Prevents formation clays from swelling
Corrosion Inhibitor	Prevents corrosion of the pipe, primarily from the acid additive
Crosslinker	Maintains fluid viscosity as temperature increases
Gelling Agent	Thickens the water in order to more effectively transport the proppant (sand)
Iron Control	Prevents precipitation of metal
pH Adjusting Agent	Maintains effectiveness of other components (i.e. crosslinkers)
Surfactant	Used to break down the surface tension of the fracturing fluid during flowback

41. *See Chemical Use in Hydraulic Fracturing*, FRACFOCUS, http://www.fracfocus.org/water-protection/drilling-usage (last visited Mar. 15, 2012).

42. *See* Edwards et al., *supra* note 19.

43. *See* CHESAPEAKE ENERGY, *supra* note 33, at 2.

B. How the Issue Came About: The Effects of the LEAF Litigation and the Energy Policy Act of 2005

Before exploring the current legal developments surrounding hydraulic fracturing and Frac Fluid disclosure, it is important to describe how the issue evolved to this point. Long before the onset of widespread public concern, there was a legal debate concerning the adequacy of hydraulic fracturing regulations. In 1994, the Legal Environmental Assistance Foundation (LEAF) was the first group to suggest that hydraulic fracturing was an underregulated practice.[44]

At issue in the LEAF litigation was whether the Environmental Protection Agency's (EPA) approval of Alabama's underground injection control (UIC) regulations was proper.[45] LEAF petitioned the EPA to withdraw its approval since the program did not regulate hydraulic fracturing activities associated with coalbed methane gas production.[46] In 1995, the EPA denied the petition, finding that hydraulic fracturing operations did not fall under the definition of "underground injection" for purposes of the SDWA.[47] The EPA reasoned that "underground injection" referred to injections for which the primary purpose was to place fluids underground for disposal, but not for recovery of oil and gas.[48]

Unsatisfied with the EPA's decision, LEAF brought suit in the U.S. Court of Appeals for the Eleventh Circuit on June 19, 1995, seeking a ruling that the EPA was legally obligated to regulate hydraulic fracturing under the UIC Programs mandated by the SDWA.[49] The court sided with LEAF, concluding that hydraulic fracturing activities did constitute "underground injections" and that the EPA's interpretation could not be "squared with the plain

44. *See* Legal Envtl. Assistance Found., Inc. v. U.S. Envtl. Prot. Agency, 118 F.3d 1467, 1471 (11th Cir. 1997).

45. The UIC Program was established under the Safe Drinking Water Act to regulate all aspects of injection wells that place fluids underground for storage and disposal. *Underground Injection Control Program*, EPA, http://water.epa.gov/type/groundwater/uic/index.cfm (last visited Jan. 3, 2013).

46. *Hydraulic Fracturing: How We Got Here and Where We Are Headed*, 62 Ann. Inst. on Oil & Gas L. (MB) § 8.02(2)(b)(i) (2011).

47. Terry W. Roberson, *The State of Texas Versus the EPA Regulation of Hydraulic Fracturing*, HOUS. LAW., Mar.–Apr. 2011, at 24–25.

48. *Legal Envtl. Assistance Found., Inc.*, 118 F.3d at 1471.

49. *Id.* at 1469, 1472.

language of the statute and thus must fall."[50] While the decision was not binding on the EPA outside of the Eleventh Circuit, it marked the beginning of the debate concerning both the adequacy of hydraulic fracturing regulations and the federal government's role in such regulations.

Following the outcome in the LEAF litigation in 1997, the Ground Water Protection Council,[51] the Interstate Oil and Gas Compact Commission,[52] and the EPA[53] all conducted studies into the threat hydraulic fracturing posed to underground drinking water supplies. Each study reached the same conclusion: hydraulic fracturing had never contaminated drinking water and "poses little or no threat" to underground sources of drinking water.[54]

With the support of these studies, the Industry moved to reverse the Eleventh Circuit's ruling in *LEAF v. EPA*[55] legislatively. With the passage of the Energy Policy Act of 2005 (the "Act"), Congress amended the SDWA to provide that "underground injection" specifically excludes "the underground injection of fluids or propping agents . . . pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities."[56] The Act effectively overruled the *LEAF* decision and codified the interpretation of the SDWA that both the EPA and the Industry had worked under for the previous three decades.[57] However, the

50. *Id.* at 1478.

51. GROUND WATER PROT. COUNCIL, SURVEY RESULTS ON INVENTORY AND EXTENT OF HYDRAULIC FRACTURING IN COALBED METHANE WELLS IN THE PRODUCING STATES (1998), *available at* http://cogcc.state.co.us/RuleMaking/PartyStatus/FinalPrehearingStmts/HESIExhibits.PDF.

52. INTERSTATE OIL & GAS COMPACT COMM'N, STATES EXPERIENCE WITH HYDRAULIC FRACTURING: A SURVEY OF THE INTERSTATE OIL AND GAS COMPACT COMMISSION (2002), *available at* http://www.energyindepth.org/PDF/IOGCC%20Hydraulic%20Fracturing%20Study%2007-2002.pdf.

53. U.S. ENVTL. PROT. AGENCY, EPA 816-R-04-003, EVALUATION OF IMPACTS TO UNDERGROUND SOURCES OF DRINKING WATER BY HYDRAULIC FRACTURING OF COALBED METHANE RESERVOIRS (2004), *available at* http://www.epa.gov/safewater/uic/pdfs/es_6-8-04.pdf.

54. *Id.* at ES-1.

55. Legal Envtl. Assistance Found. V. Envtl. Prot. Agency, 118 F.3d 1467 (11th Cir. 1997).

56. Energy Policy Act of 2005, Pub. L. No. 109-58, § 322, 119 Stat. 594, 694 (codified at 42 U.S.C. § 300h(d)(1) (2006)).

57. *See* DENNIS LATHEM, COALBED METHANE ASS'N OF ALA., LEAF V. EPA: A CHALLENGE TO HYDRAULIC FRACTURING OF COALBED METHANE WELLS IN ALABAMA 2 (2001), *available at* http://www.energyindepth.org/PDF/LEAF_v_EPA.pdf.

amendment drew immediate criticism and became known as the "Halliburton loophole" and the "Cheney exemption" because Vice President Dick Cheney, ex-CEO of Halliburton, played a role in passing the Act.[58]

Since its exemption in 2005, hydraulic fracturing has drawn increased scrutiny from environmental groups, the media, and the public. The process's potential impact on underground sources of drinking water has fueled much of the critique. After passage of the Act, there was a string of claims alleging that chemicals from nearby hydraulically fractured wells contaminated drinking water supplies.[59] Many of these claims, however, have been dismissed as not being related to hydraulic fracturing.[60] The following part summarizes a representative sample of recent state regulations and critiques their effectiveness in providing a robust disclosure regime for Frac Fluids.

III. STATEMENT AND CRITIQUE OF EXISTING STATE LAW

In order to provide some structure to the analysis of current Frac Fluid disclosure regulations, it is helpful to establish a common set of criteria to use in assessing regulatory effectiveness. This Note focuses on three criteria: (1) who is required to disclose information, (2) what information is required to be disclosed, and (3) to whom the information must be disclosed. Looking at current and proposed regulations with these categories in mind will help bring out their individual strengths and weaknesses. This part provides an overview of each category and then critiques regulations currently in effect.[61]

58. *See* Editorial, *The Halliburton Loophole*, N.Y. TIMES, Nov. 3, 2009, at A28.

59. *See* Lustgarten, *supra* note 14.

60. *See generally*, COLO. OIL & GAS INFO. SYS.: COMPLAINT REPORTS (2009), *available at* http://cogcc.state.co.us/cogis/ComplaintReport.asp?doc_num=200207912 (finding that the state sampled the water well and "[s]ample results . . . show naturally occurring biogenic methane gas in well and no impact from O&G operations"); COLO. OIL & GAS INFO. SYS.: COMPLAINT REPORTS (2008), *available at* http://cogcc.state.co.us/cogis/ComplaintReport.asp?doc_num =200190138 (finding that "[d]issolved methane in well water appears to be biogenic in origin . . . [and] [t]here are no indications of oil & gas related impacts to water well").

61. Pennsylvania passed Act 13, effective April 12, 2012, which addresses many of the issues discussed below. *See* 58 PA. CONS. STAT. ANN. § 3222.1 (West 2012).

A. Who Is Required to Disclose?

1. Overview of the Law

The first major point that a disclosure regulation must address is who is required to disclose the Frac Fluid information.[62] This task could fall to one of three different groups: the operator of the well, the service company that conducts the hydraulic fracturing treatment on behalf of the operator, or the supplier of one or more of the additives that are included in the Frac Fluid.[63]

2. Critique of State Law: Wyoming, Arkansas, and Texas

The task of determining the difference between a successful and unsuccessful disclosure regulation begins with defining who carries the obligation to disclose information.[64] While the difference in language may seem minor, its impact on the clarity and effectiveness of the regulation can be substantial.[65] A review of the disclosure regulations passed in Wyoming,[66] Arkansas,[67] and Texas[68] will illustrate this point.

Wyoming's regulation provides that "the Owner or Operator or service company shall provide to the Supervisor . . . the chemical additives, compounds and concentrations or rates proposed to be mixed and injected."[69] On its face, this provision seems to resolve the issue of who must disclose, since it requires that one of the three groups listed provide information regarding the Frac Fluid to the Supervisor, a state official.[70] However, while the provision lists the parties who could have information regarding the Frac Fluid, it fails to impose a clear obligation to disclose on any one group. This

62. BRANDON J. MURRILL & ADAM VANN, CONG. RESEARCH SERV., R42461, HYDRAULIC FRACTURING: CHEMICAL DISCLOSURE REQUIREMENTS 4 (2012), *available at* http://www.fas.org/sgp/crs/misc/R42461.pdf.

63. *Id.*

64. Mark Boling, Exec. Vice President, Sw. Energy Co., Keynote Address at the 8th Annual Shale Gas & Oil Symposium: Hydraulic Fracturing Operations—Meeting the Challenge of Effective Regulation (Jan. 25, 2012) (transcript on file with author).

65. *Id.*

66. WYO. OIL & GAS CONSERVATION COMM'N, *supra* note 20.

67. ARK. OIL & GAS COMM'N, *supra* note 21.

68. TEX. NAT. RES. CODE ANN. § 91.851 (West 2011).

69. WYO. OIL & GAS CONSERVATION COMM'N, *supra* note 20.

70. *Id.*

failure to specifically identify the "responsible party" could lead to a collapse in information and to finger pointing as to whose responsibility it was to report.[71] To ensure that this does not happen, Arkansas and Texas take a different approach.[72]

Arkansas and Texas impose an affirmative obligation on both the service companies and the suppliers to provide the well operator with all of the information the operator needs to fulfill the state Frac Fluid disclosure regulations.[73] In doing so, these regulations also ensure that the information will flow to the appropriate party.

B. What Are They Required to Disclose?

The next major component of any Frac Fluid disclosure regulation deals with *what* the operator, service company, or supplier must disclose. The answer to this question depends on how the regulation addresses three subcomponents of disclosure: the level of disclosure, the concentration information, and the handling of trade secrets.[74]

1. Level of Disclosure

a. Overview of the law

To best explain how regulations differ on "the level of disclosure," the composition of a given hydraulic fracturing fluid must first be understood. As discussed above,[75] a typical Frac Fluid is composed of water, sand, and anywhere from three to twelve chemical additives, each with its own specific purpose.[76] Each additive is further broken down into the chemical constituents that, together, compose the additive.[77] The chemical constituents that compose an additive vary based on the needs of a given well.[78] Virtually all current disclosure regulations require some disclosure of

71. Boling, *supra* note 64.

72. *See* ARK. OIL & GAS COMM'N, *supra* note 21, at r. B-19(1)(4); TEX. NAT. RES. CODE ANN. § 91.851(a)(2 (West 2011).

73. *See* ARK. OIL & GAS COMM'N, *supra* note 21, at r. B-19(1)(4); TEX. NAT. RES. CODE ANN. § 91.851(a)(2) (West 2011).

74. MURRILL & VANN, *supra* note 62, at 6–8.

75. *See supra* Part II.A.

76. *See* GROUND WATER PROT. COUNCIL & ALL CONSULTING, *supra* note 3, at 61.

77. *See id.* at 62.

78. *Id.*

the chemical constituents that make up each additive. The regulations, however, differ in one very significant respect: some require disclosure of only those chemical constituents that are classified as "hazardous" under the Occupational Safety and Health Administration regulations ("OSHA-level disclosure"),[79] while others require full disclosure of all chemical constituents, regardless of whether they are classified as "hazardous."[80]

OSHA-level disclosure refers to the disclosure of only those "hazardous" chemical constituents that OSHA requires to be reported on material safety data sheets (MSDS).[81] The OSHA regulations classify a chemical as "hazardous" if it presents a physical or health hazard.[82] The OSHA regulations further define a chemical as presenting a "health hazard" if "there is statistically significant evidence based on at least one study . . . that acute or chronic health effects may occur"[83] if employees are exposed to the chemical. However, if a particular chemical has not been the subject of a scientific study into its potential adverse effects, the chemical will not be classified as "hazardous" and, therefore, will not be subject to disclosure under a standard requiring OSHA- level disclosure.[84]

OSHA requires that any chemical constituent contained in an additive that is known to be a health hazard be listed on the MSDS if it makes up more than one percent of the additive.[85] However, if the chemical constituent has been identified as a carcinogen, it must be listed on the MSDS if it composes more than 0.1% of the additive.[86] Thus, whenever a regulation requires the disclosure of all chemical constituents that must be disclosed on the MSDS, the operator or service company will disclose only the names of those chemical

79. *See, e.g.*, LA. ADMIN. CODE tit. 43, § 118 (2011); 25 PA. CODE § 78.122 (2011).

80. *See, e.g.*, LA. ADMIN. CODE tit. 43, § 118(C)(4) (2011); ARK. OIL & GAS COMM'N, *supra* note 21, at r. B-19(l)(3)(C).

81. MURRILL & VANN, *supra* note 62, at 7.

82. 29 C.F.R. § 1910.1200(c) (2010).

83. *Id.*

84. MATTHEW MCFEELEY, NATURAL RES. DEF. COUNCIL, STATE HYDRAULIC FRACTURING DISCLOSURE RULES AND ENFORCEMENT: A COMPARISON 10 (2012), *available at* www.nrdc.org/energy/files/fracking-disclosure-IB.pdf.

85. 29 C.F.R. § 1910.1200(g)(2)(i)(C)(1) (2010).

86. *Id.*

constituents that are listed as "hazardous" under the foregoing criteria.[87]

"Full disclosure," by contrast, would require the disclosure of all the chemical constituents contained in the Frac Fluid, regardless of whether they meet OSHA's definition of "hazardous." While this full-disclosure regime is the approach that environmental groups and a concerned public are calling for,[88] the service companies and the suppliers of the additives are concerned that this level of disclosure will require them to reveal trade secrets, which could have a severely negative impact on their business.[89]

b. Critique of state law: Louisiana, Pennsylvania, Arkansas, and Texas

A number of existing state disclosure regulations require operators and service companies to disclose the additives used in Frac Fluids.[90] While type of disclosure is important in identifying the different purposes these additives serve in the hydraulic fracturing process, it does not provide any insight on the potential environmental and health impacts of the chemical constituents that make up each additive.[91] To provide meaningful information about the potential environmental and health hazards associated with Frac Fluids, states should take disclosure to the next level: the chemical constituent level.

As stated above,[92] there are two different approaches to disclosure of chemical constituents: OSHA-level disclosure and full disclosure. Louisiana and Pennsylvania, with regulations passed in 2011, require disclosure of Frac Fluid composition down to the chemical constituent level, but they require disclosure of only those chemicals that must be disclosed on an MSDS under OSHA regulations (i.e., "hazardous chemicals" only).[93] While some believe

87. MURRILL & VANN, *supra* note 62, at 7.

88. *See* Boling, *supra* note 64.

89. *Id.*

90. *See e.g.*, LA. ADMIN. CODE tit. 43, § 118(C)(2) (2011); 25 PA. CODE § 78.122(b)(6)(i) (2011); ARK. OIL & GAS COMM'N, *supra* note 21, at r. B-19(l)(3)(B) (2011); WYO. OIL & GAS CONSERVATION COMM'N, *supra* note 20, at Ch. 3 § 45(d)(i) (2010).

91. Boling, *supra* note 64.

92. *See supra* Part III.B.1.

93. *See* LA. ADMIN. CODE tit. 43, § 118(C)(2); 25 PA. CODE § 78.122(b)(6).

a disclosure regime that is limited to hazardous chemicals is sufficient, many others believe that utilizing a standard designed for workplace safety is inadequate and unacceptable.[94]

In addition, OSHA's definition of "hazardous" encompasses only those chemicals for which at least one study shows that exposure to such chemicals may result in "acute or chronic health effects [] in exposed employees."[95] This definition has led many to question whether all of the possible hazardous chemicals have been identified under the OSHA criteria.[96] Some in the Industry assert that chemical manufacturers evaluate every product they sell, so if a product is not on the MSDS provided by the supplier, it is not hazardous to humans or the environment.[97] However, Michael Wilson, director of the Labor Occupational Health Program at the University of California–Berkeley, claims that of the "more than 80,000 chemicals registered for commercial use with the EPA . . . there is enough research to identify potential hazards for less than two percent of them."[98]

Arkansas, Texas, and, more recently, Colorado, each mandate full disclosure of all chemical constituents contained in any Frac Fluid used in their states.[99] Arkansas's version of "full disclosure" differs from Texas's and Colorado's in one material respect: Arkansas requires service companies to fully disclose all chemical constituents that *might* be used for hydraulic fracturing on a master list before they are authorized to conduct hydraulic fracturing operations in the state.[100] Since the service companies do not know what combination of additives—and the chemical constituents that compose them—will be used for a given well prior to the fracturing

94. *See* MCFEELEY, *supra* note 84, at 10.

95. *Guidance for Hazard Determination*, U.S. DEP'T OF LABOR, http://www.osha.gov/dsg/hazcom/ghd053107.html (last visited Mar. 23, 2012).

96. MCFEELEY, *supra* note 84, at 10.

97. Nicholas Kusnetz, *Critics Find Gaps in State Laws to Disclose Hydrofracking Chemicals*, PROPUBLICA (June 20, 2011, 4:36 PM), http://www.propublica.org/article/critics-find-gaps-in-state-laws-to-disclose-hydrofracking-chemicals.

98. *Id.*

99. *See* COLO. CODE REGS. § 404-1:205A(b)(2)(A)(x) (2012); TEX. NAT. RES. CODE ANN. § 91.851(a)(1)(E) (West 2011); ARK. OIL & GAS COMM'N, *supra* note 21, at r. B-19(k)(8).

100. ARK. OIL & GAS COMM'N, *supra* note 21, at r. B-19(l)(3)(C).

treatment, the master list provides the state with an advanced awareness of the chemicals that may be used.[101]

The second type of full disclosure in Arkansas is the only type of disclosure currently in place in Texas and Colorado: well-by-well disclosure of all chemical constituents contained in the Frac Fluid.[102] In other words, after a given hydraulic fracturing treatment, the operator or service company will provide a list of the chemical constituents used in that specific well's Frac Fluid.[103] Here, although the effect of both provisions is the same, the language used in Arkansas is more concise. Arkansas's Rule B-19 calls for "[a]ll Chemical Constituents and associated CAS numbers utilized during the Hydraulic Fracturing Treatment."[104] Texas's full disclosure provision, on the other hand, reads:

> (E) in addition to the completed form specified in Paragraph (D), provide to the commission a list, to be made available on a publicly accessible website, of all other chemical ingredients not listed on the completed form that were intentionally included and used for the purpose of creating a hydraulic fracturing treatment for the well.[105]

Paragraph (D), referenced above, refers to the operator's obligation to disclose all MSDS ("hazardous") chemicals on the Ground Water Protection Council's FracFocus website.[106] Not only is the language somewhat convoluted, but it also ties the substantive requirements of disclosure to a form that may be modified at any time.[107] Thus, the meaning of this provision would change if the requirements for the FracFocus disclosure form were to change.

Texas also addresses the concern raised by the Industry that requiring full disclosure of all chemical constituents contained in the Frac Fluid could be construed to require the disclosure of trace

101. MCFEELEY, *supra* note 84, at 8.
102. ARK. OIL & GAS COMM'N, *supra* note 21, at r. B-19(l)(4)(C).
103. MCFEELEY, *supra* note 84, at 10–11.
104. ARK. OIL & GAS COMM'N, *supra* note 21, at r. B-19(l)(4)(C).
105. TEX. NAT. RES. CODE ANN. § 91.851(a)(1)(E) (West 2011).
106. FracFocus is a voluntary, online chemical registry created by the Ground Water Protection Council where operators and service companies post the chemicals used for a given well for the public. *FracFocus Chemical Disclosure Registry*, FRACFOCUS, http://fracfocus.org/welcome (last visited Jan. 3, 2012).
107. Boling, *supra* note 64.

amounts of chemicals that are found in the water that is used along with the "proppant."[108] To diminish this concern, the operator, service company, or supplier is not responsible for disclosing ingredients that are "not purposely added to the hydraulic fracturing treatment,"[109] or which "occur incidentally or are otherwise unintentionally present in the treatment."[110] The advantage of this provision is that the Industry will give the public full disclosure in exchange for protection from liability for any unintentional inclusion of chemical constituents in the Frac Fluid.[111]

2. Concentration Information

a. Overview of the law

Concentration information is yet another important aspect of an effective disclosure regime. This aspect of disclosure can ensure *truly* full disclosure of all chemical constituents contained in a Frac Fluid, but if this provision is not structured properly, it can give the service companies a justifiable reason to withhold the identity of chemical constituents based on a claim of trade-secret protection.[112] As was true in the discussion of full disclosure above,[113] the subtle differences in how concentration information is reported may make the difference between a successful and unsuccessful regulation.[114] To the disclosing party, there are drastically different consequences associated with disclosing the percentage chemical concentration of each additive, as opposed to disclosing the chemical concentration percentage of the total Frac Fluid.[115]

Before discussing the differences that arise from these two different disclosure methods, it is important to note why reporting chemical concentration percentages is necessary. All Frac Fluids contain chemical constituents that are "hazardous" in large enough

108. Boling, *supra* note 64.
109. TEX. NAT. RES. CODE ANN. § 91.851(a)(1)(E)(i) (West 2011).
110. *Id.* at § 91.851(a)(1)(E)(ii).
111. Boling, *supra* note 64.
112. Edwards et al., *supra* note 19.
113. *See supra* Part III.B.1.
114. Mark Boling, Exec. Vice-President, Sw. Energy Co., Model Regulatory Framework for Hydraulic Fracturing Operations, 2011 National Environment, Energy and Resources Laws Summit (Apr. 7, 2011) (transcript on file with author).
115. *Id.*

quantities.[116] However, these hazardous chemicals compose only a very small fraction of the entire Frac Fluid.[117] Thus, disclosing chemical concentration percentages gives the public a better understanding of how much of a given chemical will be pumped underground, provides some context for how dangerous the Frac Fluid is, and allows researchers to focus on the fluid's most highly concentrated chemicals when they evaluate a Frac Fluid's health and environmental risks.[118]

All of the current regulations have some requirement to provide percentage-composition information for the chemicals contained in the Frac Fluid.[119] The difference is whether the regulation requires the concentration information to be tied to each additive or to the Frac Fluid as a whole.[120] Many of the states with regulations in place have chosen an additive-by-additive approach.[121] In other words, the operator is required to disclose the percentage amount of each chemical present in each of the additives in the Frac Fluid. In practice, this means that service companies and suppliers have to divulge their "recipe" for every additive to the public and, more importantly, their competitors.[122] Service companies such as Halliburton have expressed concern that this level of disclosure threatens their trade secrets by potentially allowing competitors to reverse engineer their proprietary formulas.[123] The unintended result of an additive-by-additive reporting requirement is less disclosure,[124] since service companies and suppliers increasingly attempt to avoid revealing their proprietary additive formulas by claiming potential trade secret infringement.[125] However, certain legislators,

116. *See* GROUND WATER PROT. COUNCIL & ALL CONSULTING, *supra* note 3, at 62.

117. *Id.* at 61.

118. Boling, *supra*, note 64.

119. *See, e.g.*, COLO. CODE REGS. § 404-1:205A(b)(2)(A)(xi) (2012); TEX. NAT. RES. CODE ANN. § 91.851(a)(1)(A)–(E) (West 2011); ARK. OIL & GAS COMM'N, *supra* note 21, at r. B-19(k)(5); WYO. OIL & GAS CONSERVATION COMM'N, *supra* note 20.

120. Boling, *supra*, note 114.

121. *See, e.g.*, WYO. OIL & GAS CONSERVATION COMM'N, *supra* note 20.

122. Boling, *supra*, note 114.

123. *See* Dennis Webb, *New Fracking Rules Called Toughest in U.S.*, THE DAILY SENTINEL, Dec. 14, 2011, http://www.gjsentinel.com/news/articles/new_fracking_rules_called_toug.

124. Boling, *supra* note 114.

125. *See, e.g.*, Jeremy Fugleberg, *Wyoming Regulators Keep 146 Fracking Chemicals Secret*, CASPER STAR-TRIBUNE, Aug. 25, 2011, 7:00 AM, http://trib.com/news/state-and-regional

environmental groups, and natural gas companies have worked together to devise a way to obtain full disclosure and eliminate the threat of reverse engineering by requiring the concentration of each chemical constituent to be expressed as a percentage of the Frac Fluid as a whole.[126]

Providing the percentage composition of each chemical constituent contained in the entire Frac Fluid provides the same level of disclosure as an additive-by-additive based system, but it does not tie chemical constituents to particular additives.[127] Instead, as the name implies, chemical concentrations are given as a mass percentage of the total Frac Fluid.[128] Doing so eliminates the potential for reverse engineering a company's proprietary additive formula.[129] As a result, this approach would support the overall goal of full disclosure by taking away the Industry's main reason for seeking trade-secret protection.

b. Critique of state law: Wyoming and Texas

Chemical constituent concentrations play a substantial role in resolving the Frac Fluid disclosure issue. Not only does concentration information reveal how much of a certain chemical constituent will be pumped underground, but if compiled correctly, it can also further the goal of full disclosure discussed above.[130]

Wyoming's Frac Fluid disclosure regulation[131] illustrates the additive-based method of reporting concentration information. This is evident from the plain language of the statute:

> (d) . . . The Owner or Operator or service company shall provide to the Supervisor . . . the chemical additives, compounds and concentrations or rates *proposed* to be mixed and injected, including: . . .

/wyoming-regulators-keep-fracking-chemicals-secret/article_d6fb3ab9-5705-5159-bde9-947e09c1ebfa.html.

126. Boling, *supra* note 64.
127. *Id.*
128. *Id.*
129. *Id.*
130. *See supra* Part III.B.1.
131. WYO. OIL & GAS CONSERVATION COMM'N, *supra* note 20.

> (ii) The chemical compound name and Chemical Abstracts Service (CAS) number shall be identified (such as the additive biocide is glutaraldehyde, or the additive breaker is aluminum persulfate, or the proppant is silica or quartz sand, *and so on for each additive used*).[132]

As discussed above,[133] an additive-based method of reporting the concentrations of chemical constituents has significant drawbacks. Service companies derive their competitive advantage from developing effective additive formulas.[134] These formulas take both time and capital to develop.[135] The additive-based system essentially requires service companies to divulge their proprietary formula to the public.[136] As a result, the identity or concentration of more chemical constituents will be withheld as trade secrets, and the goal of full disclosure will not be achieved.

Wyoming courts have seen numerous trade-secret claims based on the additive-based concentration requirement and have routinely granted them.[137] Within the first year of passing its Frac Fluid disclosure regulations, Wyoming deemed 146 chemicals trade secrets.[138] Appendix 1[139] demonstrates how this would appear on a Frac Fluid public registry. Each chemical marked "SECRET" represents a successful claim of trade secrecy. Although concentration information is provided, the chemical's abstract service (CAS) number is not. A CAS number is a unique identifying number for all known chemicals, including the chemical constituents used in Frac Fluids, and provides both researchers and the public with a way to identify each chemical constituent specifically.[140] Without the CAS number, the public is denied full disclosure. Such a lack of information undermines the regulation's purpose and fails to resolve effectively the Frac Fluid disclosure issue.[141]

132. *Id.* § 45(d)(ii).
133. *See supra* Part III.B.2.a.
134. *See* Edwards et al., *supra* note 19, at 4.
135. *Id.*
136. Boling, *supra* note 114.
137. *See* Fugleberg, *supra* note 125.
138. *See* Fugleberg, *supra* note 125.
139. *See infra* app. 1.
140. *See* MCFEELEY, *supra* note 84, at 10.
141. Boling, *supra* note 64.

The system-based approach for reporting chemical constituent concentrations can be found in the Texas[142] and Colorado[143] disclosure regulations. In Texas, this approach is codified in a statutory provision: "The commission rule shall *not require that the [chemical constituents] be identified based on the additive in which they are found* or that the concentration of such [chemical constituents] be provided."[144]

The subtly different language of Texas's regulation, compared to Wyoming's, significantly changes the amount of information that is ultimately disclosed.[145] The system-based approach protects the service company's proprietary additive formulas without the necessity of asserting trade-secret protection.[146] In the end, this small change gets the public closer to the ultimate goal of full disclosure.

Appendix 2[147] illustrates how this change in reporting the concentrations of chemical constituents would appear on a public registry. The most significant difference is in removing the column in Appendix 1 labeled, "Ingredient Concentration in Additive." That column represents the difference between the Wyoming and Texas regulations. The system-based report still provides the percentage concentrations of all chemical constituents present in the Frac Fluid and lists all of the corresponding CAS numbers. Thus, to achieve the goal of public trust and acceptance of hydraulic fracturing practices, the full disclosure provided by a system-based approach to chemical constituent concentrations is superior to Wyoming's additive-based system.[148]

3. Trade-Secret Protection

a. Overview of the law

An effective trade-secrets provision is yet another vital aspect of a successful Frac Fluid disclosure regime.[149] Legislators must find a

142. TEX. NAT. RES. CODE ANN. § 91.851 (West 2011).
143. COLO. CODE REGS. § 404-1:205A (2012).
144. TEX. NAT. RES. CODE ANN. § 91.851(a)(1)(E)(iii) (West 2011) (emphasis added).
145. Boling, *supra* note 64.
146. *Id.*
147. *See infra* app. 2.
148. Boling, *supra* note 64.
149. MURRILL & VANN, *supra* note 62, at 8.

way to balance the interests of the public and environmental groups calling for full disclosure with those of the service companies and additive suppliers who desire to protect their proprietary formulas. While full disclosure is seemingly undermined by trade-secret protection, service companies often spend millions of dollars on research and development for a given formula.[150] Thus, to protect their investment and the competitive advantage that stems from it, such companies must be afforded trade-secret protection if they can substantiate their claims.[151]

Most states have regulations in place that protect legitimate trade secrets from being disclosed in publicly available filings with state agencies.[152] These regulations often contain the processes and procedures for companies to claim trade-secret protection.[153] However, some states have looked to federal standards and procedures, such as those employed by OSHA[154] or the Emergency Planning and Community Right-to-Know Act (EPCRA),[155] to deal with the trade-secret protection issue. Both OSHA and EPCRA use the same definition of what constitutes a trade secret,[156] but they differ significantly in how a trade-secret claimant substantiates the legitimacy of its claim. OSHA allows the claimant to withhold the identity of a chemical constituent if "[t]he claim that the information withheld is a trade-secret can be *supported*"[157] by the claimant. Importantly, the OSHA regulations require that the properties and effects of any hazardous chemical claimed as a trade secret be disclosed by the operator on the MSDS for such chemicals.[158] In addition, the claimant must provide the identity of any chemical

150. Edwards et al., *supra* note 19, at 4.

151. MCFEELEY, *supra* note 84, at 6.

152. *See, e.g.*, 25 PA. CODE § 78.122(c) (2011) ("The Department will prevent disclosure of the designated confidential proprietary information."); WYO. OIL & GAS CONSERVATION COMM'N, *supra* note 20 ("Confidentiality protection shall be provided consistent with Wyo. Stat. Ann. § 16-4-203(d)(v) of the Wyoming Public Records Act . . . .").

153. *See* 25 PA. CODE § 78.122(c); WYO. OIL & GAS CONSERVATION COMM'N, *supra* note 20.

154. 29 C.F.R. § 1910.1200 (2010).

155. 42 U.S.C. § 11042 (2006).

156. RESTATEMENT OF TORTS § 757 cmt. b (1939) ("[A]ny formula, pattern, device or compilation of information which is used in one's business, and which gives him an opportunity to obtain an advantage over competitors who do not know or use it.")

157. 29 C.F.R. § 1910.1200(i)(1)(i) (emphasis added).

158. *Id.* § 1910.1200(i)(1)(ii).

constituent claimed as a trade secret to medical responders in the case of an emergency.[159] Unfortunately, the OSHA regulations provide no guidance as to what a trade-secret claimant must show to "support" its trade-secret claim.

EPCRA, on the other hand, lays out detailed procedures that must be followed in order for a claimant to assert and substantiate its claim of trade secrecy. These procedures are set out in Subsection (a)(2) of EPCRA. This provision requires a trade-secret claimant to submit supporting documentation that will satisfy statutorily enumerated factors designed to substantiate the validity of the trade-secret claim.[160] Unless the claimant adequately supports each of the factors, the trade-secret claim will not be granted.[161] These factors are (1) whether the claimant disclosed the information to other parties, (2) whether state or federal law mandates disclosure of the information, (3) whether disclosure would cause substantial harm to the claimant's competitive position, and (4) whether the identity of the chemical may be discerned through reverse engineering.[162] Thus, unlike OSHA, EPCRA requires the trade-secret claimant to provide specific information to substantiate its trade-secret claim before trade-secret status is granted.

b. Critique of state law: Wyoming and Arkansas

While successful trade-secret claims limit disclosure, the public's desire for full disclosure must be weighed against the Industry's legitimate claims for keeping proprietary chemical formulas secret. The key difference between successful and unsuccessful trade-secret provisions lies in how the claimant must substantiate his or her claim.[163] Many state disclosure regulations reference the states' own public records acts.[164]

Wyoming's regulation, for example, requires the claimant to "justify[] and document[] the nature and extent of the proprietary

159. *Id.* § 1910.1200(i)(2).
160. *See* 42 U.S.C. § 11042(a)(2)(A)(ii).
161. *See id.* § 11042(b).
162. *Id.* §§ 11042(b)(1)–(4).
163. MCFEELEY, *supra* note 84, at 6.
164. *See* 25 PA. CODE § 78.122(d) (2011); WYO. OIL & GAS CONSERVATION COMM'N, *supra* note 20.

information."[165] If state regulators find a claim to be sufficient, the chemical identity will be held as a trade secret under the Wyoming Public Records Act.[166] The problem with this provision is that it does not provide the public with any indication as to how a claimant's justifications are reviewed and approved.[167] The reference included in the regulation to the Wyoming Public Records Act simply identifies trade secrets as excluded from the public record.[168] From a plain reading of the regulation, it appears that Wyoming state regulators are given discretion to decide whether to grant trade-secret protection. This lack of guidance leaves the public without a means to interpret Wyoming's decisions to approve or deny trade-secret claims.

Arkansas implemented a different approach to substantiating trade-secret claims in its Frac Fluid disclosure regulation. Instead of referencing an existing state law, Arkansas requires the claimant to meet the trade secret criteria set forth in EPCRA.[169] As discussed above,[170] EPCRA imposes a significant obligation on the claimant in substantiating a trade-secret claim. The first major benefit of Arkansas's incorporation of EPCRA is that EPCRA's heightened requirements serve as a screening process.[171] Under Arkansas's disclosure regime, fewer chemicals will be granted trade-secret protection.[172] In the end, EPCRA's criteria for substantiating a trade-secret claim benefit both the public, through more complete disclosure, and the Industry, by protecting its companies' legitimate proprietary interests.[173]

Another advantage to Arkansas's trade-secret provision is public transparency. Unlike Wyoming, Arkansas provides the public with the criteria used in adjudicating a trade-secret claim.[174] Thus, if a claimant successfully obtains trade-secret protection, the public will

165. *See* WYO. OIL & GAS CONSERVATION COMM'N, *supra* note 20.
166. *Id.*
167. *See* WYO. STAT. ANN. § 16-4-203(d)(v) (2010).
168. *Id.*
169. ARK. OIL & GAS COMM'N, *supra* note 21, at r. B-19(l)(3)(C).
170. *See supra* Part III.B.1.
171. Boling, *supra* note 64.
172. *Id*.
173. *Id*.
174. *See* ARK. OIL & GAS COMM'N, *supra* note 21 (referencing the EPCRA criteria in 42 U.S.C. § 11042(b)).

be aware of how and why it was obtained.[175] Overall, the EPCRA criteria mitigate public doubt and confusion about the process of acquiring trade-secret protection.[176]

C. To Whom Are They Required to Disclose?

1. Overview of the Law

Finally, all disclosure regulations provide varying degrees of guidance as to how and to whom the information concerning the chemical composition of the Frac Fluid must be disclosed.[177] Taking current state regulations as a whole, operators have been required to disclose to any combination of three groups: the state regulatory agency, the public, and emergency responders.[178]

2. State Law Critique: Wyoming and Texas

The regulation passed in Wyoming requires the operator to disclose the required Frac Fluid information to the state governmental entity and the public.[179] The Supervisor of the Wyoming Oil and Gas Conservation Commission receives the list of chemical constituents used in a given hydraulic fracturing treatment in the well completion report.[180] The well completion report is prepared after the treatment has taken place and includes the actual amount of chemicals used on a given well.[181] The same well completion report is made available to the public on the Wyoming Oil and Gas Conservation Commission's website.[182] However, Wyoming's regulation does not mention any sort of public

175. Boling, *supra* note 114.
176. Boling, *supra* note 64.
177. MURRILL & VAN, *supra* note 62, at 9.
178. *Id.* at 4, 9.
179. WYO. OIL & GAS CONSERVATION COMM'N, *supra* note 20.
180. *Id.*
181. *Id.*
182. WYO. OIL AND GAS CONSERVATION COMM'N, http://wogcc.state.wy.us/ (last visited Feb. 23, 2012).

accessibility.[183] Texas remedied this and other problems in their disclosure regulation.[184]

Texas's disclosure regulation is more thorough. Like other states, Texas requires the well operator to supply the state commission with a list of all chemical constituents used in the hydraulic fracturing treatment, and to make the list of chemical constituents available to the public.[185] However, unlike Wyoming's regulation, the Texas regulation specifies a central repository, FracFocus,[186] in which the information is collected.[187] Not only does this give Texas residents an idea of where to find disclosure information, but it also represents a step toward making FracFocus a nationally recognized chemical registry.[188] The public would benefit significantly from the ease of having one website from which it could obtain disclosure information for the entire country.[189]

Finally, what separates Texas's disclosure regime from those of many other states is its emergency-responder provision. Under this provision, Texas requires operators, service companies, and suppliers to provide information about chemical constituents—including those that have been deemed trade secrets—to any health professional or emergency responder who might need the information to treat a patient exposed to such chemicals.[190] The effect of this requirement is significant. In the event of a chemical spill during a hydraulic fracturing treatment, emergency responders will be able to provide more effective treatment by obtaining information about the chemicals the individual may have come into contact with.[191]

IV. PROPOSED "MODEL" REGULATORY FRAMEWORK

The analysis above illustrates how states have confronted the Frac Fluid disclosure issue. As this Note goes to print, seventeen

183. WYO. OIL & GAS CONSERVATION COMM'N, *supra* note 20, at ch. 3 § 45(h).
184. TEX. NAT. RES. CODE ANN. § 91.851(a)(1) (West 2011).
185. *See id.* at § 91.851(a)(1)(A)–(C).
186. FRACFOCUS CHEMICAL DISCLOSURE REGISTRY, http://www.fracfocus.org (last visited Feb. 22, 2012).
187. TEX. NAT. RES. CODE ANN. § 91.851(a)(1)(A) (West 2011).
188. Boling, *supra* note 64.
189. *Id.*
190. TEX. NAT. RES. CODE ANN. § 91.851(a)(7) (West 2011).
191. MURRILL & VAN, *supra* note 62, at 9.

states have rules in place to regulate disclosure.[192] While the ultimate goals of these regulations are similar, their approaches differ significantly. Not only do these differences pose a procedural burden for operators conducting business in multiple states, but they also result in deficiencies that could be avoided by examining successful strategies already implemented in other states.

In an attempt to resolve these issues, this part sets forth concepts for a "model" regulatory framework that strikes a balance between "full disclosure" and protection of legitimate trade secrets. This model regulation could be used to assist states in drafting more uniform and effective Frac Fluid disclosure regulations. The easiest way to delineate the requirements of an effective model regulation is to use the same three criteria that were used above to assess the effectiveness of existing Frac Fluid disclosure regimes: (1) who is required to disclose information; (2) what information they are required to disclose; and (3) to whom they must disclose that information.

A. The Affirmative Obligation: Requiring All Parties to Disclose

Beginning with who is required to disclose, the approach taken by Arkansas[193] and Texas[194] is most effective.[195] In essence, every party involved in a hydraulic fracturing treatment—the operator, service company, and supplier—has an obligation to disclose the information they have in their possession.[196] As Texas and Arkansas demonstrate, this can be achieved by imposing the primary disclosure obligation on the operator with a corresponding obligation on the part of the service company and supplier to provide the

192. The seventeen states are Arkansas, Colorado, Idaho, Indiana, Louisiana, Michigan, Mississippi, Montana, New Mexico, North Dakota, Ohio, Oklahoma, Pennsylvania, Texas, Utah, West Virginia, and Wyoming. Requirements for Hydraulic Fracture Stimulation—Report of Shooting or Treating, 26-2 MISS. ADMIN. CODE § 1.26 (adopted Jan. 16, 2013) (effective Mar. 4, 2013); HYDRAULIC FRACTURING FLUID DISCLOSURE REQUIREMENTS AS OF 10/26/12, VINSON & ELKINS LLP (Apr. 21, 2013), http://www.velaw.com/uploadedFiles/VEsite/Resources/HydraulicFracturingFluidDisclosureRequirements.pdf.

193. ARK. OIL & GAS COMM'N, *supra* note 21, at r. B-19(k)(8).

194. TEX. NAT. RES. CODE ANN. § 91.851(a)(2) (West 2011).

195. Boling, *supra* note 114.

196. *See* TEX. NAT. RES. CODE ANN. § 91.851(a)(2) (West 2011); ARK. OIL & GAS COMM'N, *supra* note 21, at r. B-19(l)(4).

operator with the requisite information to allow the operator to fulfill its disclosure obligation. Expressing the disclosure obligation in this manner clearly identifies each party's role in the disclosure process and eliminates the possibility of a gap in the information that is disclosed.

Another important advantage to this type of disclosure scheme is that it is the most cost effective way for state agencies to implement the new disclosure requirement.[197] This is because the operator already has the obligation to file a well completion report with the state after every hydraulic fracturing treatment.[198] Simply requiring the operator to include the Frac Fluid disclosure as an appendix to this report would significantly reduce the cost and administrative burden of transitioning to the new disclosure regulation.[199] Ultimately, the presence of a clearly defined disclosure obligation for operators, services companies, and suppliers would significantly contribute to the overall effectiveness of a Frac Fluid disclosure regulation.

B. Achieving Full Disclosure Through a System-Based Concentration Requirement and EPCRA's Trade Secret Criteria

The next category for assessing the effectiveness of the model disclosure regulation is "what information must be disclosed." As described above, three subcategories of disclosure must be addressed in order to properly evaluate this criterion: the level of disclosure, the disclosure of concentration information, and the treatment of trade secrets. Arkansas's Rule B-19 lays out the approach to the level of disclosure[200] that the model regulation requires. First, as is consistent with the ultimate goal of Frac Fluid disclosure, the information disclosed reflects "full disclosure" of all chemical constituents contained in the Frac Fluid, together with CAS numbers for all such chemical constituents. Unlike the many states that simply require OSHA-level disclosure, the model regulation mandates disclosure of all chemicals, regardless of whether they are classified as

197. Boling, *supra* note 114.
198. *Id*.
199. *Id*.
200. ARK. OIL & GAS COMM'N, *supra* note 21, R. B-19(l)(3).

"hazardous" under OSHA. Further, the model regulation includes Arkansas's concept of having a master list of Frac Fluid chemicals on file with the state agency. With this information in the state's possession before any actual hydraulic fracturing treatments are done, the potential risk of adverse health and environmental effects will be known in advance and effective mitigation efforts can be implemented.

Second, the model regulation requires concentration information on a "Frac Fluid system" basis like that found in Texas.[201] As discussed above, under this approach, the operator would be required to disclose the concentrations of all chemical constituents included in a particular Frac Fluid as a percentage by mass of the total Frac Fluid. By disclosing concentration information in this manner, the regulation will work toward the ultimate goal of "full disclosure," while at the same time ensuring that proprietary additive formulas are kept secret.

Finally, the manner in which the state handles trade-secret claims can significantly affect how successful a regulation will be in achieving "full disclosure."[202] Too lax of a standard may result in an increased number of trade-secret claims, many of which are not legitimate. Too strict of a standard, in contrast, may put service companies and suppliers in the difficult position of either foregoing work in a particular state or conducting work there at the risk of disclosing its legitimate trade secrets. It is suggested that Arkansas's use of EPCRA's criteria for substantiating trade-secret claims[203] falls in the middle of these two extremes[204] and is thus what the model regulation requires. The EPCRA criteria for supporting trade-secret claims[205] provide service companies, suppliers, and the public with an understanding of how trade-secret claims are approved or denied.[206] They also provide clear guidance to potential trade-secret claimants as to what must be proven to substantiate legitimate trade-secret claims.[207]

201. TEX. NAT. RES. CODE ANN. § 91.851(a)(1)(E)(iii) (West 2011).
202. *See supra* Part III.B.3.b.
203. ARK. OIL & GAS COMM'N, *supra* note 21, at r. B-19(k)(8).
204. Boling, *supra* note 114.
205. 42 U.S.C. §§ 11042(b)(1)–(4) (2006).
206. *Id.*
207. *Id.*

C. The Importance of State Oversight, Emergency Precautions, and Public Knowledge

The final criterion for the model regulation is "to whom must the information be disclosed." To achieve full disclosure, the model regulation requires disclosure to all interested parties: the regulatory agencies, the emergency responders, and the public.[208] Texas's regulation[209] reflects the approach proposed by the model regulation with regard to all three groups. First, as every current state regulation requires, the disclosure information must be provided to the state regulatory agency.[210] What sets Texas and the model regulation apart from the majority of the other states with regulations in place is the emergency-responder provision, and how information is disclosed to the public.[211]

An emergency-responder provision ensures that the health and safety of persons handling or otherwise exposed to Frac Fluids will not be jeopardized by trade-secret claims.[212] In the case of a chemical spill during a hydraulic fracturing operation, the operator is required to disclose to emergency responders the identity of *all* chemical constituents contained in the Frac Fluid (including their corresponding CAS number), regardless of whether any such chemical constituent is entitled to trade-secret protection. Any such disclosure that reveals legitimate trade secrets will require that the emergency responder sign a confidentiality agreement to ensure that any proprietary chemical information that is disclosed is kept secret.[213] In the end, this emergency-responder provision protects both the health of persons exposed to Frac Fluid chemicals and the legitimate trade secrets of the service company or supplier.[214]

Finally, under the "model" regulation, all Frac Fluid disclosure information is disseminated to the public. Much of the recent

208. Boling, *supra* note 114.

209. TEX. NAT. RES. CODE ANN. § 91.851(a)(7) (West 2011).

210. *See, e.g.*, LA. ADMIN. CODE tit. 43, § 118(c) (2011); 25 PA. CODE § 78.122(b) (2011); TEX. NAT. RES. CODE ANN. § 91.851(a)(1)(E) (West 2011); ARK. OIL & GAS COMM'N, *supra* note 21, at r. B-19(k); WYO. OIL & GAS CONSERVATION COMM'N, *supra* note 20, at ch. 3, § 45(d).

211. *See* TEX. NAT. RES. CODE ANN. §§ 91.851(a)(1)(A); (a)(7) (West 2011).

212. MURRILL & VAN, *supra* note 62, at 9.

213. MCFEELEY, *supra* note 84, at 13.

214. Boling, *supra* note 114.

attention to hydraulic fracturing is based upon the public's belief that the natural gas industry is trying to hide the truth about the safety of hydraulic fracturing.[215] Thus, an effective means of disclosing information to the public is crucial for any Frac Fluid disclosure regulation. The model regulation follows the Texas disclosure regulation by requiring public disclosure of all Frac Fluid information on the publicly accessible website FracFocus, a Frac Fluid chemical registry maintained by the Ground Water Protection Council. FracFocus facilitates disclosure to the public by serving as a central repository for all Frac Fluid disclosure information.[216] Instead of having to search for the information on individual state agency websites, the public would be able to obtain nationwide data in one place. In addition, recently proposed changes to the FracFocus site will make searching for and compiling information easier to accomplish.[217]

The above-described provisions of the "model" regulation all work toward the same goal: providing the most robust disclosure regime for the chemicals contained in Frac Fluids without endangering the legitimate trade secrets of those companies that provide the additives that make up the Frac Fluid. The provisions contained in the model regulation, by comparison with many current Frac Fluid disclosure regulations, are the most effective way to achieve this goal.[218]

V. CONCLUSION

On January 25, 2012, in his State of the Union address, President Obama stated:

> We have a supply of natural gas that can last America nearly one hundred years. And my administration will take every possible action to safely develop this energy. Experts

215. *Id*.

216. *Id*.

217. *GIS Coming to FracFocus*, FRACFOCUS, http://fracfocus.org/node/315 (last visited Jan. 3, 2012).

218. After the completion of this Note, Colorado passed a disclosure regulation that contains many of the suggestions found in the model regulation. *See* COLO. CODE REGS. § 404-1:205A (2012); Mark Jaffe, *Colorado Approval of Fracking Fluids' Full Disclosure Came After Long Negotiations and Nudge From Governor*, DENVER POST, Dec. 14, 2011, http://www.denverpost.com/business/ci_19542430.

> believe this will support more than 600,000 jobs by the end of the decade. And I'm requiring all companies that drill for gas on public lands to disclose the chemicals they use. Because America will develop this resource without putting the health and safety of our citizens at risk.[219]

The President's statements reflect why an effective Frac Fluid disclosure regime is so important for our nation. The United States is in a position to capitalize on a vast supply of domestic natural gas that will enable us to regain our energy independence, create much-needed jobs for Americans, and develop a low-carbon energy source that burns significantly cleaner than coal and oil.[220] The model regulation disclosure regulation serves to provide states guidance in drafting effective Frac Fluid disclosure regulations. The suggestions set forth in the model regulation are designed to achieve the goal of "full disclosure" of Frac Fluid chemicals in a manner that satisfies regulators, the natural gas industry, and environmentalists. While this may seem like an impossible task, with so much at stake for our country, failure is not an option.

219. Barack Obama, President of the U.S., State of the Union Address (Jan. 24, 2012) (transcript available at http://www.whitehouse.gov/the-press-office/2012/01/24/remarks-president-state-union-address).

220. *See Natural Gas*, EPA, http://www.epa.gov/cleanenergy/energy-and-you/affect/natural-gas.html (last visited Mar. 1, 2012).

APPENDIX 1

Trade Name	Supplier	Purpose	Ingredients	CAS #	Ingredient Concentration in Additive (% by mass)	Ingredient Concentration in HF Fluid (% by mass)
YP355 MpH	ABC Corp.	Propping agent, Gelling agent, Surfactant Clay stabilizer	Water	-	-	79.98%
			Crystalline silica	1408-704	97.03%	19.42%
			Ether Salt	**SECRET**	0.470%	0.094%
			Diammonium peroxidisulphate	7724-54	0.201%	0.040%
			Propan-2-ol	67-65-1	0.130%	0.026%
			Methanol	65-87-02	0.130%	0.026%
			Ethoxylated alcohols	**SECRET**	0.062%	0.012%
			Ethoxylated alcohols #2	**SECRET**	0.041%	0.008%
			Acetic acid	893-453	0.041%	0.008%
			Carbohydrate polymer	**SECRET**	0.029%	0.005%
			Calcium chloride	3412-3	0.0040%	0.0008%

APPENDIX 2

Trade Name	Supplier	Purpose	Ingredients	CAS #	Ingredient Concentration in HF Fluid (% by mass)
YP355 MpH	ABC Corp.	Propping agent, Gelling agent, Foamer, Clay stabilizer	Water	-	79.98%
			Crystalline silica	14808-34	19.41%
			Guar gum	9000-30-4	0.30%
			Sodium sulphate	2544-234	0.094%
			Diammonium peroxidisulphate	7727-898	0.04%
			Sodium chloride	09998-3	0.034%
			Magnesium chloride	67-56-1	0.033%
			Propan-2-ol	63-213	0.026%
			Methanol	14807-43	0.025%
			Ethoxylated alcohols	8794-312	0.012%
			Ethoxylated alcohols #2	10043-43	0.008%
			Acetic acid	15556-4	0.005%
			Calcium chloride	90002-222	0.004%
			Potassium chloride	64-19-744	0.0008%
			Cationic polymer	3948-39-39	0.0008%
			Magnesium silicate hydrate	29385-44	0.0001%