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# FRACKING THE OIL AND GAS TRADE SECRETS OF THE MARCELLUS SHALE NATURAL GAS PLAY

JEREMY I. MAYNARD\*

## I. INTRODUCTION

In a 1997 decision, the Federal Court of Appeals expanded the authority of the Environmental Protection Agency (“EPA”) to include the regulation of hydraulic fracturing (hydrofracking, fracking). Hydrofracking is a production enhancement technique used in the oil and gas industry and regulated by the underground injection control (“UIC”) programs established pursuant to Part C of the Safe Drinking Water Act (“SDWA”).<sup>1</sup> In 2005, however, this precedent was altered by the ratification of an amendment to the SDWA, which explicitly excludes hydrofracking activities from federal regulation.<sup>2</sup> Four years after the SDWA amendments, the Fracturing Responsibilities and Awareness of Chemicals Act (“FRAC Act”) was introduced to Congress, where it is currently being debated.<sup>3</sup> If approved, the Act would reinstate hydrofracking regulation under the SDWA. Furthermore, the Act intends to regulate hydrofracking as a UIC activity and contains obligations to disclose chemical mixtures and proprietary formulas used in the fracking process.<sup>4</sup>

While the federal government vacillates on its decision to regulate fracking, states largely remain the primary regulator of hydraulic fracturing activities within their borders.<sup>5</sup> Many of the Marcellus Shale states<sup>6</sup> including Kentucky, require disclosures for the permitting and disposal processes.<sup>7</sup> Public disclosure of proprietary chemical formulas classified as

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<sup>1</sup> Legal Envtl. Assistance Found. v. EPA, 118 F.3d 1467, 1475 (11th Cir. 1997).

<sup>2</sup> 42 U.S.C. § 300h (2005).

<sup>3</sup> S. 1135, 113th Cong. (2013).

<sup>4</sup> *Id.*

<sup>5</sup> See S. 1215, 111th Cong. (2009), available at <http://www.govtrack.us/congress/bills/111/s1215> (showing that a previous version of the FRAC Act was introduced in 2009 and died in committee).

<sup>6</sup> The Marcellus Shale play is a geographical natural gas formation extending under Kentucky, Ohio, Maryland, West Virginia, Pennsylvania, and New York. This play “contain[s] 200 to 500 cubic feet of natural gas” which could “supply domestic demand for up to twenty years.” EARL L. HAGSTRÖM ET AL., ASPATORE SPECIAL REPORTS, HYDRAULIC FRACTURING IN THE MARCELLUS SHALE: STRATEGIES FOR LEGAL AND REGULATORY COMPLIANCE \*20 (2011). Each state of the Marcellus Shale play require disclosures during the fracking process.

<sup>7</sup> 805 KY. ADMIN. REGS. 1:110 (2013); OHIO DEP’T OF NATURAL RES., OHIO HYDRAULIC FRACTURING STATE REVIEW (2011), available at <http://www.strongerinc.org/sites/all/themes/stronger02/downloads/Final%20Report%20of%202011%20OH%20HF%20Review.pdf>; Francis

a trade secret may result in abandoning trade secrecy protection. Because of the importance of intellectual property trade secrecy in the development of the fossil fuel economy, there is a juxtaposition of the environmental and health harms caused by fracking versus the promotion of the economy through protecting energy companies' intellectual property rights. Since there is no uniform federal regulation of fracking, different states have taken a variety of stances on the protectiveness of public health, the environment, and economic opportunism.<sup>8</sup> Some oil and gas companies may be hesitant to frack in the most protective states, because regulations may result in abandoning their trade secrets. Therefore, states with less stringent regulations present more attractive economic opportunities to oil and gas companies seeking to frack.

### *A. Hydraulic Fracturing Process*

The Marcellus Shale Play is a large stretch of natural gas-rich sedimentary rock lying under New York, Pennsylvania, Maryland, Ohio, West Virginia, and Kentucky.<sup>9</sup> The gas in the Marcellus Play is difficult to extract using traditional methods. The reserve contains tiny gas pores encapsulated by impermeable rock.<sup>10</sup> Traditional vertical drilling methods merely access an unsegregated, free flowing underground reservoir of natural gas. Hydrofracking, by contrast, injects high-pressure liquid and proppant into a horizontal natural gas well to fracture the impermeable rock.<sup>11</sup> Generally, the liquid consists of 99.5% sand and water and 0.5% salt, acid, distillates, isopropanol, and sodium or potassium carbonate.<sup>12</sup> The high pressure of the liquid fractures the rock, and the proppant, commonly sand, fills the fracture to prevent collapse.<sup>13</sup> The proppant is porous, so natural gas may flow from the surrounding pores to the wellhead. The added chemicals create a solution to lubricate the wellbore and cause the natural gas to flow up the wellbore due to density differences between the solution and the natural gas.<sup>14</sup>

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Gradijan, *State Regulations, Litigation, and Hydraulic Fracturing*, 7 ENVTL. & ENERGY L. & POL'Y J. 47, 73 (2012).

<sup>8</sup> Gradijan, *supra* note 7, at 49.

<sup>9</sup> 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, 79 (2012).

<sup>10</sup> HAGSTRÖM ET AL., *supra* note 6.

<sup>11</sup> *Id.* at \*1.

<sup>12</sup> CHRISTOPHER KULANDER ET AL., THE STATES' LEGAL FRAMEWORK: TEXAS/LOUISIANA REGION AMERICAN LAW AND JURISPRUDENCE ON FRACING \*3A-83A-9 (2011).

<sup>13</sup> Wes Deweese, *Fracturing Misconceptions: A History of Effective State Regulation, Groundwater Protection, and the Ill-Conceived FRAC Act*, 6 OKLA. J. L. & TECH. 49, \*2 (2010).

<sup>14</sup> *Id.* at \*17.

*B. The Importance of the Marcellus Shale Natural Gas Play to the United States' Economy*

Fossil fuels are important to the U.S. economy and hydrofracking increases the supply and the extraction rate of fossil fuels to meet the expanding demand of industrial America. Currently, the United States Department of Energy estimates “America relies on fossil fuels for approximately 85% of its total energy demand.”<sup>15</sup> Experts predict that by 2025, “conventional natural gas will only be able to satisfy 75% of America’s natural gas demand.”<sup>16</sup> Accordingly, unconventional fossil fuel sources, such as natural gas derived from the Marcellus Shale, increase the supply and aid in meeting the demand. Natural gas supply estimates have risen due to hydrofracking;<sup>17</sup> “[f]rom 2003 to 2008, more than 60,000 wells [were] drilled, representing an increase in production of 75%...”<sup>18</sup>

Hydrofracking has been in use since the 1947; its demand has increased steadily with fossil fuel consumption.<sup>19</sup> Each year, over thirty-five thousand hydraulic fracturing wells are completed in the United States.<sup>20</sup> This increase in hydrofracking has been greatly beneficial to the nation’s fossil fuel economy, as it “has allowed for the production of more than 600 trillion cubic feet of natural gas and 7 billion barrels of oil.”<sup>21</sup> Thus, the hydrofracking extraction method has increased both the extraction rate and the supply of natural gas that is accessible; thereby promoting energy independence and reducing fuel prices by increasing supply.

## II. TRADE SECRECY AND THE FRACKING PROCESS

Oil and gas companies consider the actual chemical formulas and concentrations used in the fracking process to be proprietary information worthy of protecting.<sup>22</sup> Oil and gas “contractors are protective of the exact recipe of their fracking fluids, considering [both] the *ingredients* and the *ratio with which the ingredients are mixed* with the water to make the fracking fluid to be trade secrets.”<sup>23</sup> Oil and gas companies may choose to rely on trade secret protection for the fracking process for several reasons.

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<sup>15</sup> Jefferies, *supra* note 9, at 104.

<sup>16</sup> *Id.*

<sup>17</sup> See Susan L. Sakmar, *The Global Shale Gas Initiative: Will the United States Be the Role Model for the Development of Shale Gas Around the World?*, 33 HOUS. J. INT’L L. 369, 381 (2011).

<sup>18</sup> Rebecca Jo Reser & David T. Ritter, *State and Federal Legislation and Regulation of Hydraulic Fracturing*, 57 THE ADVOC. (TEXAS) 31, 34 (2011).

<sup>19</sup> Jason T. Gerken, *What the Frack Shale We Do? A Proposed Environmental Regulatory Scheme for Hydraulic Fracturing*, 41 CAP. U. L. REV. 81, 82 (2013).

<sup>20</sup> Deweese, *supra* note 13, at \*1.

<sup>21</sup> *Id.*

<sup>22</sup> Jefferies, *supra* note 9, at 104.

<sup>23</sup> KULANDER ET AL., *supra* note 12, at \*3A-8 (emphasis added).

First, hydrofracking processes are almost immune to reverse engineering. Despite distribution, these processes are difficult to duplicate based on possession and observation of the finished product, and thus, the process remains a secret.

Second, oil and gas companies would rather not disclose their processes through patents, as the patent process requires disclosure of whatever is sought to be protected.<sup>24</sup> This disclosure is public, and competition could implement the disclosed process in secret. As previously mentioned, specific processes are undetectable by simple observation, but the patent process would make infringement highly likely, and consequences for that infringement highly unlikely. Therefore, infringement of process patents would be difficult to detect. Trade secret protection circumvents the disclosure requirement and protects companies from infringement by competitors.

Third, patents only last for a term before the subject matter becomes public domain.<sup>25</sup> Generally, a patent utility patent will have a term of protection lasting 20 years.<sup>26</sup> This could be extended to 21 total years of protection through crafty use of the one year provisional patent term.<sup>27</sup> However, a company does not want a term of protection, because the matter disclosed in the patent falls into the public domain upon expiration. Trade secrets, on the other hand, are protectable so long as the subject matter remains secret, because there is no statutorily defined term of protection. Therefore, the term of protection ends when the secret is disclosed, because any user of the information could claim that the information is readily ascertainable as a defense to misappropriation.<sup>28</sup> Oil and gas companies want to retain their competitive edge to keep their advances under long-term trade secret protection.<sup>29</sup>

Fourth, trade secret protection would grant oil and gas companies private rights of action for any misappropriation. Misappropriation may occur through a breach of confidence from someone who has agreed to keep the information secret or from the acquisition of protected information through improper means.<sup>30</sup> The term “improper means” encompasses any

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<sup>24</sup> *General Information Concerning Patents: Specification*, U.S. PAT. AND TRADEMARK OFF., [http://www.uspto.gov/patents/resources/general\\_info\\_concerning\\_patents.jsp](http://www.uspto.gov/patents/resources/general_info_concerning_patents.jsp) (last updated Nov. 2011).

<sup>25</sup> *General Information Concerning Patents: Nature of Patent and Patent Right*, U.S. PAT. AND TRADEMARK OFF., [http://www.uspto.gov/patents/resources/general\\_info\\_concerning\\_patents.jsp](http://www.uspto.gov/patents/resources/general_info_concerning_patents.jsp) (last updated Nov. 2011).

<sup>26</sup> 35 U.S.C. § 154(a) (2013).

<sup>27</sup> *Provisional Application for Patent*, U.S. PAT. AND TRADEMARK OFF., <http://www.uspto.gov/patents/resources/types/provapp.jsp> (last updated Nov. 19, 2013) (explaining that “[a] provisional application for patent (provisional application) has a pendency lasting 12 months from the date the provisional application is filed.”).

<sup>28</sup> *Trade Secret*, CORNELL U. L. SCH., [http://www.law.cornell.edu/wex/trade\\_secret](http://www.law.cornell.edu/wex/trade_secret) (last visited Nov. 19, 2013).

<sup>29</sup> *Id.*

<sup>30</sup> *Id.*

method of obtaining the information through unfair tactics.<sup>31</sup> Because trade secret protection can last for an indefinite term and allows a private right of action,<sup>32</sup> oil and gas companies would be likely to protect intellectual property through trade secrecy.

*A. Do the Proprietary Chemical Mixtures or Chemical Formulas Qualify for Trade Secret Protection in the Marcellus Shale States?*

Intellectual property protection allows a creator of valuable information to capitalize on the information to receive pecuniary gain.<sup>33</sup> The gain offsets the creation costs and provides an incentive to create valuable information. Thomas Jefferson believed “ingenuity should receive a liberal encouragement.”<sup>34</sup> Based on the importance of fossil fuels to the U.S. economy, innovation in fuel extraction should receive such liberal encouragement to motivate advances in fuel production.

One method of encouraging ingenuity is by offering trade secret protection of proprietary information through a cause of action for any misappropriation of trade secrets.<sup>35</sup> This cause of action has three elements: “(1) existence of a trade secret; (2) disclosure of the trade secret to the defendant in confidence, or the defendant’s acquisition of the trade secret by improper means; and (3) injury to the plaintiff resulting from the defendant’s use of the trade secret.”<sup>36</sup> By negating any one of these elements, a defendant would be able to establish that the information at issue is not a trade secret, and thus, available for public use.<sup>37</sup>

*1. The Information Must Be a Trade Secret*

Trade secret is a creature of state law<sup>38</sup> and a codification of state common law. Therefore, we must look to state law to solve this problem. Forty-seven states have enacted a version of the Uniform Trade Secrets Act

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<sup>31</sup> NATIONAL CONFERENCE OF COMMISSIONERS ON UNIFORM STATE LAWS, UNIFORM TRADE SECRETS ACT (1985), available at [http://homepages.law.asu.edu/~dkarjala/Copyright/UniformTradeSecretsAct\(1985\).pdf](http://homepages.law.asu.edu/~dkarjala/Copyright/UniformTradeSecretsAct(1985).pdf).

<sup>32</sup> *Id.*

<sup>33</sup> ROCHELLE DREYFUSS & ROBERT KWALL, INTELLECTUAL PROPERTY CASES AND MATERIALS ON TRADEMARK, COPYRIGHT, AND PATENT LAW 1 (2d ed. 2004).

<sup>34</sup> Letter from Thomas Jefferson to Oliver Evans (May 1807), in V WRITINGS OF THOMAS JEFFERSON, at 75-76 (Washington ed.), quoted in ROCHELLE DREYFUSS & ROBERT KWALL, INTELLECTUAL PROPERTY CASES AND MATERIALS ON TRADEMARK, COPYRIGHT, AND PATENT LAW 672 (2d ed. 2004).

<sup>35</sup> *Trade Secret*, *supra* note 28.

<sup>36</sup> Donald M. Zupanec, *Disclosure of Trade Secret as Abandonment of Secrecy*, 92 A.L.R.3d 138, 155 (1979).

<sup>37</sup> *Id.*

<sup>38</sup> 2 LOUIS ALTMAN & MALLA POLLACK, CALLMANN ON UNFAIR COMPETITION, TRADEMARKS AND MONOPOLIES § 14:2 (4th ed. 2013).

(“UTSA”).<sup>39</sup> Of the Marcellus Shale States, all but New York have enacted UTSA.<sup>40</sup> Kentucky adopted the Act in 1990,<sup>41</sup> while “Pennsylvania passed the Act in 2004.”<sup>42</sup> Chemical formulas fall under the type of information protectable under the UTSA, which defines trade secrets as:

(1) information, including a *formula*, pattern, compilation, program, device, method, technique, or process, (2) that derives independent economic value, actual or potential, from not being generally known to or readily ascertainable through appropriate means by other persons who might obtain economic value from its disclosure or use; (3) and is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.<sup>43</sup>

Furthermore, the Restatement of Torts § 757, comment b, contains a list of widely adopted factors used by courts to determine the existence of a trade secret.<sup>44</sup> Under the Restatement, the following factors must be analyzed to determine whether the information at issue is a trade secret:

(1) the extent to which the information is known outside the claimant’s business; (2) the extent to which it is known by employees and others involved in the business; (3) the extent of measures taken by the claimant to guard the secrecy of the information; (4) the value of the information to the business by the business in developing the information; and (5) the ease or difficulty with which the information could be properly acquired or duplicated by others.<sup>45</sup>

These principals are important because they are the foundation for the UTSA, and are likely to be considered in interpreting the UTSA.

<sup>39</sup> MELVIN F. JAGER, TRADE SECRET LAW § 3:29 (2010).

<sup>40</sup> *Compare Marcellus Shale, Background*, STATEIMPACT.NPR.ORG, <http://stateimpact.npr.org/pennsylvania/tag/marcellus-shale/> (last visited Sept. 29, 2013), with MELVIN F. JAGER, TRADE SECRET LAW § 3:29 (2013) (showing that despite New York being central to the Marcellus shale industry, it is not one of the 47 states to adopt the UTSA).

<sup>41</sup> JAGER, *supra* note 39.

<sup>42</sup> *Id.*

<sup>43</sup> See KY. REV. STAT. ANN. § 365.880(4) (West 2013); MD. CODE ANN., COM. LAW § 11-1201(e) (West 2013); OHIO REV. CODE ANN. § 1333.61(D) (West 2013); 12 PA. CONS. STAT. ANN. § 5302 (West 2013); W. VA. CODE § 47-22-1(d) (2013); *Trade Secret*, *supra* note 28.

<sup>44</sup> *Trade Secret*, *supra* note 28.

<sup>45</sup> *Id.*

(a) *The Hydrofracking Process Falls Within the UTSA Protection*

According to the UTSA, chemical formulas are protectable because a “formula” is enumerated as qualifying information for protection.<sup>46</sup> In *Felmlee v. Lockett*, the plaintiff sought an injunction for the use of chemical formulas and molds for soft plastic fishing lures.<sup>47</sup> The court looked to the Restatement of Torts § 757, which lists formulas as protectable information.<sup>48</sup> The court granted an injunction finding that blended and mixed additives constitute a formula.<sup>49</sup> Fracking chemical formulas are also a mix of additives, because the fluid commonly contains water, sand, and other chemicals.<sup>50</sup> Therefore, the proprietary chemical formulas in fracking fluid are of the type protected by the UTSA.<sup>51</sup>

2. *The Information is Not Generally Known or Readily Ascertainable*

To qualify as a trade secret under the UTSA, the information must not be known or readily ascertainable through “appropriate means.”<sup>52</sup> The Supreme Court of Indiana interpreted Indiana’s codification of the UTSA and determined the meaning of the phrase, “not being readily ascertainable” in *Amoco Prod. Co. v. Laird*.<sup>53</sup> Amoco found oil fields through microwave surveys after spending \$150,000.<sup>54</sup> The court found that the information regarding the locations of the oil fields was a trade secret because, when a “substantial investment of time, expense, or effort” is required to reproduce the information, it is “not readily ascertainable.”<sup>55</sup> Notably, fracking fluid chemical formulas are not reproducible without a substantial investment of time, expense, or effort because oil and gas companies spend money enhancing extraction techniques. For example, in 2009, Halliburton, a leader in the oil and gas industry, “spent approximately \$349 million on technology research and development.”<sup>56</sup> While this entire amount was not spent solely toward developing fracking fluid formulas, Halliburton could

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<sup>46</sup> *Id.*

<sup>47</sup> *Felmlee v. Lockett*, 351 A.2d 273, 274-75 (Pa. 1976).

<sup>48</sup> *Id.* at 277.

<sup>49</sup> *See Felmlee*, 351 A.2d at 277.

<sup>50</sup> KULANDER ET AL., *supra* note 12, at \*3A9; Dewese, *supra* note 13, at \*18.

<sup>51</sup> *See* KY. REV. STAT. ANN. § 365.880(4) (West 2013); MD. CODE ANN., COM. LAW § 11-1201(e) (West 2013); OHIO REV. CODE ANN. § 1333.61(D) (West 2013); 12 PA. CONS. STAT. ANN. § 5302 (West 2013); W. VA. CODE § 47-22-1(d) (2013); *Trade Secret*, *supra* note 28.

<sup>52</sup> *Id.*

<sup>53</sup> *Amoco Prod. Co. v. Laird*, 622 N.E.2d 912, 913 (Ind. 1993).

<sup>54</sup> *Id.* at 914.

<sup>55</sup> *Id.* at 920.

<sup>56</sup> *Technology Leadership*, HALLIBURTON, <http://www.halliburton.com/en-US/careers/why-you-ll-like-us/technology.page> (last visited Oct. 6, 2013).



ostensibly show a portion was spent developing the chemical formula. Therefore, the chemical formulas are probably not readily ascertainable.

*3. The Information is Subject to Reasonable Efforts to Maintain Its Secrecy*

Finally, the chemical formulas and mixture ratios are subject to reasonable efforts to maintain their secrecy because oil and gas companies take precautions to prevent proprietary formulas from being disclosed to outside sources. In *Elm City Cheese Co. v. Federico*, the plaintiff cheese company sued a former accountant for opening a cheese company with the plaintiff's business plan.<sup>57</sup> The Connecticut Supreme Court found that a company had made reasonable efforts to maintain secrecy of information by:

- (1) requiring employees to sign confidentiality agreements or otherwise advising them of the confidential nature of the process;
- (2) posting warning or cautionary signs, or placing warnings on documents;
- (3) requiring visitors to sign confidentiality agreements, sign in, and shielding the process from their view;
- (4) segregating information;
- (5) using unnamed or code-named ingredients; and
- (6) keeping secret documents under lock.<sup>58</sup>

The trial court found the financial information of the company was "kept in a locked safe in a locked office with a monitored burglar alarm system," and therefore, the information was subject to reasonable efforts to maintain its secrecy.<sup>59</sup>

Similarly, oil and gas companies protect their proprietary formulas as well. They report public material safety data sheets ("MSDS") for fracking fluid without revealing compounds and simply recite the symptoms of exposure to fracking fluid.<sup>60</sup> While redacting the chemical formulas from a MSDS complicates exposure treatments, the reasonable efforts taken in the censoring practice is an indication that oil and gas companies are protective of the chemical compounds used in the fracking process. As a result, the identities and mixture ratios constitute protectable trade secrets.

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<sup>57</sup> See *Elm City Cheese Co. v. Federico*, 752 A.2d 1037, 1051 (Conn. 1999).

<sup>58</sup> *Id.* at 1049.

<sup>59</sup> *Id.* at 1051.

<sup>60</sup> Hannah Wiseman, *Untested Waters: The Rise of Hydraulic Fracturing in Oil and Gas Production and the Need to Revisit Regulation*, 20 FORDHAM ENVTL. L. REV. 115, 139 (2009).

*B. Public Disclosure Could Constitute Abandonment of a Trade Secret*

Based on the previous analysis, oil and gas companies can likely show that their chemical formulas are trade secrets. This satisfies the first element for the cause of action of misappropriation against any competitors using the protected trade secret, but the analysis is not finished. Trade secret protection lasts only as long as the information is not disclosed to the public.<sup>61</sup> Disclosure causes abandonment, because the second element of the misappropriation cause of action cannot be proven. The second element is: “disclosure of the trade secret to the defendant in confidence, or the defendant’s acquisition of the trade secret by improper means.”<sup>62</sup> Public disclosure of a trade secret negates the second element of this test because the defendant neither received the information in confidence, nor by improper means. Put simply, “[b]y disclosing alleged trade secrets, the owner relinquishes the property interest in the information.”<sup>63</sup> According to the Restatement of Torts § 757, trade secrecy no longer exists once the information is disclosed.<sup>64</sup> This has been interpreted to mean, “[i]nformation will *no longer be given injunctive protection* as a trade secret if it can be *obtained through legitimate means* by a competitor.”<sup>65</sup> Examples of legitimate means of obtaining information include reverse engineering<sup>66</sup> and public disclosure.<sup>67</sup> However, legal secrecy, not actual secrecy, is required and disclosures in confidence remain protectable under trade secret law.<sup>68</sup>

Partial disclosure does not result in abandonment of a trade secret.<sup>69</sup> Information is a trade secret when it is not readily ascertainable. Accordingly, some public disclosure may not make the entire trade secret “readily ascertainable by proper means;” “[p]artial disclosure of the information to third parties, where disclosure is necessary, does not preclude a finding that the information constitutes a trade secret.”<sup>70</sup> Furthermore, “a trade secret often may include elements which by themselves may be readily ascertainable in the public domain, but when viewed together may still qualify for trade secret protection.”<sup>71</sup> In order to determine whether the information remains a trade secret, courts analyze

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<sup>61</sup> *Trade Secret*, *supra* note 28.

<sup>62</sup> *Id.*

<sup>63</sup> *Mobile Med. Int’l Corp. v. United States*, 95 Fed. Cl. 706, 734 (2010).

<sup>64</sup> RESTATEMENT (FIRST) OF TORTS § 757 (1939).

<sup>65</sup> *Id.* (emphasis added).

<sup>66</sup> Donald M. Zupanec, Annotation, *Disclosure of Trade Secret as Abandonment of Secrecy*, 92 A.L.R.3d 138, § 3[a] (1979) (citing *Iron Age Corp. v. Dvorak*, 880 A.2d 657 (Pa. Super. Ct. 2005)).

<sup>67</sup> *Id.* § 3[b].

<sup>68</sup> *Id.* § 8[a].

<sup>69</sup> *Id.* § 6.

<sup>70</sup> *Television Telecomm. Sys., Inc. v. Saindon*, 522 N.E.2d 1359, 1365 (Ill. App. Ct. 1988).

<sup>71</sup> *Amoco Prod. Co. v. Laird*, 622 N.E.2d 912, 919 (Ind. 1993).

whether “significant time, effort, and expense” would be required to reproduce the information.”<sup>72</sup> If these investments are required, then the information is probably not readily ascertainable.<sup>73</sup> Both state and federal laws regulate fracking and require certain disclosures due to the dangerous nature of the chemicals used. But whether the disclosure constitutes abandonment will hinge on the level of disclosure required.

*C. Are the Protected Chemicals Used in the Hydrofracking Process Dangerous?*

Fracking has a dark side. There are environmental and human health risks when fracking fluids are improperly disposed, or when drilling wells leech into surrounding water. Unfortunately, the fracking fluid is not the only source of dangerous material that warrants concern. The surrounding rock in the Marcellus shale formation contains harmful substances such as pyrite and uranium, which may be carried into the fracking fluid; thus, presenting more dangers to humans and the environment alike.

*1. Environmental Harms Caused by the Chemicals Used in the Fracking Process*

The proper disposal of wastewater from fracking is difficult.<sup>74</sup> In fact, Marcellus Shale fracking requires one to five million gallons of fracking fluid per well, with 20-40% of the fluid returning through the well and the rest being abandoned.<sup>75</sup> Wastewater contains salts, heavy metals, radionucleotides, bromides, arsenic, barium, and hydrocarbons at concentrations that are unsafe for human consumption.<sup>76</sup>

Fracking runoff is alleged to have caused fish kills in streams.<sup>77</sup> Fracking is also alleged to have destroyed plant life by increasing the amount of natural gas and decreasing the amount “of air in [the] soil’s shallow root zone.”<sup>78</sup> Well water contamination has been reported where fracking operations occurred nearby. These reports included allegations of: soapy water, diesel odors, iron, sulfur, methane fizzing, and oily suspensions in the water.<sup>79</sup> One report insisted that tap water left in a glass

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<sup>72</sup> *Id.* at 918.

<sup>73</sup> *See id.* at 919 (citing Peter J. Couture, *Independent Derivation and Reverse Engineering*, TRADE SECRET PROTECTION AND LITIGATION 615, 623 (1992)).

<sup>74</sup> *See* Jefferies, *supra* note 9, at 75, 100.

<sup>75</sup> *See* KULANDER ET AL., *supra* note 12, at \*3A, \*3A-9.

<sup>76</sup> *See* Jefferies, *supra* note 9, at 102.

<sup>77</sup> Wiseman, *supra* note 60, at 132.

<sup>78</sup> *Id.* at 138.

<sup>79</sup> *Id.* at 132, 138.

overnight would contain an oily layer on top by morning.<sup>80</sup> Based on these reports, affected water is no longer fit for human consumption without treatment.

## *2. Public Health Harms Caused by the Chemicals Used in the Fracking Process*

In *Fiorentino v. Cabot Oil & Gas Corp.*, a plaintiff class of sixty-three individuals alleged that their well water was contaminated with “methane, natural gas, and other toxins” from hydraulic fracturing.<sup>81</sup> The plaintiffs alleged “neurological, gastrointestinal, and dermatological symptoms and blood study results consistent with toxic exposure.”<sup>82</sup> Similarly, West Virginians who lived near a fracking event, have reported rashes from showering.<sup>83</sup> In Colorado, Steve Mobaldi and his wife experienced “burning eyes, nosebleeds, fatigue, headaches, hand numbness, bloody stools, rashes, and skin welts” after drilling began “on a property about 3,000 feet to the west.”<sup>84</sup> A doctor diagnosed Mobaldi’s wife with chemical exposure.<sup>85</sup> Mobaldi also had trees on his property that died.<sup>86</sup> These reports indicate that fracking events introduce harmful chemicals into the environment that are detrimental to human health. Additionally, harmful gases may be released which put people in danger.<sup>87</sup> In an area of coal bed methane hydrofracking, a Colorado county employee took measurements from local homes, finding toxic levels of hydrogen sulfide and explosive levels of methane in many of the homes.<sup>88</sup>

While public health concerns have not been reliably linked to hydrofracking, allegations of such a link have brought public attention to the matter.<sup>89</sup> Whether these claims are valid or not, federal and state governments have reacted through legislation.<sup>90</sup> Several pieces of this legislation and proposed legislation contain certain disclosure requirements that could potentially result in abandoning the chemical identities or mixtures in fracking fluid.<sup>91</sup>

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<sup>80</sup> *Id.* at 138.

<sup>81</sup> *Fiorentino v. Cabot Oil & Gas Corp.*, 750 F. Supp. 2d 506, 509 (M.D. Pa. 2010).

<sup>82</sup> Wiseman, *supra* note 60, at 132.

<sup>83</sup> *Id.*

<sup>84</sup> *Id.* at 138.

<sup>85</sup> *Id.*

<sup>86</sup> *Id.*

<sup>87</sup> *Fracking Air Pollution*, CATSKILL MOUNTAINKEEPER, <http://www.catskillmountainkeeper.org/our-programs/fracking/whats-wrong-with-fracking-2/air-pollution/> (last visited Sept. 29, 2013).

<sup>88</sup> Wiseman, *supra* note 60, at 129.

<sup>89</sup> *Id.* at 132.

<sup>90</sup> *Id.* at 142-43.

<sup>91</sup> MATTHEW MCFEELEY, NATURAL RES. DEF. COUNCIL, STATE HYDRAULIC FRACTURING DISCLOSURE RULES AND ENFORCEMENT: A COMPARISON 1 (2012), *available at* <http://www.nrdc.org/energy/files/Fracking-Disclosure-IB.pdf>.

### *D. Legislative Solution to Public Harms and Disclosure Requirements*

Due to the negative public image and possible public health issues presented both federal and state legislatures have created restrictions through permits, disposal, inspection, monitoring, recordkeeping, and reporting requirements in order to combat these public harms.<sup>92</sup>

#### *1. Safe Drinking Water Act*

The Safe Drinking Water Act (“SDWA”) is federal legislation requiring the EPA to “promulgate regulations addressing underground fluid injection to protect groundwater drinking supplies.”<sup>93</sup> Under this Act, states create UIC programs and seek approval from the EPA for the programs.<sup>94</sup> UIC programs classify wells by type.<sup>95</sup> Class I includes wells used for disposal “of hazardous, industrial, or municipal wastes beneath underground sources of drinking water.”<sup>96</sup> Class II wells are for the injection of fluids in the course of conventional oil or gas production.<sup>97</sup> Class III wells are for the injections used for mineral extraction.<sup>98</sup> Class IV includes wells injecting hazardous and radioactive waste above or into an underground water supply.<sup>99</sup> Finally, Class V is a catchall for any other wells not fitting the other categories.<sup>100</sup> Before *LEAF v. EPA*, fracking wells remained unclassified because the “EPA interpret[ed] that definition as encompassing only those wells whose ‘principal function’ is the underground emplacement of fluids,” while fracking entails temporary injection and then the removal of the fluid.<sup>101</sup> In *LEAF v. EPA*, the Eleventh Circuit ruled that hydrofracking wells are UIC Class II wells, requiring that the states and EPA must regulate the wells because “Congress dictated that *all* underground injection be regulated under the UIC programs.”<sup>102</sup>

The EPA did not directly regulate fracking, but set the minimum requirements for state UIC programs, including disclosure of the “source and appropriate analysis of the chemical and physical characteristics of the

<sup>92</sup> 42 U.S.C. § 300h(b)(1)(C) (2005).

<sup>93</sup> Jefferies, *supra* note 9, at 98.

<sup>94</sup> Legal Envtl. Assistance Found. v. EPA, 118 F.3d 1467, 1469-70 (11th Cir. 1997); Angela C. Cupas, *The Not-So-Safe Drinking Water Act: Why We Must Regulate Hydraulic Fracturing at the Federal Level*, 33 WM. & MARY ENVTL. L. & POL’Y REV. 605, 605 (2009).

<sup>95</sup> Legal Envtl. Assistance Found. v. EPA, 118 F.3d 1467, 1470 (11th Cir. 1997).

<sup>96</sup> *Id.*

<sup>97</sup> *Id.*

<sup>98</sup> *Id.*

<sup>99</sup> *Id.*

<sup>100</sup> *Id.*

<sup>101</sup> *Id.* at 1471.

<sup>102</sup> *Id.* at 1474.

injection fluid.”<sup>103</sup> The EPA collected this information, but this does not constitute abandonment of a trade secret because the disclosure was not public, even in light of the Freedom of Information Act (“FOIA”).<sup>104</sup> FOIA allows individuals to make a request for information collected by government agencies.<sup>105</sup> However, FOIA does not apply to information that constitutes a trade secret.<sup>106</sup> The proprietary chemical formulas are probably trade secrets as analyzed above, and therefore, an individual will not be able to receive this information via FOIA requests.

Underground injections, for the purposes of storage or hydraulic fracturing, have been explicitly excluded from the “underground injection” definition since the 2005 amendments to the SDWA.<sup>107</sup> The SDWA “underground injection” exclusions read, “(i) the underground injection of natural gas for purposes of storage; and (ii) the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities.”<sup>108</sup> These exclusions mean the EPA no longer regulates underground injections in the hydrofracking process. As a result, states again assume the role of regulators of hydraulic fracture, which is in accordance with the original congressional intent behind the SDWA before *Leaf v. EPA*.<sup>109</sup> Thus, the amended SDWA does not require federal disclosures of proprietary chemical formulas, and trade secret protection is not abandoned under the SDWA.<sup>110</sup>

## 2. State UIC Program Disclosure Requirements

The states remain the regulators of fracking, and most disclosures for these Class II wells occur in well permitting or completion reports.<sup>111</sup> States requiring additional disclosures could potentially stifle innovation and inhibit development of hydraulic fracturing in their state, because trade secrets may become abandoned. This factor may motivate oil and gas companies to frack in other states not requiring disclosure. In fact, New York has seen many of the oil and gas companies move their fracking operations to more favorable states.<sup>112</sup>

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<sup>103</sup> 40 C.F.R. § 146.24(a)(4) (2013).

<sup>104</sup> Freedom of Information Act, 5 U.S.C. § 552 (2013).

<sup>105</sup> *Id.* § 552(a)(1).

<sup>106</sup> *Id.* § 552(b)(4).

<sup>107</sup> Jefferies, *supra* note 9, at 98.

<sup>108</sup> 42 U.S.C. § 300h(d)(1)(B)(i)-(ii) (2013).

<sup>109</sup> Scott R. Kurkoski, *The Marcellus Shale: A Game Changer for the New York Economy?*, N.Y. St. B. J., Jan. 2012, at 10, 13.

<sup>110</sup> Safe Drinking Water Act, 42 U.S.C. § 300f (1974).

<sup>111</sup> Markus G. Puder, *Did the Eleventh Circuit Crack “Frac”?-Hydraulic Fracturing After the Court’s Landmark Leaf Decision*, 18 VA. ENVTL. L.J. 507, 517 (1999).

<sup>112</sup> Kurkoski, *supra* note 109, at 10, 11.

*(a) Kentucky*

Kentucky requires some disclosure during the permitting process.<sup>113</sup> According to the Kentucky Regulations, applications for a Class II well require submitting a MSDS “for inhibitors if added to the injection fluid for control of scaling, corrosion, or bacterial growth.”<sup>114</sup> Also, § 15 of the regulation allows for the applicant to make a confidentiality request for “confidential business information.”<sup>115</sup> The regulation, however, does not give full protection to confidential information. The regulation states, “[i]nformation regarding the existence, absence, or level of contaminants in drinking water and records,” which a statute requires a company to disclose, cannot be granted a confidentiality request.<sup>116</sup>

The MSDS disclosure does not amount to an abandonment of a trade secret. If it is assumed that the MSDS does not qualify for a confidentiality request, then the MSDS disclosures are public information not eligible for trade secret protection.<sup>117</sup> This is because the defendant would have obtained the information by proper means of public disclosure. However, this disclosure only requires the MSDS of some of the chemical categories used in fracking fluid. There would have been no disclosure of chemical concentrations, ratios, or a complete list of all the chemicals used. “Partial disclosure of the information to third parties, where disclosure is necessary, does not preclude a finding that the information constitutes a trade secret.”<sup>118</sup> The partial disclosure is necessary by law, and some of the information in the trade secret would be in the public domain.<sup>119</sup> However, the defendant would have to invest significant “time, effort, and expense”<sup>120</sup> to determine the fracking fluid chemical concentrations and the exact chemicals used because the company would have to hire engineers to experiment with different fluid compositions. Therefore, an oil and gas company could bring a cause of action alleging a defendant obtained the complete information improperly. Although unlikely, independent discovery would be a defense to misappropriation, because the information would have been obtained by proper means. The likelihood of abandoning chemical identity or the mixture ratio trades secrets by public disclosure is low in Kentucky.

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<sup>113</sup> 805 KY. ADMIN. REGS. 1:110 (2008).

<sup>114</sup> *Id.*

<sup>115</sup> *Id.*

<sup>116</sup> *Id.*

<sup>117</sup> Gradijan, *supra* note 7, at 72.

<sup>118</sup> Televation Telecomm. Sys., Inc. v. Saindon, 522 N.E.2d 1359, 1365 (Ill. App. Ct. 1988).

<sup>119</sup> *Id.*

<sup>120</sup> Amoco Prod. Co. v. Laird, 622 N.E.2d 912, 918 (Ind. 1993).

*(b) Ohio*

In Ohio, the required hydraulic fracturing disclosures for the process include “the type, volume[,] and concentration of acid used” as well as the “type and volume of fluid used to stimulate the well.”<sup>121</sup> Amendment Senate Bill 165 of the Ohio regulation requires the submission of MSDS for the fracking fluid with each well completion form.<sup>122</sup> A requirement for including Chemical Abstract Services (“CAS”) numbers has also been considered.<sup>123</sup> The MSDS data is also published on a website.<sup>124</sup> Similar to Kentucky, Ohio allows companies to request that their information be kept confidential. However, “no information submitted has been marked as ‘confidential.’”<sup>125</sup>

Assuming all the above requirements take effect, companies hydrofracking in Ohio risk the abandonment of the chemical identity of their hydrofracking fluid, but not the chemical mixture ratios. A CAS number specifically identifies a chemical, and the Ohio requirements seem to require MSDS data for all chemicals used in fracking fluid.<sup>126</sup> Even the concentration of acids used must be disclosed.<sup>127</sup> Therefore, a competitor could look up these disclosures on the website. The website is public and would not be considered improper means for a misappropriation cause of action. As a result, the chemical identities used in the trade secret is no longer a secret and will not be protected; this lack of protection makes Ohio a less favorable state for oil and gas companies interested in utilizing the fracking process to increase the production of natural gas.

On the other hand, the concentration of each chemical in the fracking fluid will remain undisclosed.<sup>128</sup> Why is disclosure of an exhaustive list of ingredients without concentrations not a public disclosure of the formula? Imagine baking a cake with a list of ingredients, but no measurements or mixing instructions. While two bakers could potentially make similar cakes, different bakers relying on the same list would probably create two very different cakes. Similarly, a competitor does not know another oil and gas company’s secret formula just by seeing a list of ingredients. Therefore, significant time, effort, and expense must be invested to determine the appropriate chemical composition through experimentation. A competitor may discover another fluid composition that

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<sup>121</sup> OHIO DEPARTMENT OF NATURAL RESOURCES, *supra* note 7, at 24.

<sup>122</sup> *Id.*

<sup>123</sup> *Id.*

<sup>124</sup> *Id.*

<sup>125</sup> *Id.*

<sup>126</sup> Jefferies, *supra* note 9, at 98; Jacquelyn Pless, *Fracking Update: What States are Doing to Ensure Safe Natural Gas Extraction*, NAT’L CONF. ST. LEGISLATURES, <http://www.ncsl.org/issues-research/energyhome/fracking-update-what-states-are-doing.aspx> (last updated July 2011).

<sup>127</sup> OHIO DEPARTMENT OF NATURAL RESOURCES, *supra* note 7, at 4.

<sup>128</sup> Kurkoski, *supra* note 109.



works without using the same compositions as the trade secret holder. Disclosure of the ingredients is not disclosure of the fluid composition, and the plaintiff could potentially prove acquisition of their formula by improper means. Therefore, a trade secret remains in the fluid composition.

In Ohio, there is a high risk of abandonment of trade secret protection of chemical identities and low risk of abandonment of trade secret protection for the mixture ratios used in fracking fluid.

*(c) Maryland*

In Maryland, House Bill 411 and Senate Bill 422 would have required disclosing the chemicals used in hydraulic fracturing to the Department of the Environment.<sup>129</sup> However, both of these bills died.<sup>130</sup> At this time, “there are no specific regulations governing fracking” in the state of Maryland. Absent public disclosure requirements, an oil and gas company could allege a competitor obtained their chemical formula through improper means. An oil and gas company could then bring a claim on how the remainder of the fracking formula was also obtained through improper means. The likelihood of abandoning trade secret protection regarding chemical identities and mixture ratios in Maryland is low, putting it in a similar category with Kentucky as a state favorable for companies wishing to protect chemical formulas in the fracking process.

*(d) West Virginia*

West Virginia’s proposed legislation, House Bill 2403, “would have required gas well operators to submit” lists of water additives to the Office of Oil and Gas.<sup>131</sup> However, as in Maryland, this bill also died.<sup>132</sup> Without requirements to disclose chemical constituents or concentrations, an oil and gas company can bring a cause of action for misappropriation of their fracking formulas. Thus, the likelihood of abandonment of either trade secret through disclosure in West Virginia is low since there is no public disclosure requirement.

*(e) Pennsylvania*

The Pennsylvania Department of Environmental Protection (“DEP”) requires disclosure of names of chemicals used in fracking and disclosure of concentrations and chemical formulas in case of a medical

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<sup>129</sup> Pless, *supra* note 126.

<sup>130</sup> Puder, *supra* note 111.

<sup>131</sup> Pless, *supra* note 126.

<sup>132</sup> *Id.*

emergency.<sup>133</sup> Additionally, wastes generated in Marcellus Shale fracking must be noted in an annual report.<sup>134</sup> The DEP may require the proportions and concentrations of chemicals in fracking fluid in the future.<sup>135</sup> Pennsylvania allows companies to request that their hydrofracking information remain private, through a system called confidential proprietary information (“CPI”), but no requests regarding hydraulic fracturing have been made.<sup>136</sup> Employees working at a fracking site are allowed to request MSDS for the chemicals used at the site.<sup>137</sup> Furthermore, since 2007, Pennsylvania has kept all hydrofracking chemical information on a website.<sup>138</sup>

The existing disclosure requirements would not constitute disclosure of a trade secret because the chemical concentrations would not be disclosed. If the DEP requires disclosure of the chemical concentrations and identifications in the future, the whole “recipe” for the fracking fluid would be disclosed. A competitor could find the information through proper means because a website would contain the fracking fluid chemicals and concentrations. Employees could also obtain the information through a request and then sell or use the information without a confidentiality agreement. Thus, a plaintiff oil and gas company could not prove the second element of misappropriation because no improper means would have been used to obtain the information; the presence of information in the public domain makes the information readily ascertainable, and therefore, no trade secret exists. If the chemical concentrations become a disclosure requirement, the likelihood of abandonment of both trade secrets is high in Pennsylvania.

*(f) New York*

The Supplemental Generic Environmental Impact Statement on the Oil, Gas, and Solution Mining (“SGEIS”) controls hydraulic fracturing activities in New York. SGEIS primarily regulates disclosure of the fracturing chemicals through drilling permits.<sup>139</sup> Permits require the “disclosure of the ‘frac’ fluid compositions and percentages of chemicals”

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<sup>133</sup> Gradijan, *supra* note 7, at 75.

<sup>134</sup> *Well Construction Standards FAQ*, PA. DEP’T ENVTL. PROTECTION, <http://www.portal.state.pa.us/portal/server.pt/community/faq/20480> (last visited Jan. 14, 2013).

<sup>135</sup> PA DEP’T OF ENVTL. PROT., PENNSYLVANIA HYDRAULIC FRACTURING STATE REVIEW 18 (2010), *available at* <http://www.strongerinc.org/sites/all/themes/stronger02/downloads/PA%20HF%20Review%20Print%20Version.pdf>.

<sup>136</sup> *Id.*

<sup>137</sup> *Id.* at 33 (citing Pennsylvania Worker and Community Right to Know Act, 35 P.S. §§ 7301-7320).

<sup>138</sup> *Id.* at 18.

<sup>139</sup> Gradijan, *supra* note 7, at 71-73.

for each well.<sup>140</sup> This constitutes disclosure of the entire formula for the fracking fluid. Once disclosed, this information would be in the public domain and would be readily ascertainable by competitors.<sup>141</sup> As long as the information is obtained through proper means, such as through the public domain, an oil and gas trade secret holder cannot bring a misappropriation action against a competitor. The likelihood of abandonment of both trade secrets in New York is high making this a less favorable state for oil and gas companies.

### 3. *The FRAC Act*

The explicit exclusion of regulating hydraulic fracturing from EPA regulation in the 2005 amendments to the SDWA has been labeled the “Halliburton Loophole.”<sup>142</sup> The FRAC Act is proposed legislation to reverse the exclusion of the 2005 SDWA amendment and close the loophole.<sup>143</sup> In 2009, Congressmen DeGette introduced the FRAC Act in the House of Representatives, which would have required “companies conducting fracturing operations to disclose the chemicals used in the fracturing operations.”<sup>144</sup> The FRAC Act has been considered by Congress twice, but has never passed.<sup>145</sup>

The FRAC Act was written as an amendment to § 300(b)(C) of the SDWA, and “includ[es] a requirement that any person using hydraulic fracturing disclose to the State (or the Administrator if the Administrator has primary enforcement responsibility in the state) *the chemical constituents* (but not the proprietary chemical formulas) used in the fracturing process.”<sup>146</sup> Subpart (4) of § 300h(b), however, would require certain disclosures:

(4) The State (or Administrator) shall make the disclosure or chemical constituents referred to in subparagraph (C) of paragraph (1) available to the public, *including a posting of the information on an appropriate Internet website*. In addition, whenever the State or the Administrator, or a treating physician or nurse, determines that a *medical*

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<sup>140</sup> NY DEC Proposes New Safety Measures, Mitigation Strategies to Govern Potential Marcellus Shale Drilling (Sept 2009), INTERSTATE OIL & GAS COMPACT COMMISSION, <http://groundwork.iogcc.org/topics-index/shale-gas/the-state-perspective/ny-dec-proposes-new-safety-measures-mitigation-strategi> (last visited Jan. 14, 2013).

<sup>141</sup> Gradijan, *supra* note 7, at 72.

<sup>142</sup> Deweese, *supra* note 13, at \*1.

<sup>143</sup> *Id.*

<sup>144</sup> *Id.*

<sup>145</sup> Stephen Goss, *FRAC Act Re-Introduced To Senate*, ENVTL. WORKING GROUP (July 16, 2013), <http://www.ewg.org/enviroblog/2013/07/frac-act-re-introduced-senate>.

<sup>146</sup> Deweese, *supra* note 13, at \*11 (emphasis added).

*emergency exists and the proprietary chemical formulas or specific chemical identity of a chemical used in hydraulic fracturing is necessary for emergency first-aid treatment, the person using hydraulic fracturing shall immediately disclose the proprietary chemical formulas or the specific chemical identity of a trade secret chemical to the State, the Administrator, or that treating physician or nurse, regardless of the existence of a written statement of need or a confidentiality agreement. The person using hydraulic fracturing may require a written statement of need and a confidentiality agreement as soon thereafter as the circumstances permit.*<sup>147</sup>

The danger of the FRAC Act to oil and gas companies lies in the disclosure of chemical identities in cases of medical emergency. Interestingly, medical emergency is undefined.<sup>148</sup> This requirement forces disclosure without a confidentiality agreement.<sup>149</sup> Of course, the company could obtain a confidentiality agreement later.<sup>150</sup> However, a time window exists where the nurses, patient, and state could disclose the information without breaching such an agreement.<sup>151</sup> Therefore, the recipient of the information has not used improper means or breached confidentiality to obtain the information and, as a result, misappropriation cannot be proven if the information was obtained in that window.

Fortunately for oil and gas companies, the disclosure required by the FRAC Act would only be the chemical formula or identity.<sup>152</sup> There is no mention of requiring disclosure of the concentrations or ratios used. Without the ratios, a recipient of the chemical ingredients list must experiment to determine the proper ratios themselves. Thus, both trade secrets would not be disclosed under the FRAC Act, and the oil and gas company could bring a cause of action for misappropriation regarding mixture ratios.<sup>153</sup> The likelihood of abandoning trade secret protection regarding chemical identities is high, and the likelihood of abandonment regarding the mixture ratios is low based on the partial disclosure required in the FRAC Act's worst-case scenario.

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<sup>147</sup> *Id.* at \*12 (emphasis added).

<sup>148</sup> *Id.* at \*15.

<sup>149</sup> *Id.* at \*13.

<sup>150</sup> *Id.*

<sup>151</sup> *Id.* at \*12.

<sup>152</sup> *Id.* at \*13.

<sup>153</sup> *Televation Telecomm. Sys., Inc. v. Saindon*, 522 N.E.2d 1359, 1365 (Ill. App. Ct. 1988).

## III. CONCLUSION

Oil and gas companies could lose their trade secret protection due to a complete disclosure of proprietary chemical formulas, including concentrations. New York and Pennsylvania's regulations have a high likelihood of abandoning trade secret protection for chemical identities and mixture ratios. Alternatively, the likelihood of abandoning trade secret protection is low in Kentucky, Maryland, and West Virginia. Further, the likelihood of abandoning protection for the chemical identities, but not the mixture ratios, is high in Ohio and in the proposed FRAC Act. Because trade protection is important for the economic position of oil and gas companies, Kentucky, Maryland, and West Virginia's regulatory schemes are more encouraging of fracking activity and innovation. These states should be monitored for tort claims against oil and gas companies to determine if the alleged public harms remain unsubstantiated. Because many of the public health claims have not been clearly linked to fracking and unconventional energy sources are important to the economy, the states' differing regulatory schemes provide good experimental models for efficient regulation of hydrofracking rather than a federal blanket approach. Since the FRAC Act was not passed,<sup>154</sup> the states' varied regulatory models can be observed to determine the appropriate level of disclosure required and, if necessary, a suitable federal regulatory scheme could be modeled in the future.

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<sup>154</sup> *S. 1135: FRAC Act*, GOVTRACK.US, [www.govtrack.us/congress/bills/113/s1135](http://www.govtrack.us/congress/bills/113/s1135) (last visited Sept. 26, 2013).