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# Promoting Industry Transparency in the Field of Hydraulic Fracturing to Facilitate Equitable Balancing of Economic Interests and Public Health

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*Trevor Gruwell*[*]

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## INTRODUCTION

Patients entering the emergency room must often contemplate lasting health consequences following their visit. Normally, the medical staff in the emergency room do not face similar lasting health risks and will continue on with their work as they did before. This was not true, however, for Cathy Behr, a former nurse in the Durango, Colorado Emergency Room, who will likely never recover from her brief exposure to fracking fluid additives. Cathy was on duty when a fracking company employee was rushed to the emergency room after a workplace accident left him covered in fracking fluid additives.[1] As a precaution, the emergency room

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1. *See* Elliot Fink, Note, *Dirty Little Secrets: Fracking Fluids, Dubious Trade Secrets, Confidential Contamination, and the Public Health Information Vacuum*, 29 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 971, 995 (2019).

was shut down and ventilated within minutes of the patient's arrival.[2] The safety precautions were not sufficient for Cathy, whose brief exposure while treating her patient proved nearly fatal.[3] Cathy immediately lost her sense of smell and suffered blurred vision.[4] She quickly developed a severe headache, her skin turned yellow, and her lungs took on liquid.[5] As Cathy described the circumstances surrounding her ICU visit, she recalled, "I couldn't breathe, [and] I was drowning from the inside out."[6] Upon examination by her colleagues, doctors determined that Cathy's heart, liver, and respiratory system were all failing.[7]

Cathy's doctors quickly diagnosed her with chemical poisoning and began fighting to keep her alive.[8] When her doctors reached out to Weatherford, the company that produced the fracking fluid responsible for Cathy's injuries, company executives refused to provide her doctors with complete information on the product, claiming trade secret protection.[9] Cathy's doctors were left quite literally guessing what chemicals to which she was exposed while struggling to keep her alive.[10] Cathy's story is particularly tragic because she became a victim while providing medical care to those in need. Her efforts to help others were not reciprocated by those responsible for her plight. As a result, her story reveals an egregious indifference to human life by companies in the fracking industry.[11]

Unfortunately, experiences like Cathy's involving public exposure to fracking fluids and companies' subsequent refusal to disclose information are not isolated incidents.[12] Another extreme incident occurred in Ohio, where a fire caused several truckloads of fracking additives to explode, dumping thousands of gallons of toxic liquid into a tributary of the Ohio

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2. *See* Eric Frankowski, *Gas Industry Secrets and a Nurse's Story*, HIGH COUNTRY NEWS (July 28, 2008), https://www.hcn.org/wotr/gas-industry-secrets-and-a-nurses-story [https://perma.cc/257G-JSDQ].

3. *See* Jim Moscou, *Oil & Gas Exploration: Is 'Fracking' Safe?*, NEWSWEEK (Aug. 19, 2008, 8:00 PM), https://www.newsweek.com/oil-gas-exploration-fracking-safe-87557 [https://perma.cc/865F-USW4].

4. Fink, *supra* note 1, at 995.

5. Moscou, *supra* note 3.

6. *Id.*

7. Frankowski, *supra* note 2.

8. *See* Moscou, *supra* note 3.

9. Fink, *supra* note 1, at 995.

10. *See* Frankowski, *supra* note 2.

11. *See* Fink, *supra* note 1, at 995.

12. *See* Amy Mall, *Incidents Where Hydraulic Fracturing Is a Suspected Cause of Drinking Water Contamination*, NRDC: EXPERT BLOG (Feb. 28, 2014), https://www.nrdc.org/experts/amy-mall/incidents-where-hydraulic-fracturing-suspected-cause-drinking-water-contamination [https://perma.cc/FU7V-5LYH].

River.[13] More than 70,000 fish died, and toxic substances leached directly into the local water supply, affecting millions of residents.[14] But Halliburton, the company responsible for the spill, delayed disclosure of the compounds comprising the spilled chemicals for five days.[15] When Halliburton finally made a disclosure, it was incomplete, leaving local public health authorities uninformed concerning the risks to human health.[16] These officials were left guessing, just like Cathy's doctors, as to which toxic chemicals were present in the water supply. The water supply was eventually declared safe—without ever knowing what chemicals were spilled into it.[17]

These stories reveal a serious public policy concern, one intertwined with both legal and moral overtones. In both instances, company executives prioritized their economic interest in intellectual property over human health. The legal issue presented by this real world problem is whether fracking fluids should be shielded from disclosure and potential regulation by trade secret protection. The underlying moral issue is straightforward: As reflected in the Golden Rule, should fracking companies be expected to treat others as they would expect to be treated in similar circumstances?

Two competing views are evident in this situation. As several commentators have noted "the oil and gas industry is the only industry in America that the [Environmental Protection Agency (EPA)] allows to inject known hazardous materials—unchecked—directly into or adjacent to underground drinking water supplies."[18] Conversely, other commentators have criticized environmental advocates for fear-mongering, asserting that fracking is safe and does not pose any such risk.[19] According to one publication, "[A]ctivist groups opposed to

13. Fink, *supra* note 1, at 973.
14. *Id.*
15. *Id.*
16. *See id.* at 973–74.
17. *See* Melanie McCormick, *Conflicting Theories at Play: Chemical Disclosure and Trade Secrets in the New Federal Fracking Regulation*, 9 GOLDEN GATE U. ENV'T L.J. 217, 235–36 (discussing how local water agencies in Ohio were never given access to the information claimed proprietary by Halliburton; thus, it remains questionable whether the water was safe to drink or not).
18. *Id.* at 229 (quoting *The Halliburton Loophole*, EARTHWORKS, https://earthworks.org/issues/inadequate_regulation_of_hydraulic_fracturing/ [https://perma.cc/TFQ4-MLQJ] (last visited Nov. 13, 2021)).
19. *See* John D. Furlow & John R. Hays, Jr., *Disclosure with Protection of Trade Secrets Comes to the Hydraulic Fracturing Revolution*, 7 TEX. J. OIL GAS & ENERGY L. 289, 293 (2011).

frac[k]ing have exploited the lack of public information and veil of secrecy surrounding the process to bolster otherwise unsupported allegations of groundwater contamination."[20]

This Article determines where the line should be drawn between competing public health and economic interests, proposing that federally mandated disclosure requirements help protect human health without deterring economic activity. Part I of this Article will provide an overview of the fracking process and demonstrates that fracking poses a risk to human health. Next, Part II will examine the current regulatory scheme at the federal and state levels, concluding neither the federal nor the state regulatory scheme adequately addresses fracking. Part III will review how other countries that utilize trade secret protections have addressed this same tension between public health and safety against the economic interests of fracking companies. Part IV will then provide evidence depicting how full disclosure of fracking fluid components would leave fracking fluid trade secrets still intact. Finally, Part V of this Article will argue for federal legislation mandating public disclosure to best reconcile the tension between public safety and industrial activity.

## I. FRACKING AND PUBLIC HEALTH

### *A. The Fracking Process*

Petroleum operations—when fracking is unnecessary—simply involve drilling into porous sections of rock, allowing oil and gas to pass through the rock and into the well.[21] Many rock formations have low permeability, or little pore space; consequently, gas cannot travel freely within the formation.[22] Fracking, or hydraulic fracturing, addresses this problem by injecting fluid into a well at sufficiently high pressures in order to fracture the surrounding rock formation.[23] Fracturing may create new fissures or enlarge preexisting small fissures, increasing interconnectivity within the rock formation and enabling more efficient petroleum extraction.[24]

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20. *Id.*

21. Brie D. Sherwin, *Chocolate, Coca-Cola, and Fracturing Fluid: A Story of Unfettered Secrecy, Toxicology, and the Resulting Public Health Implications of Natural Gas Development*, 77 OHIO ST. L.J. 593, 601 (2016).

22. *Id.*

23. *Id.*

24. *See id.*

The largest constituents of fracking fluid are water and sand, which account for roughly 99% of fracking fluid.[25] The remaining fluid is composed of additives including biocides, cleaners, surfactants, corrosion inhibitors, and friction reducers.[26] Although accounting for only 1% of the fluid, these additives constitute thousands of gallons because of the large total volume of fluid used in a fracking operation.[27] The exact mixture of additives is dependent on the rock formations into which a well is drilled.[28]

Before fracking begins, a well must be completely constructed. This process first involves drilling a hole and inserting a steel casing smaller than the diameter of the borehole.[29] Next, with the casing in place, cement is pumped to the bottom of the borehole where it fills the space between the outside layer of the steel casing and the surrounding rock.[30]

Once the well is completely constructed, the operator pours acid into the well to clean out any cement inside the casing.[31] Next, water is mixed with sand proppants and chemical additives at the surface to create the frack fluid.[32] The fluid is then injected into the well, fracturing the rock.[33] Additional water and proppants are pumped into the well to keep gas flowing.[34] The last stage, known as the "flowback," removes plugs from the well and allows fluid to flow back to the surface from the underground well.[35] Flowback consists of fracking fluids, oil, gas, and potentially radioactive materials that seeped into the well during earlier stages.[36]

### *B. Fracking Fluids Pose a Threat to Public Health and Safety*

Are there legitimate public health and safety concerns surrounding fracking? Halliburton has argued the chemicals used in fracking fluids are

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25. Fink, *supra* note 1, at 976–77.
26. *See* Furlow & Hays, *supra* note 19, at 303.
27. Fink, *supra* note 1, at 976–77.
28. *Id.* at 977–78.
29. *See* Sherwin, *supra* note 21, at 601.
30. *Id.*
31. Fink, *supra* note 1, at 976.
32. *Id.*; *Proppant*, SCHLUMBERGER OILFIELD GLOSSARY, https://glossary.oilfield.slb.com/en/Terms/p/proppant.aspx [https://perma.cc/UUP3-WAJU] (last visited June 29, 2021) (defining proppants as "[s]ized particles mixed with fracturing fluid to hold fractures open after a hydraulic fracturing treatment," which are often a combination of sand and manmade materials such as resin coated sand or ceramic substances).
33. Fink, *supra* note 1, at 976.
34. *Id.* at 977.
35. *Id.*
36. *Id.* at 976–77.

safe, making public disclosure unnecessary.[37] Alternatively, many proponents of fracking acknowledge fracking fluid's toxicity but claim it is safe because there is supposedly no potential for human exposure.[38] Critics of fracking disagree, arguing disclosure should be required for public health and safety reasons.[39] Two pieces of information must be depicted to prove that fracking poses a threat to human health: the toxicity of the fluids involved and the potential for exposure. This section demonstrates first that fracking fluids contain toxic additives and second that people are exposed to fracking fluids.

*1. Fracking Fluids Contain Toxic Additives*

Despite Halliburton's confidence in the safety of its fracking fluids,[40] multiple studies suggest fracking fluids are toxic.[41] Estimates on the exact toxicity vary due to trade secret protection shielding or preventing disclosure of the chemical compositions of additives.

According to Physicians for Social Responsibility ("PSR"), one study "examined the toxicity of 353 chemicals used in fracking and found that 25[%] can cause cancer and mutations; 37[%] affect the endocrine system; 40 to 50[%] affect the brain, kidneys, and nervous, immune and cardiovascular systems; and more than 75[%] affect other organs and organ systems."[42] Another scientific study examining fracking fluid additives noted fracking fluids "contain several constituents, which raises the concern that the mixture of constituents may pose a greater health hazard than the individual constituent."[43]

Limited disclosure makes understanding the risks of fracking difficult. For example, according to PSR, a large percentage of the chemicals used in fracking operations cause harm to human health; however, only 353

37. *See id.* at 995, 1003.

38. *See* Furlow & Hays, *supra* note 19, at 292–93, 307–14.

39. *See* Sherwin, *supra* note 21, at 613–18.

40. Fink, *supra* note 1, at 1010–11 (explaining that a formula called CleanStim™ has been developed to be more safe but is "not in wide use").

41. *See* PHYSICIANS FOR SOC. RESP., HYDRAULIC FRACTURING AND YOUR HEALTH: WATER CONTAMINATION (2018), https://www.psr.org/wp-content/uploads/2018/09/fracking-and-water-contamination.pdf [https://perma.cc/24G7-UWDD].

42. *Id.*

43. Elizabeth V. Wattenberg et al., *Assessment of the Acute and Chronic Health Hazards of Hydraulic Fracturing Fluids*, 12 J. OCCUPATIONAL & ENV'T HYGIENE 611, 621 (2015).

chemicals were analyzed in the study.[44] The 2016 EPA report on fracking identified 1,606 chemicals used in fracking.[45] Of the 1,606 chemicals identified by the EPA, only 173 chemicals have health information available.[46]

Chemicals such as 2-butoxyethanol, used as a common surfactant in fracking, are known to damage the liver, spleen, bone marrow, and red blood cells.[47] Similarly, methylene chloride is used as a solvent in fracking and is known to be toxic.[48] Overall, many chemicals used in fracking mixtures are "known or possible human carcinogens."[49]

*2. People Are at Risk for Exposure to Fracking Fluids*

Fracking companies routinely claim that fracking is not linked to groundwater contamination and that fracking cannot cause groundwater contamination, even going so far as claiming it is impossible.[50] These types of statements are incomplete in their conveyances and are factually incorrect.[51] As one commentator noted in response to these fracking companies' claims, "When information is stifled, it is easy to claim that no problem exists."[52] This section discusses mechanisms by which individuals are exposed to fracking fluids with a particular focus on drinking water contamination. This section then provides real-world examples where individuals were exposed to fracking fluids and suffered harm as a result.

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44. PHYSICIANS FOR SOC. RESP., *supra* note 41.

45. Fink, *supra* note 1, at 1002.

46. *Id.*

47. Sherwin, *supra* note 21, at 606–07.

48. Rachael Rawlins, *Planning for Fracking on the Barnett Shale: Soil and Water Contamination Concerns, and the Role of Local Government*, 44 ENVTL. L. 135, 145 (2014).

49. *See* Travis D. Van Ort, Note, *Hydraulic Fracturing Additives: A Solution to the Tension Between Trade Secret Protection and Demands for Public Disclosure*, 4 KY. J. EQUINE, AGRIC., & NAT. RES. L. 439, 442 (2012).

50. *See* Furlow & Hays, *supra* note 19, at 308.

51. *See* Chris Mooney, *The Truth About Fracking*, 305 SCI. AM. 80, 82 (2011) (explaining researchers often consider only single instances of fracking at a single well site, but companies often drill multiple wells closely spaced at a single site to maximize access to gas, which changes the analysis).

52. Sherwin, *supra* note 21, at 633.

*a. How People Are Exposed to Fracking Fluids: Drinking Water Contamination*

Fracking fluids can enter drinking water sources through several different routes including leaking, spilling, and dumping, and these risks, along with the associated risk of soil and surface water contamination, cannot be ignored.[53] In fact, in its most recent report, the EPA concluded that every step in the fracking process has the potential to contaminate water sources.[54]

First, surface-level spills can pollute both groundwater and surface water.[55] In its report, the EPA examined the potential for drinking water contamination through surface spills and concluded that "[s]pills of additives and hydraulic fracturing fluids can reach groundwater and surface water resources."[56] The diagram below illustrates factors affecting how surface spills can reach surface water directly or travel through soil and ultimately reach groundwater.

53. Rawlins, *supra* note 48, at 135.

54. *See* OFF. OF RSCH. & DEV., U.S. ENV'T PROT. AGENCY, EPA-600-R-16-236ES, HYDRAULIC FRACTURING FOR OIL AND GAS: IMPACTS FROM THE HYDRAULIC FRACTURING WATER CYCLE ON DRINKING WATER RESOURCES IN THE UNITED STATES 1 (2016), https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990 [https://perma.cc/X2CN-J9TB] [hereinafter HYDRAULIC FRACTURING FOR OIL AND GAS].

55. *See id.* at 21.

56. *Id.* at 16.

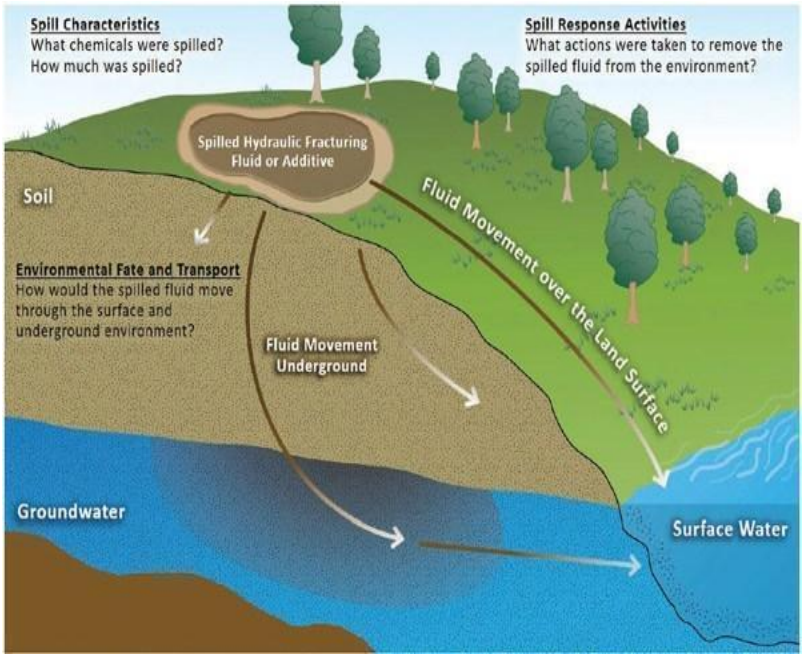


*Figure 1: Generalized depiction of factors that influence whether spilled hydraulic fracturing fluid or additives reach drinking water resources.*[57]

The EPA analyzed data taken from roughly 151 spills of fracking fluids or additives that occurred between 2006 and 2012.[58] The median volume of those spills was 420 gallons, with as much as 19,320 gallons released during a single spill.[59] Of the spills analyzed, 13 were confirmed to reach surface water, releasing thousands of gallons of fracking fluids into the surface water.[60] The Colorado Oil and Gas Conservation Commission identified 125 spills between 2010 and 2013 in Colorado alone.[61] Exposure of this type has led one legal commentator to note that "[a]lthough the gas industry is quick to claim that there are no proven cases of groundwater contamination related to hydraulic fracturing . . . . Surface contamination and the attendant risk to ground and surface waters cannot be denied."[62]

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57. *Id.* at 21 fig. ES-5. Diagram was made available for public use by the EPA.
58. *See id.* at 20.
59. *See id.*
60. *See id.*
61. *See id.*
62. Rawlins, *supra* note 48, at 135, 194.

Second, evidence suggests that subsurface fracking activity can cause subsurface water contamination.[63] According to the EPA, "Belowground pathways [for contamination], including the production well itself and newly-created fractures, can allow hydraulic fracturing fluids or other fluids to reach underground drinking water sources."[64] Additionally, there are instances where the geologic formation intended to be fracked shares rock space with an aquifer.[65] In some instances, the mechanical integrity of a well casing is compromised, allowing fracking fluids to escape.[66] Lastly, there is potential for larger-than-expected fissures because of pressures exerted from multiple wells being fracked in an area rather than just a single well.[67] The following diagram from the EPA illustrates such risks.

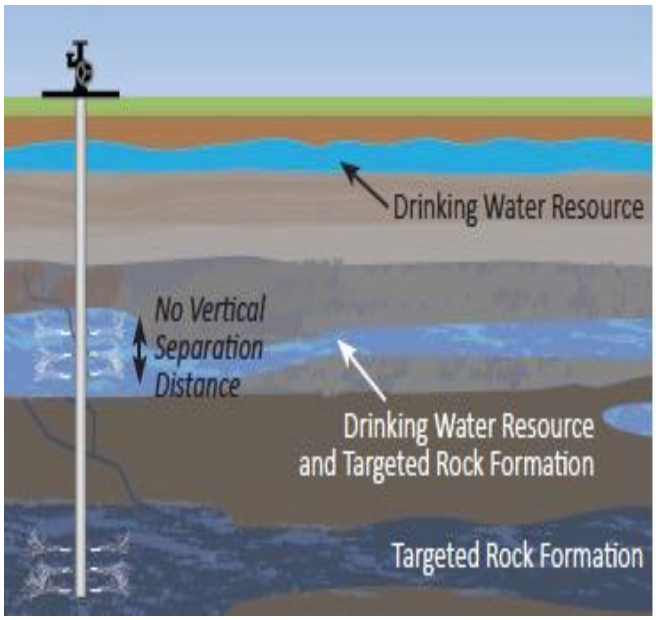


*Figure 2: Diagram illustrating instances where target rock locations and drinking water sources are collocated.*[68]

63. *See* HYDRAULIC FRACTURING FOR OIL AND GAS, *supra* note 54, at 23.
64. *Id.*
65. *See id.* at 27.
66. *Id.* at 29.
67. *See* Mooney, *supra* note 51.
68. HYDRAULIC FRACTURING FOR OIL AND GAS, *supra* note 54, at 28 fig. ES-7. Diagram made available for public use by the EPA.

The diagram above depicts how drinking water sources can be co-located with rock formations targeted for fracking. In these instances, groundwater contamination occurs where the relative location of an aquifer is near or shares space with a rock formation being fracked.[69] Some proponents of fracking who claim the practice is safe rely on a presumption that there are thousands of feet between the targeted fracking area and a nearby aquifer, making groundwater contamination impossible.[70] The EPA's report indicates that while infrequent, there are currently ongoing instances where fracking is taking place in the same rock space as aquifers.[71] Accordingly, in those instances where no separation exists between the rock formations being fracked and an aquifer, the fracking process directly contaminates the groundwater.

Another potential route for groundwater contamination caused by fracking may occur when mechanical integrity of the well casing is compromised. When cement casings lack mechanical integrity, the well itself acts as a conduit for oil, gas, and fracking fluids to flow between rock layers, endangering drinking water sources.[72] Faulty cementing may not always exist because of improper well construction; one fracking engineer has stated that "[a] significant percentage of cement jobs will fail. It will always be that way. It just goes with the territory."[73]

One pro-fracking legal commentator claims that fracking is safe while in the same breath acknowledges the risks associated with faulty well casings.[74] On its face, this claim is an outright contradiction. Some fracking proponents continue to claim fracking is safe because well construction—in particular, cement casing construction—is subjectively excluded from their definition of fracking.[75] This narrow definition of fracking is based in part on the fact that fracking companies frequently do not drill the wells they frack; instead, they contract with well operators/owners to perform well stimulation.[76] Defining fracking narrowly to exclude well construction does not eradicate the very real

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69. *Id.* at 27.

70. *See* Furlow & Hays, *supra* note 19, at 308.

71. *See* HYDRAULIC FRACTURING FOR OIL AND GAS, *supra* note 54, at 27.

72. *Id.* at 24.

73. Mooney, *supra* note 51, at 84.

74. *See* Jeffrey C. King et al., *Factual Causation: The Missing Link in Hydraulic Fracture—Groundwater Contamination Litigation*, 22 DUKE ENVTL. L. & POL'Y F. 341, 341–51 (2012).

75. *See* Mooney, *supra* note 51, at 84.

76. Fink, *supra* note 1, at 1006–07 (explaining that companies who own mineral leases contract out fracking operations).

potential for harm caused by faulty wells' contamination of drinking water sources.

Fear of groundwater contamination also stems from abandoned wells located near current fracking sites. Approximately 1 million wells have been fracked since the beginning of fracking's development,[77] combined with numerous other vertical wells that have not yet been fracked. The United States ("U.S.") has millions of abandoned oil and gas wells.[78] Abandoned wells pose a significant threat to groundwater because they can provide a vertical pathway between rock layers to drinking water sources.[79] This is particularly alarming because "decades ago people didn't case wells, and they didn't plug wells when they were finished,"[80] meaning that older abandoned wells have little to no safety measures in place. Many abandoned wells can thus act as a direct conduit for fracking fluids to travel vertically between rock layers and potentially contaminate groundwater.

Lastly, the belief that fracking cannot cause vertical travel and subsequent contamination in the absence of faulty well casing is also questionable.[81] According to an engineering expert who formerly worked in fracking, the belief that fracking cannot cause such vertical movement is based on the assumption of "one water blast, in one lateral, one time."[82] In practice, a dozen or more vertical wells are often situated close together and fracked multiple times.[83] In other words, the way fracking is conducted in practice has not been analyzed thoroughly enough to determine whether multiple wells in close proximity could, when combining forces, create fractures linking existing fissures to groundwater sources.

Produced water, or "flowback," is another avenue allowing for drinking water contamination.[84] Produced water contains fracking chemicals and additional environmental pollutants, such as heavy metals and radioactive materials from the rock formations being fracked.[85] Additionally, "Disposal practices can release inadequately treated or

77. HYDRAULIC FRACTURING FOR OIL AND GAS, *supra* note 54, at 4.

78. *See* Kyle Ferrar, *Literally Millions of Failing, Abandoned Wells*, FRACTRACKER ALL. (Mar. 29, 2019), https://www.fractracker.org/2019/03/failing-abandoned-wells/ [https://perma.cc/8Y7Q-JK54].

79. *See* HYDRAULIC FRACTURING FOR OIL AND GAS, *supra* note 54, at 28.

80. Mooney, *supra* note 51, at 84.

81. *See id.* at 82.

82. *See id.*

83. *Id.*

84. HYDRAULIC FRACTURING FOR OIL AND GAS, *supra* note 54, at 29.

85. *Id.*

untreated hydraulic fracturing wastewater to groundwater and surface water resources."[86]

In sum, fracking can contaminate drinking water sources at nearly every stage of the process.[87] Surface spills of fracking additives can reach both the surface water and the groundwater.[88] Subsurface contamination of groundwater can occur through faulty well casing, abandoned wells, and potentially through the combined forces of multiple wells fracked in close proximity.[89] "Flowback" or produced water also poses risks to drinking water through spills and disposal.[90]

*b. Evidence of Actual Human Exposure as a Result of Fracking*

This section is not an exhaustive list of human exposures and adverse health effects from fracking, but it demonstrates that exposure and adverse effects are not uncommon. Unfortunately, information surrounding instances of contamination is often not publicly available because companies generally require a non-disclosure agreement as part of a final settlement.[91] However, some instances of public exposure to fracking fluids do remain publicly available; for example, the introduction of this Article highlights two extreme cases of fracking fluid exposure, both of which involved spills. The spill in Ohio, described above, exposed millions of local residents to fracking fluids by contaminating their drinking water source.[92] Nurse Cathy Behr and employees of the fracking company were also exposed to additives from a spill, which was nearly fatal for Cathy.[93]

According to the Natural Resource Defense Council (NRDC), "at least 36 cases of publicized groundwater contamination" have been linked to fracking as of 2014.[94] One story, the details of which remain partially public from court documents, comes from Pennsylvania.[95] George Zimmerman spent $15,000 testing his drinking water to prepare for a private fracking project near his home.[96] Subsequent tests conducted after

86. *Id.* at 34.
87. *See generally id.* at 1–6, 41–42.
88. *See id.* at 21.
89. *See id.* at 29*; see also* Mooney, *supra* note 51.
90. *See* HYDRAULIC FRACTURING FOR OIL AND GAS, *supra* note 54, at 29.
91. *See* Fink, *supra* note 1, at 998–1000.
92. *Id.* at 973.
93. *Id.* at 995.
94. *Id.*
95. *See id.* at 995–96.
96. *Id.* at 996.

fracking had begun found seven known carcinogens in Zimmerman's drinking water that were absent before the fracking operation began.[97] Similarly, the Leighton family, also located in Pennsylvania, experienced contamination of their water as a result of nearby fracking operations.[98] Before a negligently constructed well casing was fracked, the Leightons tested their water supply.[99] After contamination by fracking operations, the Leightons' water supply was discolored and even flammable.[100] Fortunately, the before and after testing they conducted aided the Leighton family in proving causation in their subsequent claim against the fracking company.[101]

Regulators have also recognized incidents of contamination. For example, the EPA noted one incident in North Dakota where part of the inner casing of a fracking well burst, ultimately resulting in the contamination of groundwater supplies.[102] Another example of fracking fluid contamination occurred in Windsor, Colorado, where a mechanical failure resulted in fracking fluids spraying out of the well for more than 30 hours.[103] During the mechanical failure, roughly 84,000 gallons of fracking fluid spilled, and regulators are still uncertain to what extent the local water resources were contaminated.[104] In 2010, the EPA investigated complaints surrounding drinking water in Parker County, Texas.[105] The EPA's investigation concluded that the local drinking water had been contaminated with benzene, toluene, ethane, and methane.[106] Based on compositional and isotopic fingerprinting, the EPA was able to determine that the water source contamination likely resulted from oil gas extraction in the area.[107] In 2013, XTO Energy, a fracking company, was fined for negligent actions resulting in toxic waste discharge directly into the Susquehanna River, which continued for two months.[108] Additionally, in Wyoming the EPA recently found 2-butoxyethanol ("2-BE") in

97. *Id.*
98. *Id.*
99. *See id.*
100. *Id.* at 996–97.
101. *See id.*
102. *See* HYDRAULIC FRACTURING FOR OIL AND GAS, *supra* note 54, at 26.
103. McCormick, *supra* note 17, at 235.
104. *Id.*
105. *See* Rawlins, *supra* note 48, at 140–42.
106. *Id.*
107. *Id.*
108. Fink, *supra* note 1, at 985.

groundwater; 2-BE's presence was associated with local fracking operations.[109]

Three health studies spanning from 2015 to 2017 in Pennsylvania indicate that proximity to fracking operations has a negative impact on human health.[110] In 2015, the first study was conducted in Washington County, Pennsylvania, and linked proximity to fracking with upper respiratory problems and adverse skin effects.[111] The second study, also conducted in 2015, examined pregnancy statistics in central Pennsylvania.[112] The study ultimately linked smaller birth weight and baby size to fracking exposure, correlating the pregnant mother's proximity to a fracking well with reduced birth weight and size.[113] In 2017, the third study linked proximity to fracking with more frequent instances of migraines, chronic fatigue, and nasal and sinus problems as compared to those who lived further away from fracking operations.[114]

Notwithstanding the concerns over groundwater contamination, there are also clear air quality concerns from fracking that potentially cause health problems. In 2012, one study conducted weekly air sampling for one year to examine the air quality in areas surrounding hydraulic fracking.[115] The study found methylene chloride, a known toxic solvent

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109. Sherwin, *supra* note 21, at 606–07.

110. *See* Fink, *supra* note 1, at 1001.

111. *Id.* (citing Peter M. Rabinowitz et al., *Proximity to Natural Gas Wells and Reported Health Status: Results of a Household Survey in Washington County, Pennsylvania*, 123 ENV'T HEALTH PERSP. 1, 24 (2015), https://ehp.niehs.nih.gov/1307732/ [https://perma.cc/DXW6-WK66]).

112. *See id.*

113. *Id.* (citing Shaina L. Stacy et al., *Perinatal Outcomes and Unconventional Natural Gas Operations in Southwest Pennsylvania*, 10 PLOS ONE 1 (2015)).

114. *Id.* (citing Aaron W. Tustin et al., *Associations Between Unconventional Natural Gas Development and Nasal and Sinus, Migraine Headache, and Fatigue Symptoms in Pennsylvania*, 125 ENV'T HEALTH PERSP. 189 (2017)). Moreover, other studies have generally confirmed these findings. *See A New Fracking Landscape: Report on Recent Science Shows Overwhelming Evidence of Harm*, PHYSICIANS FOR SOC. RESP. (Mar. 13, 2018), https://www.psr.org/blog/2018/03/13/a-new-fracking-landscape-report-on-recentscience-shows-overwhelming-evidence-of-harm/ [https://perma.cc/3EZV-ZDP5].

115. Rawlins, *supra* note 48, at 145 (citing Theo Colborn et al., *An Exploratory Study of Air Quality Near Natural Gas Operations*, 20 HUM. & ECOLOGICAL RISK ASSESSMENT 86 (2012)).

not reported by fracking companies, present in the surrounding air 73% of the time.[116]

Fracking companies publicly claim the fracking process and products are safe while also acknowledging public safety concerns as a corporate liability.[117] For example, while informing its investors of its current operations, Range Resources mentioned the company had "uncontrollable flows of oil, natural gas, or well fluids."[118] Another fracking company, Noble Energy, disclosed the "possible underground migration of hydrocarbons and chemicals" as a key concern of its business.[119] Halliburton warned investors about the risks of "pre-injection spills or releases of stored fracturing fluids and potential spills or releases of fuel or other fluids."[120]

These studies and reports indicate that the public's exposure to fracking fluids and byproducts occurs all over the country. Having demonstrated both that the presence of certain toxic additives render fracking fluids unsafe and also that public exposure to fracking fluids has occurred and continues to occur, the next section illustrates the regulatory shortcomings at both the federal and state levels.

## II. CURRENT REGULATORY SCHEME

Although fracking poses troublesome environmental and public health impacts—particularly drinking water contamination—the current regulatory scheme does not meaningfully address the risks presented by fracking and also does not require disclosure of the chemicals used in the fracking process.[121]

Traditionally, Congress has relied on public involvement and citizen participation to control industrial practices that affect public health.[122] Some view the right of citizens to know about health risks as a fundamental policy underlying environmental protection.[123] Citizens suits are explicitly authorized in several environmental laws, such as the Clean

116. *Id.* (noting there are many clean air implications from fracking; for example, methylene chloride was found in the air rather than the water but still remains a potential source for exposure to humans).

117. *See* Fink, *supra* note 1, at 985–95.

118. *Id.* at 985.

119. *Id.* at 985–86.

120. *Id.* at 986.

121. *See id.* at 983–86.

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

123. *See* Fink, *supra* note 1, at 986.

Water Act (CWA)[124] and the Safe Drinking Water Act (SDWA).[125] The National Environmental Policy Act (NEPA) not only ensures information regarding environmental impacts is gathered but also that the information is shared with the public.[126] Other laws, like the Administrative Procedure Act (APA)[127] and Freedom of Information Act (FIA),[128] also expand public awareness and involve the public in governmental decision making processes.

However, these laws do not ensure public access to information regarding what chemicals are injected underground near people's homes and potentially contaminating their drinking water.[129] This shortcoming in legally required disclosure precludes any opportunity for meaningful citizen participation or action against fracking companies for health related effects from exposure to fracking fluids. As a recent publication explained:

> [H]ydraulic fracturing is exempt from all of the environmental laws that would normally protect the public and environment—namely, the Clean Air Act; the Clean Water Act; the Safe Drinking Water Act; the Resource Conservation and Recovery Act; the Comprehensive Environmental Response, Compensation, and Liability Act (or "Superfund"); the National Environmental Policy Act; and the Toxic Release Inventory under the Emergency Planning and Community Right to Know Act. This leaves the United States with a "patchwork" of state disclosure requirements, many of which offer little—if any—protection to the public.[130]

The above quoted material highlights major regulatory shortcomings in regard to the fracking industry. Rather than protecting and involving the public, federal regulatory schemes punt the problem to a patchwork of state disclosure requirements, which also come up short in meaningful public involvement or protection. The next section first examines how

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124. 33 U.S.C. § 1365.

125. 42 U.S.C. § 300j-8.

126. *See* Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 350 (1989) (explaining that NEPA requires agencies to examine potential environmental impacts and broadly disseminate that information).

127. 5 U.S.C. § 553 (requiring notice of potential regulations and giving opportunity for citizens to comment on proposed rulemaking).

128. *Id.* § 552 (requiring agencies to make information publicly available and empowering citizens to make information requests).

129. *See* McCormick, *supra* note 17, at 229.

130. Julie E. Zink, *When Trade Secrecy Goes Too Far: Public Health and Safety Should Trump Corporate Profits*, 20 VAND. J. ENT. & TECH. L. 1135, 1160–61 (2018).

federal laws aimed at protecting public health, safety, and the environment apply to fracking. It then examines some of the methods states use to promote disclosure of fracking fluid composition.

### *A. Federal Regulatory Scheme*

This section first reviews the two federal statutes best equipped to deal with water contamination related to fracking: the SDWA and the CWA. Unfortunately, neither statute currently provides protection from fracking contamination nor a disclosure requirement.[131] Next, this section discusses NEPA and other applicable statutes dealing with waste management, specifically the Resource Recovery and Conservation Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), ultimately concluding that most fracking activity occurs in an absence of federal regulation.

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

The SDWA is the primary law protecting drinking water.[132] Mainly concerning tap water, the SDWA regulates public water systems ("PWS"). Roughly 85% of people living in the U.S. get their water from a PWS, while the remaining 15%, or 45 million people, drink water directly from private wells.[133] While groundwater is not the SDWA's primary focus, the SDWA attempts to protect groundwater used for drinking water.[134]

Under the SDWA, the Underground Injection Control Program ("UIC") is the main regulatory program aimed at protecting aquifers used as drinking water sources.[135] The UIC vests enforcement authority with the states[136] and outlines basic monitoring requirements governing underground injections on both public and private property to avoid endangering drinking water sources.[137] At its core, however, the SDWA

131. *See* Fink, *supra* note 1, at 986–87.

132. James Salzman, *The Past, Present and Future of the Safe Drinking Water Act*, UCLA PUB. L. & LEGAL THEORY SERIES 3 (2019).

133. *Id.* at 3.

134. *Id.* at 3–4.

135. *See id.* at 4.

136. John Craven, *Fracking Secrets: The Limitations of Trade Secret Protection in Hydraulic Fracturing*, 16 VAND. J. ENT. & TECH. L. 395, 407 (2014).

137. *See* 42 U.S.C. § 300h(b)(1).

focuses on water associated with PWS; thus, many private wells receive very little attention or protection.[138]

Beyond limitations based on the SDWA's focus on PWS sources, fracking has further evaded significant regulation due to the UIC program's limited scope. The EPA originally interpreted "underground injection" to exclude fracking; instead, the EPA focused the UIC program on regulating wells that dispose of unwanted materials.[139] An environmental group, the Legal Environmental Assistance Foundation, Inc. ("LEAF"), challenged the EPA's interpretation and convinced the United States Court of Appeals for the Eleventh Circuit that the UIC should apply to hydraulic fracturing operations.[140] Based on that decision, the EPA conducted a limited study examining the use of hydraulic fracking without diesel additives and found it did not pose a serious threat to drinking water sources.[141]

In 2005, Congress amended the SDWA's definition of "underground injection" to specifically exclude "hydraulic fracturing operations."[142] This carveout provision effectively exempts fracking operations from proactive regulation under the SDWA.[143] It is often referred to as the "Halliburton Loophole" because high ranking political leaders with ties to the Halliburton fracking company were involved in crafting the legislation.[144] In short, the provision "essentially exempts fracking companies from compliance with UIC programs because their fracking fluids no longer require a permit."[145] This is particularly troubling in light of the EPA's most recent study, which determined that fracking poses a threat to drinking water at every stage of the process.[146] By comparing chemicals known to be used in the gas industry against those few chemicals regulated under the SDWA, one publication confirmed that toxic chemicals used in fracking and oil and gas operations escape detection and regulation under the SDWA.[147]

Another SDWA provision authorizes the EPA to issue emergency orders when a contamination event presents an "imminent and substantial

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138. *See* Rawlins, *supra* note 48, at 159.

139. Rebecca Jo Reser, *State and Federal Statutory and Regulatory Treatment of Hydraulic Fracturing*, 80 DEF. COUNSEL J. 90, 96–97 (2013).

140. *Id.* at 97.

141. *Id.*

142. *Id.*

143. *See* Craven, *supra* note 136, at 407.

144. *See* Fink, *supra* note 1, at 987.

145. Craven, *supra* note 136, at 407.

146. *See* HYDRAULIC FRACTURING FOR OIL AND GAS, *supra* note 54, at 29.

147. *See* Rawlins, *supra* note 48, at 159–60.

endangerment to the health of persons."[148] As one commentator points out, this does not provide for the proactive protection of drinking water resources.[149] Moreover, if the specific chemical substance contaminating a groundwater source is unknown, proper testing for the contamination is likely not possible.[150] Thus, if a company claims trade secret protection, the EPA will likely be unaware of the exact risk posed by the contaminating event and may decide not to issue emergency orders even though an emergency could in fact be occurring.[151]

In sum, the SDWA protects primarily PWS sources rather than groundwater sources. While most of the country relies on their local PWS for the drinking water, roughly 15% of Americans use underground aquifers for their drinking water and rely on the UIC program to protect their aquifers.[152] Unfortunately for those who rely on groundwater, the "Halliburton Loophole" excludes fracking from regulation or disclosure under the SDWA and, by extension, the UIC.[153]

*2. Clean Water Act*

The CWA focuses on protecting surface water and does not directly regulate groundwater or potential groundwater contamination.[154] To accomplish surface water regulation, the CWA vests states with enforcement authority and outlines basic requirements the states must meet to comply with the CWA.[155] In particular, the CWA bans the discharge of pollutants from "point sources" into "waters of the United

148. 42 U.S.C. § 300i(a).

149. *See* Craven, *supra* note 136, at 407–08.

150. *See* Fink, *supra* note 1, at 1002–03 (noting that public health officials may not be able to test for substances they do not know exist); *see also* Ivana Bobeldijk, *Screening and Identification of Unknown Contaminants in Water with Liquid Chromatography and Quadrupole-Orthogonal Acceleration-Time-of-Flight Tandem Mass Spectrometry*, 929 J. CHROMATOGRAPHY A 63, 64–67 (2001) (explaining that traditional chromatography requires comparing a sample against a library sample, or known substance, and that even when using cutting-edge research methods, testing for unknown contaminants is challenging).

151. *See* Fink, *supra* note 1, at 1002.

152. *See* Salzman, *supra* note 132 at 3–4.

153. *See* Craven, *supra* note 136, at 407–08.

154. U.S. ENV'T PROT. AGENCY, INTRODUCTION TO THE CLEAN WATER ACT 2 (2021), https://cfpub.epa.gov/watertrain/pdf/modules/introtocwa.pdf [https://perma.cc/YV4A-23SK].

155. Craven, *supra* note 136, at 408–09.

States" unless the polluting party obtains the proper permit from the state.[156]

The EPA's jurisdiction under the CWA is limited to the "waters of the United States."[157] Therefore, the CWA does not regulate fracking and can only regulate fracking fluids that constitute wastewater that flows into sewer systems and discharges directly into "waters of the United States."[158] For many, the primary concern surrounding fracking operations is not the wastewater flowing through publicly owned treatment works before entering waters of the U.S.; rather, the concern is the contamination of aquifers that are used as drinking water sources.[159] The CWA often fails to protect groundwater resources relied on for drinking water sources based on the jurisdictional limitation of "waters of the United States."[160]

*3. National Environmental Policy Act*

NEPA is procedural rather than substantive legislation, meaning NEPA "does not mandate particular results, but simply prescribes the necessary process."[161] To comply with NEPA, agencies involved in permitting must take a "hard look" to "consider" the environmental impacts.[162] NEPA requires the information gathered to be made publicly available when "major [f]ederal actions significantly affecting the quality of the human environment" is likely to occur.[163] One key aspect of NEPA is the requirement for a "detailed statement," which in practice is known as an "environmental impact statement ("EIS")."[164] The Supreme Court in *Robertson v. Methow Valley Citizens Council* explained that NEPA ensures agency decisions will be carefully made with relevant information, and that information will be made publicly available.[165]

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156. *Id.* at 408.
157. *Id.*
158. *Id.*
159. *Id.*
160. *Id.* at 408–09.
161. Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 350 (1989) (explaining that NEPA requires agencies to examine potential environmental impacts and broadly disseminate that information).
162. *See* Kleppe v. Sierra Club, 427 U.S. 390, 410 nn.20–21 (1976) (explaining that the Court should not "substitute its judgment" for that of the agency; rather, NEPA requires that the court ensure the agency has taken a "hard look" at the impacts of proposed actions).
163. *See* 42 U.S.C § 4332(C).
164. GEORGE C. COGGINS ET AL., FEDERAL PUBLIC LAND AND RESOURCES LAW 240 (7th ed. 2014).
165. 490 U.S. at 333.

Agencies can avoid the costly time intensive process of an EIS in some situations through a "categorical exclusion" ("CE").[166] CEs are available to an agency when the contemplated action, examined individually or cumulatively, will not have a significant effect on the environment.[167] In other words, agency actions constituting CEs are so insignificant in their impact that no information gathering is required under NEPA.

Like the SDWA, NEPA was also amended by the Energy Policy Act of 2005, which created a "rebuttable presumption" that fracking operations would fall into a "categorical exclusion" and avoid the typical procedural requirements of NEPA entirely.[168] With the rebuttable presumption in place, proponents of fracking operations can receive a permit without conducting a significant inquiry into potential environmental impacts unless the public can demonstrate "extraordinary circumstances" to warrant an actual NEPA investigation.[169] However, if fracking fluids are unknown to the public, then showing potential harm from contamination would be nearly impossible.[170]

*4. Waste Management Statutes*

The Resource Conservation and Recovery Act (RCRA) regulates "hazardous waste" from "cradle to grave" and "seeks to ensure that wastes are properly treated and not simply diluted to mask the concentration of hazardous constituents."[171] In fact, regulation under RCRA requires that if any, even a small amount, of a listed hazardous waste mixes with other nonhazardous waste, all of the waste is regulated as hazardous.[172]

In practice, RCRA does not regulate known hazardous substances used in fracking operations.[173] This is because RCRA, like both the SDWA and NEPA, contains a carveout provision specifying that waste generated in oil and gas operations does not constitute hazardous waste.[174] This carveout creates an illogical situation; many chemicals known to be hazardous and otherwise regulated under RCRA are unregulated when used in fracking operations[175]

166. COGGINS ET AL., *supra* note 164, at 251.
167. *See* 40 C.F.R § 1508(d) (2020).
168. Craven, *supra* note 136, at 410.
169. *Id.*
170. *Id.* at 410–11.
171. Rawlins, *supra* note 48, at 164–65, 172.
172. *Id.* at 172.
173. Craven, *supra* note 136, at 409–10.
174. *See* 42 U.S.C § 6921(b)(2)(A).
175. Craven, *supra* note 136, at 409–10.

CERCLA creates a system to clean up hazardous waste. CERCLA excludes "petroleum, including crude oil . . ., natural gas, and natural gas liquids," in its definition of a hazardous substance.[176] This exclusion has not been fully interpreted, and it remains unclear whether CERCLA applies to fracking.[177] While it is currently questionable whether fracking can be regulated under CERCLA, one recent decision from the United States Court of Appeals for the Ninth Circuit indicates that CERCLA's petroleum exclusion likely precludes fracking regulation.[178]

*5. Federal Regulatory Scheme Summary*

Federal environmental law as it currently stands does not provide for meaningful disclosure or regulation in the fracking context. First, the SDWA does not apply to fracking because of the "Halliburton Loophole," which leaves underground drinking water sources unprotected and vulnerable to contamination.[179] Second, the CWA only applies to "waters of the United States," leaving underground drinking water sources exposed.[180] Third, NEPA, similar to the SDWA, contains a carveout provision making its information gathering and disseminating requirements inapplicable to fracking.[181] Fourth, RCRA exempts oil and gas operations, leaving known hazardous substances entirely unregulated.[182] Fifth, CERCLA's petroleum exclusion likely precludes fracking regulation.[183] Unfortunately, due to the multitude of legal inadequacies in federal environmental law, citizens are left both uninformed and unprotected from the risks posed by fracking.

*B. State Regulatory Scheme*

Because federal law fails to adequately regulate fracking, states are left responsible to protect their citizens' health and safety. States vary greatly in the extent of their regulations, especially surrounding

176. *Id.*
177. *See id.*
178. *See* John Watson, *The Superfund Petroleum Exclusion - Alive and Well in the Ninth Circuit*, LEXOLOGY (Apr. 10, 2018), https://www.lexology.com/library/detail.aspx?g=10515832-6892-4f75-ad89-0aec6c48be3e [https://perma.cc/P6H4-V2XQ].
179. *See* Craven, *supra* note 136, at 407.
180. *See id.* at 408–09.
181. *See id.* at 410–11.
182. *See id.* at 409–10.
183. *See* Watson, *supra* note 178.

disclosure.[184] The next section outlines current state regulatory action regarding fracking in general.

*1. Overview of State Regulation of Fracking*

Without federal fracking regulations, ascertaining the exact number of states where fracking occurs is difficult, but the best estimate is that at least 32 states currently have some fracking operations.[185] Alarmingly, a 2019 survey found that at least 13 of those states have no fracking regulations in place whatsoever.[186]

While many states do not require disclosure, the states that do require disclosure differ in their approaches.[187] States generally follow one of two strategies on the scope of disclosure required: requiring disclosure of all compounds or requiring disclosure of substances listed under the Occupational Safety and Health Act (OSHA).[188] Under the first approach, all states requiring disclosure of chemicals involved in fracking provide trade secret protections to shield disclosure.[189] The net result of this approach is that fracking companies are not required to disclose their materials. The second approach also falls short of providing meaningful protection for three reasons. First, OSHA acknowledges that "most chemicals have not been adequately tested to determine their health hazard potential," so thousands of chemicals have never been tested and thus avoid required disclosure.[190] Second, chemicals that cause latent health effects from chronic exposure, such as from drinking water contamination, may not be listed under OSHA because the testing procedures do not always take into account chronic exposure.[191] Lastly, companies may still

184. *See* Zink, *supra* note 130, at 1160–61.

185. Matthew McFeeley, *Falling Through the Cracks: Public Information and the Patchwork of Hydraulic Fracturing Disclosure Laws*, 38 VT. L. REV. 849, 859 (2014).

186. *See* Isabelle Weber, *How State Regulations Hold Us Back and What Other Countries Are Doing About Fracking*, FRACTRACKER ALL. (Oct. 10, 2019), https://www.fractracker.org/2019/10/regulations-by-country/ [https://perma.cc/U5BE-8EGB].

187. *See* Keith B. Hall, *Hydraulic Fracturing: Trade Secrets and the Mandatory Disclosure of Fracturing Water Composition*, 49 IDAHO L. REV. 399, 410 (2013).

188. *Id.*

189. *Id.* at 411.

190. Rawlins, *supra* note 48, at 148–51.

191. *Id.* at 149.

be able to claim trade secret protection and avoid disclosure despite those chemicals being listed under OSHA.[192]

All states protect disclosure of fracking fluid composition through trade secret law, and some states do not require a company to provide any support to claim trade secret protection.[193] In some states, if a company claims trade secret protection, regulators cannot compel disclosure.[194] This creates a situation where if an accident or emergency arises, regulators do not have the proper information to inform first responders and physicians. The few states that require disclosure and do not allow for the trade secret exception may still shield disclosures from the public based on exceptions to their open records laws.[195] According to one commentator, "all states currently let fracking companies designate their disclosure as 'trade secret,'" allowing the companies to shield the chemicals involved and their concentrations as well.[196]

An additional level of complexity is tacked on when disclosure is required because of the variety of requirements imposed by multiple states.[197] For example, many states that mandate disclosure require the disclosure be made within a specified time of completion of the fracking operation.[198] Some states require disclosure before a fracking operation takes place; however, in the field, fracking companies often change their fracking fluid mixture between the time of reporting and commencing of a fracking operation.[199]

States that require disclosure and make such disclosure available to the public commonly use a private website, FracFocus.org ("FracFocus"), for such disclosures.[200] Some states use FracFocus as the only means of public disclosure, effectively relinquishing their responsibility for data management and disclosure concerning fracking fluids.[201]

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192. *Id.* at 149–51.
193. Hall, *supra* note 187, at 411.
194. Reser, *supra* note 139, at 103.
195. *Id.* at 102; Douglas E. Lee, *Open Records*, FREEDOM F. INST., https://www.freedomforuminstitute.org/first-amendment-center/topics/freedom-of-the-press/freedom-of-information-overview/open-records/ [https://perma.cc/F6XS-YLVX] (last visited Oct. 14, 2021) ("Each of the states and the District of Columbia has enacted its own open-records law. State laws control local governments' and agencies' policies, which may grant even more access to their records than the minimum level set by the state.").
196. Fink, *supra* note 1, at 989.
197. *Id.* at 989–90.
198. *Id.* at 990.
199. Reser, *supra* note 139, at 102–04.
200. McFeeley, *supra* note 185, at 862–67.
201. *Id.* at 863.

A recent study conducted by researchers at Harvard University concluded that FracFocus "fails as a regulatory compliance tool."[202] Normally, state agencies must provide record management and retention to protect against unauthorized alterations and ensure future data availability.[203] FracFocus, as a private website, can remove, edit, or otherwise alter data contained therein without governmental notice or approval.[204] FracFocus goes so far as to state that it "assume[s] no responsibility for the timeliness, deletion, misdelivery, or failure to store any" information.[205] One example of why using FracFocus as the exclusive forum for public disclosure is problematic is due to the fact that wells are often re-fracked, meaning the fracking process is repeated.[206] For example, if a well is fracked multiple times, FracFocus may not contain records for each fracking event; instead, FracFocus will likely only contain records of the most recent fracking event.

State laws dealing with disclosure often hinder health professionals and first responders from doing their jobs effectively.[207] For example, ten states do not provide physicians with access to fracking information to treat patients.[208] In states where there is a vehicle for physicians and first responders to access such information, the process is so bogged down with administrative requests that it takes days, or even weeks, for physicians and first responders to receive the relevant information.[209]

When physicians are able to obtain the relevant fracking information for diagnosing and treating their patients, the physicians must then navigate the Medical Gag Rule.[210] The Medical Gag Rule prohibits physicians from disclosing proprietary or trade secret information even to a patient with suspected exposure to fracking fluids.[211] One doctor speaking on this subject noted, "It's intimidating for the doctor, and it's

202. McCormick, *supra* note 17, at 233.
203. McFeeley, *supra* note 185, at 863.
204. *Id.*
205. *Id.* (quoting *Terms and Conditions*, FRACFOCUS, https://www.fracfocus.org/index.php/terms [https://perma.cc/L7FM-N79R] (last visited Oct. 15, 2021)).
206. *See* Paul S. Goodman et al., *Investigating the Traffic-Related Environmental Impacts of Hydraulic-Fracturing (Fracking) Operations*, 89–90 ENV'T INT'L 248, 249 (2016).
207. *See* Sherwin, *supra* note 21, at 628–36.
208. *Id.* at 628–29.
209. *Id.* at 629.
210. *See id.*
211. *Id.* at 629–30.

intimidating for the patient."[212] One legal commentator has also stated, "Public health officials are prevented from executing their ethical obligations to communicate with and treat patients because of information restrictions and litigation threats. Similarly, scientists who seek to study the effects of fracturing chemicals on the environment and human health through scientific research are limited by these same mechanisms."[213]

In summary, states vary widely in how they address regulation of the fracking industry.[214] Some states do not require any disclosure of the chemicals used in fracking operations.[215] Of the states that do require disclosure, most have exceptions allowing companies to claim trade secret protection and avoid disclosure.[216] FracFocus, which many states rely on for important information related to fracking, is an ineffective regulatory tool.[217] In emergency situations, first responders and doctors are often not able to obtain vital information in a timely manner, and when they do, they cannot disclose that information to potential victims harmed by the fluids involved.[218]

*2. Wyoming, Colorado, and Texas as Example States*

This section provides a brief overview of how fracking, specifically the disclosure of fracking materials, is regulated in three western states with robust fracking industries: Wyoming, Colorado, and Texas.

*a. Wyoming*

Wyoming is home to both a robust oil and gas industry as well as strong regulations over that industry.[219] Wyoming was the first state to adopt regulations requiring disclosure of fracking fluid components.[220] The Wyoming Oil and Gas Conservation Commission (the "Commission") requires information from well operators as part of the

212. *Id.* at 632.
213. *Id.* at 635.
214. *See* Zink, *supra* note 130, at 1160–61.
215. *See* Weber, *supra* note 186.
216. *See* McCormick, *supra* note 17, at 218.
217. *Id.* at 233.
218. *See* Sherwin, *supra* note 21, at 628–32.
219. *See* Kate Galbraith, *Strong Rules on Fracking in Wyoming Seen as Model*, N.Y. TIMES (Nov. 22, 2013), https://www.nytimes.com/2013/11/23/business/energy-environment/wyomings-strong-fracking-rules-may-be-a-model.html [https://perma.cc/94RT-WHRY].
220. Hall, *supra* note 187, at 412.

permitting process for fracking operations.[221] Owners or operators can avoid disclosure by claiming trade secret protection but must submit a written request to the Commission to recognize the trade secret "justifying and documenting the nature and extent of the proprietary information."[222] Most of these written requests for trade secret protection are granted by the Commission.[223] The information that is not protected as a trade secret is posted on the Commission's website.[224]

*b. Colorado*

Colorado regulations require operators to make their disclosures by submitting relevant information to FracFocus rather than to the regulatory agency.[225] Colorado regulations do not require operators to submit or disclose trade secrets.[226] When an operator claims trade secret protection, they are asked a series of follow-up questions including the following:

> (1) the operator has not disclosed the information claimed to be a trade secret to any other person (except to persons who are bound by a confidentiality agreement or certain government employees, etc.); (2) that no law requires public disclosure of the information; (3) that disclosure likely would harm the competitive position of the company; and (4) that the information is not readily accessible through reverse engineering.[227]

These questions are the essential components of a trade secret,[228] and answering appropriately provides the justification needed to avoid disclosure.

The justification required by Colorado regulations differs from that of Wyoming in two important ways. First, in Colorado there is no "attempt to conduct a thorough examination or verify trade secret claims" on the part of the regulatory agency.[229] Second, operators are able to withhold disclosure from not only the public but also from the regulatory agency issuing permits associated with oil and gas extraction.[230] Colorado has

221. *Id.*
222. *Id.*
223. *Id.*
224. *Id.*
225. *Id.* at 414.
226. *Id.* at 414–15.
227. *Id.*
228. *See* Wiseman, *supra* note 122, at 6–8.
229. Hall, *supra* note 187, at 415.
230. *Id.* at 417.

structured its regulations this way to avoid risk of inadvertent disclosure on the part of a regulator.[231] Thus, in order to minimize liability and legal costs, Colorado regulations seek to keep not only the public but also the government in the dark regarding hydraulic fracturing chemicals. Similar to some fracking companies' corporate decisions surrounding fracking fluid disclosure, Colorado's policy potentially endangers the health and safety of its citizens to minimize potential financial liabilities. When regulators do not know the composition of a fracking fluid, they likely will be ill-prepared to deal with emergencies, such as the incident in Windsor, Colorado.[232] In that instance, 84,000 gallons of fracking fluid were released in a mechanical failure that lasted more than 30 hours.[233] The long-term effects from the Windsor spill remain uncertain.[234]

*c. Texas*

Similar to Colorado, Texas regulations also circumvent regulatory agencies from having actual knowledge of chemical compositions claimed to be trade secrets.[235] Texas requires fracking companies to fill out a "Chemical Disclosure Registry" form and upload it to FracFocus.[236] Operators may withhold disclosure by claiming trade secret protection on their form.[237] Operators claiming the protection are required to provide the family name of a substance unless doing so would jeopardize the trade secret.[238]

When an operator claims trade secret protection, the operator is given a "presumption of validity."[239] Regulations further limit potential litigation by restricting who is allowed to challenge the presumption; only property owners where the wellhead is located, owner of adjacent property to the wellhead, or an "agency of this state with jurisdiction over a matter to which the claimed trade secret information is relevant" are allowed to challenge trade secrets.[240]

Fracking has combined with horizontal drilling, making it possible for a fracking operation to directly impact subsurface wells more than 6.2

231. *Id.*
232. *See* McCormick, *supra* note 17, at 235.
233. *Id.*
234. *Id.*
235. *See* Hall, *supra* note 187, at 414.
236. *See* 16 TEX. ADMIN. CODE § 3.29 (2020).
237. *See id.* § 3.29(f).
238. *See id.* § 3.29(c)(1)(B).
239. Craven, *supra* note 136, at 403.
240. 16 TEX. ADMIN. CODE § 3.29(f)(1).

miles away from a wellhead.[241] With the potential for water contamination from fracking compounded by the distances involved with horizontal drilling, Texas's requirement that only the property owner and adjacent property owners can challenge a trade secret is too restrictive. Additionally, when Texas regulators do not know what chemicals are present, proper safeguards may not be put in place in the event of an emergency due to the lack of such vital information.[242]

This section has demonstrated that state regulatory schemes neither adequately address the risks posed by fracking nor do they inform the public of those risks. The next section will examine how other countries that value intellectual property have addressed similar concerns surrounding fracking.

## III. HOW OTHER COUNTRIES APPROACH THE PROBLEM

Other nations with similar intellectual property rights, particularly trade secret protections, have also experienced tension between protecting fracking companies' trade secrets and the public health.[243] This section explores how Canada, Europe, and Australia managed this tension.

### *A. Canada: Additional Governmental Agency Review*

Most fracking in Canada is regulated by the Canada Oil and Gas Operations Act, which requires hydraulic fracturing operations to have an Environmental Protection Plan ("EPP").[244] Part of an EPP requires an applicant to "[d]escribe the procedures for the selection, evaluation, and use of chemical substances, including process chemicals and drilling fluid ingredients."[245] The EPP also asks the applicant if they are willing to "publicly disclose the chemicals used in the hydraulic fracture fluids."[246]

This regulatory scheme pressures an applicant to publicly disclose chemicals used or risk unsuccessful permit applications in the future.[247]

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241. Jason Lavis, *Directional Drilling: Everything You Ever Wanted to Know*, DRILLERS.COM (Aug. 14, 2018), https://drillers.com/directional-drilling-everything-you-ever-wanted-to-know/ [https://perma.cc/SX7H-WGMY].

242. Craven, *supra* note 136, at 403.

243. *See* Allan Ingelson & Tina Hunter, *A Regulatory Comparison of Hydraulic Fracturing Fluid Disclosure Regimes in the United States, Canada, and Australia*, 54 NAT. RES. J. 217, 219 (2014).

244. *Id.* at 227.

245. *Id.*

246. *Id.* at 228.

247. *Id.*

One leading oil industry association, Canadian Association of Petroleum Producers, reported that the "industry actively supports disclosing the content of fracturing fluids in operations."[248]

Canada's regulatory scheme takes this protection a step further under the Canadian Environmental Protection Act (CEPA) by providing that "no new substances, including chemicals in hydraulic fracturing fluids, can be introduced into the country prior to an evaluation of their toxicity."[249] A company wishing to introduce a new chemical into Canada for the purpose of fracking may do so and keep it secret but must comply with CEPA by providing "comprehensive information about the substance" to the Federal Minister of the Environment.[250] If the requirements under CEPA are met, the Canadian government will recognize the confidentiality of the trade secret claimed by a company.[251] Additionally, the Canada Hazardous Materials Information Review Act designates a separate government agency, the Hazardous Materials Review Commission, to review and register these types of trade secrets.[252]

*B. Europe and the Precautionary Principle*

The precautionary principle obligates governments to "refrain from authorizing or executing an activity such as fracking when there is no scientific certainty of the magnitude, causality, and probability of damage."[253] Essentially, the precautionary principle takes a "better-safe-than-sorry" approach by requiring regulation even when no risk has been observed.[254] Proponents of a chemical or process—in this case fracking fluids—are required to demonstrate its safety or at least monitor its effects.[255]

In using the precautionary principle, several countries have called for a moratorium, or ban, on fracking operations.[256] For example, in 2011

248. *Id.*
249. *Id.*
250. *Id.*
251. *Id.* at 229.
252. *Id.*
253. Héctor Herrera, *The Legal Status of Fracking Worldwide: An Environmental Law and Human Rights Perspective*, GLOB. NETWORK FOR HUM. RTS & THE ENV'T (Jan. 6, 2020), https://gnhre.org/human-rights/the-legal-status-of-fracking-worldwide-an-environmental-law-and-human-rights-perspective/ [https://perma.cc/XMH4-EQNW].
254. Craven, *supra* note 136, at 412.
255. *See* Zink, *supra* note 130, at 1177–78.
256. Herrera, *supra* note 253.

France banned fracking with law 835 of the Assembly of France, citing the Charter for the Environment of 2005, part of the French Constitution, as the basis for this prohibition.[257] Law 835 has been upheld by France's highest court in challenges from oil and gas companies.[258] In 2015, the Netherlands declared a five-year moratorium on fracking operations because of studies conducted by the Dutch government in 2013 on the effects of fracking.[259] In 2016, Germany banned fracking entirely.[260] Ireland, Wales, and England have also banned or declared moratoriums on fracking operations.[261] Many public health advocates in the U.S. have called for governments to follow the European model and apply the precautionary principle.[262] The state of New York implemented a moratorium in 2010 and subsequently banned fracking in 2014; many viewed this approach as an American application of the precautionary principle.[263]

### *C. Australia: Mandatory Public Disclosure*

The Australian national government cannot impose regulations on fracking, but it has released a guidance document suggesting states require "full public disclosure of the chemicals used in hydraulic fracturing activities."[264] The guidance document notes that a balance must be struck between intellectual property rights and public disclosure, potentially allowing for full disclosure to the regulator without public disclosure.[265] Currently, no confidential agreements exist with state regulators, and full disclosure is required.[266] Queensland and Western Australia have taken two different approaches in regulating fracking, both of which emphasize disclosure.[267]

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257. *Id.*
258. *Id.*
259. *Id.* (explaining "[t]he studies have demonstrated that there is also great uncertainty regarding the effects of drilling for shale gas deep below the surface of the ground").
260. *Id.*
261. *See id.*
262. David Tuller, *As Fracking Booms, Dearth of Health Risk Data Remains*, 34 HEALTH AFFS. 903, 905 (2015).
263. *See* Herrera, *supra* note 253.
264. Ingelson & Hunter, *supra* note 243, at 242.
265. *Id.*
266. *Id.*
267. *See id.* at 243–52.

In Queensland, a company seeking to perform hydraulic fracking must complete an Environmental Authority ("EA"), which helps determine the impact a given action will have on the environment.[268] Each EA for a fracking operation requires a list of the chemicals to be used to stimulate a well,[269] and the list is then made available on a public register.[270] Landowners upon whose land fracking will take place receive additional notice beyond the register in the form of a Notice of Intention to Undertake Hydraulic Fracturing Activities ("NOI") at least ten days before fracking begins and a Notice of Completion of Hydraulic Fracture Activities ("NOC") within ten days of completion.[271]

In Western Australia, "All chemicals used in the drilling and hydraulic fracturing activity are required to be disclosed."[272] Western Australia goes as far as regulating not only fracking fluids but also "*all* fluids used down-hole for all activities, including drilling and cementing."[273] Western Australia is among the first petroleum producing areas in the world to require this type of disclosure.[274]

In summary, Australia affords businesses and individuals intellectual property rights, including trade secret protection. The national government in its guidance document suggested states require disclosure and weigh the need for disclosure against the need of trade secret protection. In both the eastern states of Australia and Western Australia, states require disclosure of chemicals used in fracking and also make that information publicly available.

Other countries have taken a more intensive approach to fracking regulation. Much of Europe has, at least temporarily, banned fracking altogether. Canada requires an evaluation of toxicity before any new chemicals can be used in fracking, and Australia requires robust disclosure.

## IV. TRADE SECRETS AND DISCLOSURE

Can regulators require public disclosure of fracking fluid components without hindering trade secret protection or rendering fracking economically infeasible? As discussed above, there are serious human health concerns caused by fracking that are compounded by the lack of

268. *Id.* at 245.
269. *Id.*
270. *Id.* at 246.
271. *Id.* at 246–47.
272. *Id.* at 248–49.
273. *Id.* at 251.
274. *Id.*

meaningful regulation and disclosure. Halliburton claims that disclosure would reveal their formula, allowing for reverse engineering which would kill their trade secret.[275] Critics of Halliburton's position contend disclosure is possible without killing such trade secrets.[276] This section examines intellectual property law governing trade secrets and patents, demonstrating that disclosure can occur without destroying trade secret protections.

### *A. Intellectual Property: Trade Secrets and Patents*

Patents and trade secrets are two forms of intellectual property typically used in protecting fracking fluid information.[277] The federal government administers and issues patents, while state law generally lays the foundation for trade secret protections.[278]

#### *1. Patents*

The basic idea behind patent protection is that an inventor publicly discloses their invention with exactness; in return, they will have a period of time to benefit economically from their invention.[279] Inventors retain a legal monopoly for 20 years,[280] after which anyone can use the design or invention.[281]

Patent protection is available for useful,[282] novel,[283] or non-obvious[284] inventions or discoveries. Each unique fracking fluid fulfills these three requirements. First, they are useful in the extraction of natural gas. Second, they are novel because they are developed to accommodate unique rock formations found in different geographic areas.[285] Third, specific fluids are

275. Fink, *supra* note 1, at 1004–05.
276. *See* Sherwin, *supra* note 21, at 636–45.
277. *See* Craven, *supra* note 136, at 412–16.
278. *Id.*
279. Daniel R. Cahoy et al., *Fracking Patents: The Emergence of Patents as Information-Containment Tools in Shale Drilling*, 19 MICH. TELECOMM. & TECH. L. REV. 279, 295–96 (2013).
280. 35 U.S.C. § 154(a)(2).
281. *See* Ballard & Ballard Co. v. Borden Co., 107 F. Supp. 41, 50 (W.D. Ky. 1952).
282. 35 U.S.C. § 101.
283. *Id.* § 102.
284. *Id.* § 103.
285. *See* Craven, *supra* note 136, at 401–02.

likely non-obvious provided they are different from other publicly available formulas that have been previously used.[286]

In recent years, the number of patents used by fracking companies has dramatically increased.[287] Starting in 2004, over 150 patents associated with fracking have been issued per year, more than tripling the previous two decades' numbers.[288] This increase in patent use indicates some companies are able to use patents for their fracking technology and remain economically viable.

*2. Trade Secrets*

Many companies prefer to use trade secrets over patents;[289] in fact, according to the Department of Energy (DOE), 84% of fracking operations claim trade secret protection.[290] One advantage of trade secret protection over patent protection is that trade secrets have no time limit unlike the 20 year term for patent protection.[291] Researching new and more efficient fracking fluid mixtures for specific rock types and formations is expensive.[292] Some companies choose to use trade secret protection rather than patents because it provides a longer time horizon to recuperate money invested in researching the fracking formulas. One disadvantage of trade secret protection compared to patents is that trade secrets are based on state law, and states may administer their trade secret protections differently.[293] Where different states have varying reporting requirements, a company operating in multiple states has a massive administrative burden.

Trade secret protection is available in most states for information "including a formula" with "independent economic value" and provided that the party claiming trade secret has taken reasonable steps to "maintain its secrecy."[294] Fracking formulas qualify for trade secret protection because they fulfill two required elements. First, companies using fracking technology stand to gain an economic advantage if their fracking fluid is

286. Cody B. Johnson, *Intellectual Property and the Law of Fracking Fluid Disclosures: Tensions and Trends*, 6 ONE J: OIL & GAS NAT. RES. & ENERGY J. 443, 473 (2021).
287. Cahoy et al., *supra* note 279, at 289.
288. *Id.* at 290.
289. *See* Fink, *supra* note 1, at 1002.
290. *Id.*
291. *Id.* at 1016.
292. *See* Craven, *supra* note 136, at 401.
293. *See id.* at 413–14.
294. Wiseman, *supra* note 122, at 6–7.

more efficient than other mixtures.[295] Second, fracking companies clearly have taken reasonable steps to avoid disclosure, including in some instances avoiding direct requests from the EPA to disclose fracking fluid composition.[296]

Disclosing trade secret information can result in severe penalties; for example, a federal employee can serve jail time for disclosing a trade secret.[297] In states where doctors are afforded access to trade secret information, they are often placed under a gag order or are statutorily required to keep the information confidential.[298] In some states, this includes restricting doctors from disclosing to their patients the cause of the victims' injuries in order to protect trade secrets.[299]

Requiring secrecy can sometimes spur criticism. There are many instances where such criticism is warranted; consider the aforementioned Ohio River spill where trade secret protection empowered Weatherford to prioritize corporate profits ahead of the health and safety of the local residents. As one commentator recently put it, "secrecy has the capacity to corrupt and to invite abuse. Due to other's lack of knowledge regarding the trade secret, those with knowledge operate in a system free from oversight. This lack of accountability coupled with the desire for higher profits . . . results in a loosening of moral constraints."[300]

### *B. Disclosure Without the Loss of Trade Secret Protection*

The question of whether disclosure of ingredients would cause fracking companies to lose their trade secrets is controversial.[301] Ron Hyden, a chemical engineer speaking on behalf of Halliburton, believes disclosure of ingredients with their relative concentration would provide sufficient information to reverse engineer formulas.[302]

Alternatively, scholars, regulators, and some fracking proponents agree that a systems approach, or disclosure of ingredients, would not endanger companies' trade secrets.[303] One source of this consensus comes from the 2014 DOE panel indicating reverse engineering based on an

295. *Id.* at 7.
296. *Id.* at 7–8.
297. Hall, *supra* note 187, at 423.
298. *See* Sherwin, *supra* note 21, at 628–36.
299. *See id.*
300. Zink, *supra* note 130, at 1143.
301. *See* Fink, *supra* note 1, at 1021–23.
302. *Id.* at 1004.
303. *Id.* at 1005.

ingredient list "is not possible."[304] Scholars agree, explaining that "due to the complexity of the fluid components and the way that they are used, it is extremely difficult for another company to steal the product."[305] The DOE panel went so far as to conclude that "[a] list of chemicals that includes the contributions from all the constituents added makes it extremely difficult to reverse engineer to determine which chemicals and in what proportions these chemicals are present in a particular additive or product with specific trade name."[306] This is because fracking solutions can include multiple trade-marked substances.[307] In a systems approach, if all of the ingredients of all the substances being mixed are disclosed together, according to experts and scholars, reverse engineering would be too complicated.[308]

In 2014, Baker Hughes, a Houston-based fracking company, began listing "all of the chemicals it uses."[309] When asked about this decision and its potential impacts on trade secrets, Baker Hughes executives responded, "[i]ntroducing greater transparency about the chemicals used in the hydraulic fracturing process and protecting the ability to innovate are not conflicting goals."[310] They further stated that disclosure "is consistent with our belief that we are partners in solving industry challenges, and that we have a responsibility to provide the public with the information they want and deserve. It simultaneously enables us to protect proprietary information that is critical to our growth."[311]

According to regulators, scholars, and responsible fracking companies, full disclosure of chemicals can occur while also maintaining trade secret protection.[312] Since legislators, environmental groups, and natural gas companies agree that full disclosure of all ingredients as a percentage of the whole "eliminates the potential for reverse engineering," full disclosure should be considered as a viable means of allowing for greater information while also protecting proprietary information.[313]

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304. *Id.* at 1003.
305. *Id.* at 1004.
306. Sherwin, *supra* note 21, at 636.
307. *See* Fink, *supra* note 1, at 1003–04.
308. *See id.*
309. Zink, *supra* note 130, at 1161.
310. *Id.* at 1162.
311. *Id.*
312. *See* Fink, *supra* note 1, at 1003–04.
313. *See* Chris Boling, Note, *Hydraulic Fracturing and Chemical Disclosure: What You Do Not Know Could Hurt You*, 46 LOY. L.A. L. REV. 257, 275–76 (2012).

## V. PROPOSED SOLUTION: MANDATORY PUBLIC DISCLOSURE

The current legal structure regulating fracking is flawed.[314] Policy decisions involving health and science should be based on a process including: "(1) hypothesis; (2) scientific data in the form of environmental, observational and experimental data; (3) a synthesizing process that involves modeling and risk assessment, and from that; (4) a decision-making process that leads to policymaking."[315] In order to make proper regulatory and policy decisions involving human health, robust scientific inquiry into any potential adverse health effects should be conducted.

Mandatory public disclosure of all fracking chemicals will allow for research to begin on chemicals commonly used but previously not disclosed. The disclosure should take place before a fracking operation begins, so adequate water testing can occur prior to potential contamination, thus eliminating the harm at its source. Since many of the rock formations targeted by fracking operations span multiple states, creating a national disclosure standard would be the most effective solution.[316] In fact, many consider a national approach to fracking regulation the "wisest" approach.[317] As discussed in the next section, a national disclosure requirement will include information accessibility requirements in order to overcome the shortcomings of FracFocus and other registries. Subparts A and B will discuss the effects a uniform disclosure requirement would have on industry as well as the impacts on public involvement and tort law.

### *A. Uniform Disclosure Requirements: Effect on Industry*

As previously discussed, fracking companies will be able to provide full disclosure of all chemicals involved while maintaining trade secret protection.[318] Some companies that operate in multiple states may find a national disclosure requirement beneficial because it would lessen the administrative burden in determining the disclosure requirements of each state in which the company operates.

One negative effect on companies may be that requiring pre-injection disclosure could cause delays in the fracking process may occur.[319] This is

314. *See* Sherwin, *supra* note 21, at 616.
315. *Id.*
316. Van Ort, *supra* note 49, at 452–53.
317. *See id.* at 453.
318. *See* Boling, *supra* note 313, at 276.
319. *See* Hall, *supra* note 187, at 424–26.

because companies often determine the exact composition of fracking fluids shortly before beginning the fracking process.[320]

A related concern is that fracking companies may employ less efficient fracking fluid solutions to avoid potential delays resulting from disclosure requirements.[321] This is due to a company's potential decision to make initial disclosure before thorough geological studies are conducted and then use the initial formula disclosed rather than adjusting the formula based on a more complete understanding of the rock formations.[322]

Another concern is that fracking companies may have to conduct additional studies before disclosure in order to ensure that the proper fracking fluid mixture is used for a particular site.[323] Although these delays could potentially occur, fracking will likely still be profitable. In Queensland, Australia, as discussed above, regulators require disclosure before and after fracking; yet, Queensland continues to harbor a robust oil and gas industry.[324] Following the Queensland model, a pre-frack disclosure in the U.S., even with potential delays, would likely still be profitable and resource extraction would continue.

### *B. Uniform Disclosure Requirements: Other Effects*

Requiring pre-injection public disclosure of all chemicals used in the fracking process will incentivize safer company practices and promote better health outcomes in emergency situations through informed public involvement and exposure to potential tort liability.

#### *1. Public Involvement: Safer Fracking Fluid and Improved Outcomes*

Mandatory public disclosure would allow for greater public involvement in fracking operations. With fracking chemicals publicly available, scientific research could be conducted, leading to a more complete understanding of the health implications posed by the chemicals in question. Experts believe an increase in publicly available information will encourage fracking companies to develop safer fracking fluids.[325]

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320. *Id.* at 425–26.
321. *Id.* at 426.
322. *Id.*
323. *Id.*
324. *See* discussion *supra* Part III.C; *Gas Industry Overview*, QUEENSLAND GOV'T, https://www.business.qld.gov.au/industries/mining-energy-water/energy/gas/overview [https://perma.cc/U3LL-AQVQ] (last updated Apr. 27, 2018).
325. Craven, *supra* note 136, at 404.

Public perception could also incentivize companies to implement safer technologies they already have available; for example some companies, like Halliburton, have safe fracking fluids available but use them very infrequently.[326] This public perception could come from those who would be directly affected by the potential fracking operation. Public perception and pressure to engage in safe practices could also come from individuals who are not directly affected by fracking but are sympathetic to the potential harm of their distant neighbors.

Further, fracking fluid disclosure could lead to improved outcomes in emergency situations when contamination, spills, and other accidents occur.[327] For example, if Cathy Behr's doctors had known what type of chemical poisoning occurred, she may have been afforded better health outcomes with her vision and sense of smell. With the Ohio River spill, instead of guessing if millions of people were drinking safe water, local authorities could have tested for specific chemicals and better understood the risks of exposure.

*2. Tort Law: Safer Fracking Fluid and Improved Outcomes*

An informed public, combined with the protections of tort law, will benefit overall public health. Tort law provides a "variety of public policy goals at once, including economic efficiency, deterrence of risky activity, injury compensation, spreading loss associated with injuries, and even social justice."[328] Many lawmakers view tort law as a regulatory device.[329] Whether the purpose of tort law was meant to be regulatory in nature, it has caused some businesses to self-regulate in order to avoid potential liability.[330] Self-regulation by businesses demonstrates an important impact of tort law—namely, it promotes awareness by businesses for the safety of individuals. Tort law, and specifically tort liability, will incorporate the Golden Rule by forcing businesses to account for the harms they cause and take preventative measures to avoid those harms.

Toxic tort plaintiffs face several challenges, but proving causation is generally the most difficult due to the types of harms considered in toxic

326. *See* Fink, *supra* note 1, at 1010–11.

327. *See* Wiseman, *supra* note 122, at 9–10.

328. Jason M. Solomon, *Equal Accountability Through Tort Law*, 103 NW. U. L. REV. 1765, 1771 (2009).

329. *Id.* at 1768.

330. Allan Kanner, *Toxic Tort Litigation in a Regulatory World*, 41 WASHBURN L.J. 535, 545 (2002) (explaining that tort law has the effect of regulating, especially where punitive damages are available).

tort litigation.[331] Under the current legal framework, victims of toxic exposure stemming from fracking face an even greater hurdle than other toxic tort litigants because fracking companies can shield disclosure by claiming trade secret protection. In essence, potential victims of toxic exposure may never know, much less have the ability to prove, what exactly caused their injuries.

Mandatory pre-injection disclosure will facilitate protection of groundwater resources by private citizens dependent on groundwater. These citizens can select some of the chemicals used in the upcoming fracking operation unique to that operation and perform subsequent tests on their drinking water for those substances. If those chemicals were not present before fracking began but are later found in the drinking water source, those chemicals' presence will help plaintiffs prove causation. These pre-injection disclosures will provide much-needed help to people who face circumstances similar to those of the Leighton family and George Zimmerman.

Although water testing is still cost prohibitive in many instances,[332] knowing all chemicals involved in a fracking operation at least enables individuals to test their water in preparation for nearby fracking. Additionally, testing can be more exact in nature by selecting chemicals a property owner knows the fracking company will use, potentially reducing the financial burden of protecting their drinking water source on an individual scale.

Ultimately, some of the decisions made by companies like Weatherford and Halliburton demonstrate an unwillingness by executives to put themselves in the shoes of those who will be potentially harmed by fracking. Requiring disclosure of fracking fluids would help to arm potential victims of toxic exposure, so they can prove the harms they suffered in court. When individuals have a better chance of success in court, companies will likely be incentivized to start accounting for potential harm to their neighbor when making decisions regarding their fracking operations.

## CONCLUSION

Fracking companies currently operate behind closed doors protected by trade secret law and a lack of meaningful regulation, creating the aforementioned moral dilemma: Should these companies be expected to

331. *See* Robert F. Blomquist, *Emerging Themes and Dilemmas in American Toxic Tort Law, 1988-91: A Legal-Historical and Philosophical Exegesis*, 18 S. ILL. U. L.J. 1, 119 (1993).

332. *See* Fink, *supra* note 1, at 996.

treat others as they would expect to be treated in similar circumstances? Unfortunately, when fracking accidents have jeopardized human health, some companies have not followed any semblance of the Golden Rule. Requiring full disclosure of fracking fluid components removes this moral dilemma, thus protecting vulnerable individuals by empowering medical personnel and public health officials to make informed decisions when responding to fracking-related accidents. Full disclosure requirements appropriately incorporate the Golden Rule principle by incentivizing companies to review their fracking practices with an eye toward avoiding potential harm to others.

Halliburton has equated its fracking fluid mixtures to "Coca-Cola and Dr. Pepper, KFC's fried chicken, and Bush's Baked Beans" recipes in an effort to explain the company's need for trade secret protection.[333] Ironically, the solution proposed here makes the same comparison but in a slightly different way: fracking fluids should be treated like Coca-Cola and Dr. Pepper with federally mandated disclosure of their components. Regulators, environmental groups, and responsible fracking companies agree full disclosure can be undertaken without foregoing trade secret protection. Australia is an example of a country requiring such disclosure while also boasting a robust energy sector. If Coke can list its ingredients while maintaining trade secret protection, then Halliburton ought to be required to do so as well.

333. *Id.* at 1003.