

FALLING THROUGH THE CRACKS: PUBLIC INFORMATION AND THE PATCHWORK OF HYDRAULIC FRACTURING DISCLOSURE LAWS

Matthew McFeeley^{*†}

INTRODUCTION

The United States has seen a proliferation of oil and gas drilling in recent years, spurred largely by the development of large-volume hydraulic fracturing. The number of producing wells in the U.S. has exploded¹ and more than 15 million Americans now live within one mile of a recently drilled oil and gas well.²

New oil and gas development has been largely fueled by hydraulic fracturing, or “fracking.” Fracking involves pumping large volumes of water, chemicals, and sand (or a similar material) into a well to create cracks in the rock formation to allow oil and gas inside the formation to flow to the surface. Fracking has generated significant controversy due to complaints of air and water contamination and the increasing presence of industrial oil and gas exploration activity in formerly agricultural, rural, and suburban communities.

Concerns over the potential environmental and health effects of fracking have led a number of states to adopt rules requiring disclosure of the chemicals used in the process.³ This Article provides a review of hydraulic fracturing disclosure rules in the United States and argues that these rules should be significantly strengthened to fulfill their potential as a regulatory tool. Part I of this Article provides background on hydraulic fracturing, its history, and its current usage. Part II lays out the purposes

* Attorney, Natural Resources Defense Council. J.D. 2011 University of Pennsylvania Law School; M.P.P. 2008 Harris School of Public Policy, University of Chicago; B.S. 2002, University of California, San Diego.

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1. In the fifteen-year period from 1996 to 2011, for example, the number of producing gas wells in the country rose from 301,811 to 514,637, a 70% increase. See *U.S. Natural Gas—Number of Gas and Gas Condensate Wells (Number of Elements)*, U.S. ENERGY INFO. ADMIN. (last updated Mar. 31, 2014), http://www.eia.gov/dnav/ng/hist/na1170_nus_8a.htm.

2. Russell Gold & Tom McGinty, *Energy Boom Puts Wells in America's Backyards: Hydraulic Fracturing Largely Driving Transformation of the Nation's Landscape*, WALL ST. J., Oct. 25, 2013, <http://online.wsj.com/news/articles/SB10001424052702303672404579149432365326304> (“At least 15.3 million Americans lived within a mile of a well that has been drilled since 2000. That is more people than live in Michigan or New York City.”).

3. See *infra* Table 1. Of course, disclosure policies are only one of the many tools that governments have at their disposal to understand and manage the risks of fracking. States have implemented a wide variety of rules related to fracking and associated oil and gas development that do not involve disclosure, but they are beyond the scope of this Article.

that hydraulic fracturing chemical disclosure laws hope to achieve. Part III reviews relevant federal laws and then provides a detailed look at the array of state fracking disclosure rules. Part IV concludes with thoughts about how to more fully realize the benefits that fracking disclosure laws may bring.

The review of state rules makes clear that significant regulatory gaps remain despite fracking industry proponents' claims that federal rules would be "onerous" and "duplicative" of state regulations.⁴ Fracking occurs in more than thirty states. Of these, about one-third have no fracking chemical disclosure rule at all.⁵ Among the remaining states that do have rules, disclosure requirements are often weak. Very few states require disclosure prior to fracking or notification to local landowners and tenants that fracking will occur. While many states have relatively robust chemical identification requirements for disclosure after fracking, most allow trade secret claims to be made without any justification or oversight, effectively giving companies the ability to evade the rules at will. Few states ensure that health professionals and emergency responders will have access to all the information they may need to treat patients or respond to the scene of an accident. Finally, there are widespread problems with the accessibility of disclosed information, which are likely to limit the utility of disclosures in most states.

In order to realize the full potential benefits of fracking disclosure laws, more comprehensive rules must be written. Disclosure policies should also be broadened to require the disclosure of chemicals used throughout the oil and gas development process and to require reporting on the many other pollutant releases that occur. And further attention must be devoted to developing tools to aid in interpreting the information provided by these rules.

4. Doc Hastings, *Protecting the States' Right to Regulate Hydraulic Fracturing*, THE DAILY CALLER (Nov. 19, 2013), <http://dailycaller.com/2013/11/19/protecting-the-states-right-to-regulate-hydraulic-fracturing/>; see also Wes Deweese, *Fracturing Misconceptions: A History of Effective State Regulation, Groundwater Protection, and the Ill-Conceived Frac Act*, 6 OKLA. J.L. & TECH., no. 49, 2010, at 1, 1, available at <https://www.law.ou.edu/sites/default/files/files/FACULTY/2010okjoltrev49.pdf> (arguing that federal regulation of hydraulic fracturing would "impose costly . . . hurdles" and "inhibit the development" of resources).

5. I define "fracking chemical disclosure rule" as a rule that (1) requires some information on the substances used in fracking, and that (2) makes that information available to the public online without a public records request and without having to physically travel to the regulator's office to inspect files. Therefore, this analysis does not classify a state like Idaho as having a disclosure rule, despite the fact that it requires that information on fracking chemicals be submitted to the state, because those records are not publicly disclosed as a matter of course.

I. BACKGROUND

The recent expansion of oil and gas production in the United States has been largely driven by the development of high-volume hydraulic fracturing and horizontal drilling techniques.⁶ These technologies have allowed extraction of oil and gas from low-permeability geologic formations that were previously inaccessible or uneconomic.⁷ Over 90% of oil and gas wells drilled today are hydraulically fractured, by most estimates.⁸

Hydraulic fracturing has been used for decades, but its modern incarnation looks little like the techniques that were first used in the late 1940s.⁹ Early fracking generally used less than 1,000 gallons of fluid and 500 pounds of proppant (the sand or sand-like substance that is combined with the fluid and pumped into the well to prevent the fractures from closing once fracking ceases).¹⁰ Modern, multi-stage fracturing techniques, on the other hand, may use 8 million gallons of water or more¹¹ and the average horizontal fracking treatment now uses more than 4 million pounds of proppant.¹² Likewise, chemical use has vastly increased. Chemicals generally make up somewhere between 0.5% and 2% of the total fracking fluid, according to industry sources.¹³ For a 6 million gallon frack

6. *Technology Drives Natural Gas Production Growth from Shale Gas Formations*, U.S. ENERGY INFO. ADMIN. (July 12, 2011), <http://www.eia.gov/todayinenergy/detail.cfm?id=2170>.

7. *Hydraulic Fracturing: Overview*, USGS.GOV, <http://energy.usgs.gov/OilGas/UnconventionalOilGas/HydraulicFracturing.aspx> (last updated Jan. 27, 2014).

8. *E.g.*, MARY TIEMANN & ADAM VANN, CONG. RESEARCH SERV., R41760, HYDRAULIC FRACTURING AND SAFE DRINKING WATER ACT REGULATORY ISSUES 2 (2013), *available at* <https://www.fas.org/sgp/crs/misc/R41760.pdf>; Press Release, Ground Water Prot. Council & Interstate Oil & Gas Compact Comm'n, GWPC and IOGCC launch www.fracfocus.org (April 11, 2011), *available at* <http://groundwork.iogcc.org/topics-index/hydraulic-fracturing/iogcc-in-action/gwpc-and-iogcc-launch-wwfracfocusorg>.

9. The first commercial hydraulic fracturing treatments were performed in 1949 by the Halliburton Oil Well Cementing Company, which had recently obtained a patent for the process. *See* Carl I. Montgomery & Michael B. Smith, *Hydraulic Fracturing: History of an Enduring Technology*, J. PETROLEUM TECH., Dec. 2010, at 26, 27, *available at* <http://www.ourenergypolicy.org/wp-content/uploads/2013/07/Hydraulic.pdf>.

10. *See id.* at 28.

11. *See* CHARLES W. ABDALLA & JOY R. DROHAN, PA. STATE COLL. OF AGRIC. SCIS., WATER WITHDRAWALS FOR DEVELOPMENT OF MARCELLUS SHALE GAS IN PENNSYLVANIA 3 (2010), *available at* <http://pubs.cas.psu.edu/FreePubs/pdfs/ua460.pdf> (“Hydrofracturing a horizontal Marcellus well may use 4 to 8 million gallons of water, typically within about 1 week.”).

12. Carolyn Davis, *U.S. Onshore Proppant Market Accelerating to 2015*, NGI'S SHALE DAILY (Oct. 16, 2013), <http://www.naturalgasintel.com/articles/96090-us-onshore-proppant-market-accelerating-to-2015>.

13. *See Hydraulic Fracturing: The Process*, FRACFOCUS.ORG, <http://fracfocus.org/hydraulic-fracturing-how-it-works/hydraulic-fracturing-process> (last visited Apr. 27, 2014) (noting that 98% to 99.5% of fracturing fluid consists of water and sand, the remainder consists of chemical additives).

treatment, which is not uncommon in many areas of the country,¹⁴ this means that 30,000 to 120,000 gallons of chemicals are used each time a well is fracked. And a well may be refractured multiple times throughout its life.¹⁵

Fracking chemicals present significant environmental and human health risks. Many are toxic.¹⁶ A number are classified as known or probable carcinogens.¹⁷ These chemicals may be released into the environment in multiple ways. Fracking fluids have spilled, contaminating soil and water bodies.¹⁸ Equipment failures and other problems have led to well blowouts during fracking, spraying fracking fluids into the air and onto surrounding lands.¹⁹ Fracking also has the potential to cause groundwater contamination.²⁰

14. *E.g.*, Russell Gold, *Energy Firm Makes Costly Fracking Bet—on Water*, WALL ST. J., Aug. 13, 2013, <http://online.wsj.com/news/articles/SB10001424127887323420604578652594214383364>.

15. *See* ENVTL. PROT. AGENCY, SUMMARY OF STAKEHOLDER WORKSHOP ON THE U.S. GHG INVENTORY FOR NATURAL GAS SYSTEMS HELD SEPTEMBER 13–14, 2012 IN WASHINGTON, DC, at 2 (2012), *available at* http://www.epa.gov/climatechange/Downloads/ghgemissions/2012Workshop/Sep2012_EPA_Workshop_NG_in_the_GHG_Inventory_Report.pdf (discussing various estimates of the rate at which wells are refractured in subsequent years).

16. *See* Theo Colborn et al., *Natural Gas Operations from a Public Health Perspective*, 17 HUM. & ECOLOGICAL RISK ASSESSMENT: INT'L J. 1039, 1040, 1045–46 (2011).

17. *See id.* at 1050–51 tbl.2 (listing chemicals found in fracking fluid with ten or more known adverse health effects); *Chemicals in Natural Gas Operations: Health Effects Spreadsheet and Summary*, ENDOCRINE DISRUPTION EXCHANGE (2011), <http://endocrinedisruption.org/chemicals-in-natural-gas-operations/chemicals-and-health> (Click on link to “Spreadsheet of products, chemicals and their health effects (Excel)”) (keeping a database of potential health risks associated with chemicals used in natural gas operations); *Agents Classified by the IARC Monographs, Volumes 1–109*, INT'L AGENCY FOR RES. ON CANCER, <http://monographs.iarc.fr/ENG/Classification/index.php> (last updated Oct. 30, 2013) (containing a list of chemicals suspected or known to be carcinogenic to humans).

18. *E.g.*, Bruce Finley, *Water Fouled with Fracking Chemicals Spews Near Windsor*, DENVER POST, Feb. 14, 2013, http://www.denverpost.com/ci_22586154/water-fouled-fracking-chemicals-spews-near-windsor (reporting on spills of contaminated water in Colorado); Laura Legere, *Pa. Fines Cabot \$56K for 3 Chemical Spills in Susquehanna County*, TIMES-TRIBUNE, Oct. 23, 2009, <http://thetimes-tribune.com/news/pa-fines-cabot-56k-for-3-chemical-spills-in-susquehanna-county-1.356458>.

19. *E.g.*, Gayathri Vaidyanathan, *Hydraulic Fracturing: When 2 Wells Meet, Spills Can Often Follow*, ENERGY WIRE (Aug. 5, 2013), <http://www.eenews.net/energywire/stories/1059985587>; Andrew Maykuth, *Pa. Investigating Marcellus Well Blowout*, PHILLY.COM (Jan. 26, 2011), http://articles.philly.com/2011-01-26/business/27049596_1_talisman-energy-blowout-marcellus-shale; Laura Legere, *After Blowout, Most Evacuated Families Return to Their Homes in Bradford County*, TIMES-TRIBUNE, Apr. 21, 2011, <http://thetimes-tribune.com/news/gas-drilling/after-blowout-most-evacuated-families-return-to-their-homes-in-bradford-county-1.1135253>.

20. *See, e.g.*, DOMINIC C. DIGIULIO ET AL., U.S. ENVTL. PROT. AGENCY, 600/R-00/000, DRAFT REPORT: INVESTIGATION OF GROUND WATER CONTAMINATION NEAR PAVILLION, WYOMING 33 (2011), *available at* http://www2.epa.gov/sites/production/files/documents/EPA_ReportOnPavillion_Dec-8-2011.pdf (concluding that “the explanation best fitting the data for the deep monitoring wells is that constituents associated with hydraulic fracturing have been released into the Wind River drinking water aquifer”).

Transport and storage of hazardous fracking chemicals also pose risks. The tens or hundreds of thousands of gallons of chemicals used for a high-volume hydraulic fracturing treatment must be trucked through communities to the well site and stored there. Accidents, fires, or explosions at the well site may cause the release of chemicals even before fracking commences. After fracking, wastewater (which contains the chemicals that were injected into the well, termed “flowback”) resurfaces and must be transported to an offsite disposal facility.²¹ Accidental chemical releases may occur at any of these stages of the fracking process.

II. THE PURPOSES OF HYDRAULIC FRACTURING CHEMICAL DISCLOSURE LAWS

Hydraulic fracturing chemical disclosure laws serve a number of purposes. First, the public has a right to know what chemicals are being transported through their communities, stored on well sites near homes, schools, and hospitals, and injected into the ground near drinking water sources.²² Comprehensive chemical information is important to formulating emergency response plans, and it allows first responders to protect themselves and the public when acting to address accidents and emergencies. Health professionals need information on what patients may have been exposed to, and in what concentrations, for diagnosis and treatment.²³ And the information is crucial to scientific research on fracking and its cumulative environmental and health effects.²⁴ Additional research is, in turn, necessary for well-informed policies to protect the public.²⁵

21. *Fracturing Fluid Management*, FRACFOCUS.ORG, <http://fracfocus.org/hydraulic-fracturing-how-it-works/drilling-risks-safeguards> (last visited Apr. 27, 2014).

22. Congress recognized the right to know about the chemicals in one’s community when it passed the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), Pub. L. 99-499, 100 Stat. 1728 (codified at 42 U.S.C. §§ 11001-11049 (2006)). For further discussion of EPCRA, see Part III.A, *infra*. Such a right has also been recognized by a number of states, California’s Proposition 65 being the most prominent example. See John D. Echeverria & Julie B. Kaplan, *Poisonous Procedural “Reform”*: In Defense of Environmental Right-to-Know, 12 KAN. J.L. & PUB. POL’Y 579, 585 (2003) (discussing Proposition 65 and other state laws). For a discussion of the interests underlying individuals’ right to know about hazardous chemicals in their communities, see Shannon M. Roesler, *The Nature of the Environmental Right to Know*, 39 ECOLOGY L.Q. 989, 1017–18 (2012).

23. See CAL. DEP’T OF PUBLIC HEALTH & DEP’T OF INDUS. RELATIONS, UNDERSTANDING TOXIC SUBSTANCES: AN INTRODUCTION TO CHEMICAL HAZARDS IN THE WORKPLACE 26 (2008), available at <http://www.cdph.ca.gov/programs/hesis/Documents/introtoxsubstances.pdf> (noting the need for information on a chemical substance’s identity and concentration for determining potential health effects).

24. Relatedly, many commentators argue that public disclosure of information related to environmental issues that are a matter of public debate furthers a right to self-governance. See, e.g., Roesler, *supra* note 22, at 1015 (noting that information of this sort “furthers an interest in self-government not only by informing citizens, but also by engaging citizens,” and noting that such

Chemical disclosure can be an important tool in determining the source of any water contamination that occurs from fracking.²⁶ When paired with adequate notice to local landowners and residents, pre-fracking disclosure allows these people to conduct baseline testing to establish the quality of water sources prior to hydraulic fracturing, including the presence or absence of identified chemical constituents of fracking fluids. Pre-fracturing disclosure also allows regulatory entities to evaluate and manage the risks that chemicals may pose during transport, storage, fracking itself, and during the shipment and disposal of fracking wastewater. Disclosure provides the public with information it can use to monitor agency activities to ensure that agencies are acting in the public interest. Many agencies overseeing oil and gas development are especially vulnerable to “capture” because most have joint missions that involve both protecting the environment and encouraging extraction.²⁷ Disclosure policies provide information that the public can use to act as a check on captured agencies.²⁸ Robust disclosure may also spur companies to innovate or improve environmental practices once information about their environmental practices and those of their competitors is known.²⁹

engagement is “essential to republican strains of democratic theory, in which citizens participate in dialogue in order to identify and further the common good”).

25. The necessity of obtaining environmental performance information to inform policy development cannot be overlooked. Nor should decision makers underestimate the challenge of obtaining such information from regulated entities that are loath to divulge it without clear and specific disclosure laws. See Wendy E. Wagner, *Commons Ignorance: The Failure of Environmental Law to Produce Needed Information on Health and the Environment*, 53 DUKE L.J. 1619, 1641–49, 1720–26 (2004).

26. In economic theory, disclosure can be seen as remedying the market failure that occurs when environmental or health harms are not traceable to their source. See Cass R. Sunstein, *Informational Regulation and Informational Standing: Akins and Beyond*, 147 U. PA. L. REV. 613, 624 (1999) (explaining that mandatory disclosure can remedy a market failure created by inadequate information). To the extent that disclosure, via regulatory means, tort liability, or other means, forces fracking companies to internalize the costs of their activities, the market failure is remedied. Economic theorists also posit that disclosure requirements may improve overall social welfare by facilitating Coasean bargaining. See David W. Case, *Corporate Environmental Reporting As Informational Regulation: A Law and Economics Perspective*, 76 U. COLO. L. REV. 379, 422–23 (2005). However, outside of the context of contractual agreements such as oil and gas leases, it is questionable whether such bargaining is likely to occur in the fracking context.

27. E.g., *Mission Statement and Strategic Plan*, COLO. OIL & GAS CONSERVATION COMMISSION, <http://cogcc.state.co.us/> (last visited Apr. 27, 2014) (follow “Mission” in the left-hand navigation menu) (“The mission of the Colorado Oil and Gas Conservation Commission (COGCC) is to foster the responsible development of Colorado’s oil and gas natural resources.”).

28. See Echeverria & Kaplan, *supra* note 22, at 589 (asserting that disclosure policies empower the public to monitor agency actions thereby helping to resolve agency capture problems).

29. See, e.g., MICHAEL E. KRAFT ET AL., *COMING CLEAN: INFORMATION DISCLOSURE AND ENVIRONMENTAL PERFORMANCE* 55 (2011) (noting that, on average, facilities lowered their levels of toxic releases after the inception of the Toxic Release Inventory, and arguing that a number of factors led to these reductions, including industry knowledge of release levels and improved regulatory

Moreover, fracking disclosure policies can provide these benefits at very low cost. Generally, companies performing fracking generate contemporaneous logs which record the chemical mixture, water use, injection pressures, and other data.³⁰ Very little expense or effort is required to enter the final resulting information into an electronic form for submission to a government agency. Somewhat higher costs may accompany provisions requiring factual substantiation of trade secret claims and allowing challenges to those claims.³¹ However, these costs should be limited by the fact that they will generally need to be incurred only once for each chemical identity or other trade secret claimed.

As discussed further in Part IV.C, fracking chemical disclosure rules should be used as a foundation for much more comprehensive disclosure requirements that cover chemical use at all stages of oil and gas exploration and production, as well as disclosure of other environmental impacts associated with the industry. While state reporting requirements all fall far short of this goal, some do require certain information regarding water use and waste generation to be tracked and transmitted to the regulator. Such reporting allows a more complete accounting of the full impacts of oil and gas development.

Of course, disclosure does not, by itself, make fracking any safer. An adequate regulatory regime must also include, among other things, standards requiring best practices in well siting and construction, spill and leak reduction and containment, pollution capture, waste disposal, and in minimizing impacts from well pads, roads, and pipelines. However, a comprehensive disclosure rule is one essential component of a full suite of regulations meant to safeguard against the risks posed by fracking, and by oil and gas development more generally.

oversight made possible by the disclosures); *see also* JORGE H. GARCÍA ET AL., WHAT KINDS OF FIRMS ARE MORE SENSITIVE TO PUBLIC DISCLOSURE PROGRAMS FOR POLLUTION CONTROL? THE CASE OF INDONESIA'S PROPER PROGRAM 6 (2008), *available at* <http://ideas.repec.org/p/rff/dpaper/dp-08-12-efd.html> (noting an "immediate, positive response," concentrated among the worst-performing firms in the first six months of a disclosure and rating regime for water pollution).

30. *See* GROUND WATER PROT. COUNCIL ET AL., MODERN SHALE GAS DEVELOPMENT IN THE UNITED STATES: A PRIMER 60–61 (2009), *available at* http://fracfocus.org/sites/default/files/publications/shale_gas_primer_2009.pdf ("Every aspect of the fracture stimulation process is carefully monitored.").

31. *See* Hydraulic Fracturing Chemical Disclosure Requirements, 36 Tex. Reg. 5768, 5768 (proposed Sept. 9, 2011) (codified at 16 TEX. ADMIN. CODE § 3.29 (2014)) ("The Commission estimates that the approximate cost of substantiating a claim of entitlement to trade secret protection would range between \$1,000 and \$5,000.").

III. EXISTING LAWS REQUIRING DISCLOSURE OF HYDRAULIC FRACTURING CHEMICALS

Oil and gas regulation is largely an exception to the tradition of “environmental federalism” that prevails in the United States. This is because oil and gas exploration and production operations enjoy a number of exemptions in federal environmental laws, including the Clean Air Act, the Clean Water Act, and the Safe Drinking Water Act.³² Rather than the traditional system in which states must meet or exceed minimum federal standards,³³ ensuring that baseline environmental and health protections are in place, states have full regulatory authority over most aspects of oil and gas exploration and production activities.³⁴ Thus, hydraulic fracturing chemical disclosure is largely left to the states.

A. Federal Laws Related to Hydraulic Fracturing Chemical Disclosure

No federal law currently requires public disclosure of hydraulic fracturing chemicals. Legislation has been introduced to do so, but its prospects of passage in the current Congress are low.³⁵ Some minimal federal disclosure requirements do exist that are applicable to hydraulic fracturing. These requirements are set forth below. However, existing federal requirements provide information only on a narrow subset of hydraulic fracturing chemicals and the disclosures that do occur are not readily accessible to the public.

The relevant federal disclosure requirements that exist are set forth in the Emergency Planning and Community Right-To-Know Act (“EPCRA” or “Act”).³⁶ EPCRA was enacted in 1986 in response to a number of large-

32. See, e.g., 42 U.S.C. § 300h(d)(1)(B)(ii) (2006) (exempting hydraulic fracturing from the requirements of the Safe Drinking Water Act). This provision is often referred to as the “Halliburton loophole” after former Halliburton CEO and Vice President Dick Cheney, who was purportedly responsible for ensuring that this provision was included in the Energy Policy Act of 2005. See Editorial, *The Halliburton Loophole*, N.Y. TIMES, Nov. 2, 2009, http://www.nytimes.com/2009/11/03/opinion/03tue3.html?_r=0.

33. See Michael G. Faure & Jason Scott Johnston, *The Law and Economics of Environmental Federalism: Europe and the United States Compared*, 27 VA. ENVTL. L.J. 205, 214 (2009).

34. Rebecca W. Watson & Nora R. Pincus, *Hydraulic Fracturing and Water Supply Protection—Federal Regulatory Developments*, 49 ROCKY MTN. MIN. L. INST. 235, 235 (2012); Christopher S. Kulander, *Shale Oil and Gas State Regulatory Issues and Trends*, 63 CASE W. RES. L. REV. 1101, 1103 (2013).

35. The Fracturing Responsibility and Awareness of Chemicals (FRAC) Act would amend the Safe Drinking Water Act (SDWA) to delete the exemption for hydraulic fracturing and require public disclosure of fracking chemicals nationwide. See S. 1135, 113th Cong., § 2(a), (c) (2013); H.R. 1921, 113th Cong., § 2(a), (b) (2013).

36. See 42 U.S.C. §§ 11001–11050 (2006).

scale chemical accidents, including the Bhopal disaster.³⁷ EPCRA was passed, in part, to provide information to federal, state, and local government agencies that must plan for and respond to emergencies during which chemical releases might occur.³⁸ EPCRA contains a number of provisions that require the reporting of chemical releases and the storage of certain chemicals.³⁹

EPCRA contains requirements that apply to chemical release and chemical storage. EPCRA's chemical release reporting requirements apply only incidentally to fracking operations. The Act requires two types of chemical release reporting. First, some types of industrial facilities must report the release, management, and transfer of certain chemicals to the Toxics Release Inventory (TRI), which EPA publishes online.⁴⁰ Oil and gas facilities are not required to report to the TRI.⁴¹ EPCRA's second set of chemical-release reporting applies only to a limited set of chemicals that are particularly hazardous and then only when releases occur in amounts above a threshold reporting standard.⁴² While fracking facilities can trigger this requirement, they are unlikely to do so in the course of normal operations and such a report would provide information only on the single chemical for which such a report was filed, leaving the public without information on the remainder of the contents of the fracking fluid.

EPCRA's chemical storage reporting requirements apply only to chemicals deemed hazardous under rules set forth by the Occupational Safety and Health Administration (OSHA).⁴³ Facilities that store chemicals

37. See LINDA-JO SCHIEROW, CONG. RESEARCH SERV., RL 32683, THE EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT (EPCRA): A SUMMARY 1 (2012), available at <http://www.fas.org/sgp/crs/misc/RL32683.pdf> (explaining that many members of Congress supported legislation to reduce the risk of chemical accidents following the Bhopal incident in India).

38. See *What is ECPRA?*, EPA.GOV, <http://www2.epa.gov/epcra-tier-i-and-tier-ii-reporting/what-epcra> (last updated Jan. 14, 2014) (explaining that ECPRA is designed to increase "knowledge and access to information on chemicals" and that states "can use the information to improve chemical safety and protect public health and the environment").

39. 42 U.S.C. §§ 11021, 11022.

40. *Id.* § 11023(a), (j).

41. See *id.* § 11023(b)(1)(A) (applying TRI reporting requirement to facilities covered by Standard Industrial Classification [SIC] codes 20-39). Oil and gas extraction facilities are classified under SIC code 13. *SIC Codes and Counts by Division*, NAICS ASS'N, <http://www.naics.com/free-code-search/sictwodigit.html?minsic=10&maxsic=14> (last visited Apr. 27, 2014). EPA has authority to add or remove SIC codes for which reporting is required under EPCRA, but has not used its authority to add oil and gas extraction facilities. See 42 U.S.C. § 11023(b)(1)(A) (applying TRI reporting requirement to facilities covered by SIC codes 20-39, but not SIC Code 13, "Oil and Gas Extraction").

42. See 42 U.S.C. § 11004(a)(1), (a)(2)(B), (b)(1).

43. See *id.* §§ 11021(a)(1), 11022(a)(1) (requiring material safety data sheets and emergency and hazardous chemical inventory forms for chemicals deemed hazardous under OSHA rules); 29 C.F.R. § 1910.1200 & app. A (2013) (providing the criteria for determining a hazardous substance). Facilities storing certain quantities of "extremely hazardous" chemicals must also report that storage and

deemed hazardous under OSHA rules must keep Material Safety Data Sheets (MSDSs) for these chemicals at the facility, and provide them to the state and local emergency planning committees and the local fire department.⁴⁴ However, many chemicals do not require MSDSs. OSHA rules require only that MSDSs be prepared for those chemicals which have been researched and found to be hazardous in a workplace context.⁴⁵ Fracking chemicals need not be reported if they have not been studied or if hazard studies have not yet been completed. Moreover, OSHA hazard rules focus on the types of concerns likely to arise in a workplace context, such as acute exposure to a chemical in an accident.⁴⁶ Because fracking may pose hazards via environmental pathways that are unlikely to occur in a workplace (such as the risk of drinking water contamination), an MSDS may not be required even when potentially dangerous fracking chemicals have undergone study.

Additionally, OSHA rules allow significant leeway in the information that must be provided on an MSDS. Material Safety Data Sheets need not list all chemical ingredients in a product nor provide specific amounts for each ingredient.⁴⁷ Frequently, ingredients are listed only as “proprietary.”⁴⁸ In one study, researchers analyzed every MSDS they could obtain for products used in the oil and gas industry.⁴⁹ After reviewing 944 data sheets, the researchers found that a mere 14% specified the complete chemical contents of the product, and for almost half of the products, less than 1% of the chemical makeup of the product could be determined.⁵⁰ Even if products used in fracking meet the requirements to be deemed hazardous under OSHA rules, the information provided to state and local officials on MSDSs is of limited use in determining what chemicals are actually being used in the fracking process. And initial reporting is not required until a chemical has been stored at the fracking facility for three months.⁵¹

work with the local emergency planning committee to develop an emergency response plan. *See* 42 U.S.C. § 11002(a)(2).

44. Colborn et al., *supra* note 16, at 1043; *EPCRA Sections 311-312: Emergency Planning and Community Right-to-Know Act (EPCRA) Hazardous Chemical Storage Reporting Requirements*, U.S. ENVTL. PROT. AGENCY, <http://www2.epa.gov/epcra-tier-i-and-tier-ii-reporting/epcra-sections-311-312> (last updated Mar. 16, 2014).

45. *See* 29 C.F.R. § 1910.1200 & app. A.0.2.6; *Frequently Asked Questions: Hazardous Communications (HAZCOM)*, OCCUPATIONAL HEALTH & SAFETY ADMIN., <https://www.osha.gov/html/faq-hazcom.html#faq11> (last visited Apr. 27, 2014) (“OSHA does not require nor encourage employers to maintain MSDSs for non-hazardous chemicals.”).

46. *See* 29 C.F.R. at app. A.1.1.

47. Colborn et al., *supra* note 16, at 1044.

48. *Id.*

49. *See id.* at 1043.

50. *Id.* at 1039, 1045.

51. *See* 40 C.F.R. § 370.33 (2013).

B. State Laws Requiring Disclosure of Hydraulic Fracturing Chemicals

Because federal disclosure requirements do not exist, the number of states with fracking is impossible to determine with certainty. However, there is credible evidence of fracking activity occurring in at least thirty-two states since 2005.⁵² Of these thirty-two states, ten have no rules requiring the public disclosure of fracking chemicals at all. The remaining twenty-two states with fracking have some disclosure requirements.⁵³ However, these state rules vary widely in their scope, substance, and in the exemptions they grant for claims that information is a trade secret.

Hydraulic fracturing chemical disclosure rules can usefully be evaluated on a number of dimensions, including: (1) the scope of the rule; (2) the accessibility of the information disclosed; (3) requirements for disclosure prior to fracturing and for notice to persons near the well, if any; (4) disclosure requirements after fracturing; (5) the rules and procedures governing claims that information is a confidential trade secret and may therefore be withheld from the public; and (6) the extent to which trade secret information is available to health professionals and emergency responders who may need the information to carry out their job. In general, states perform poorly on almost all metrics.

1. The Scope of Disclosure Rules

Hydraulic fracturing is one technique among a broader subset of technologies used to “stimulate” an oil and gas well.⁵⁴ While fracking has attracted the lion’s share of public attention because of its prevalence, other methods of well stimulation are starting to gain prominence as their use increases. One such stimulation technique is matrix acidizing, which increases the permeability of the rock formation by using reactive acids to eat away at the rock, rather than via the creation of fractures.⁵⁵ Much like hydraulic fracturing, well-stimulation techniques like acidizing have existed

52. Matthew McFeeley, *New Evidence: Fracking Has Occurred in At Least 32 States Since 2005*, NRDC SWITCHBOARD (Jan. 17, 2013), http://switchboard.nrdc.org/blogs/mmcfeeley/new_evidence_fracking_has_occu.html.

53. The number of states with disclosure requirements and the characterization of those requirements are accurate as of January 29, 2014. However, this area of regulation is swiftly-moving, and changes may have occurred while this Article was in production.

54. ENERGY INFO. ADMIN., DRILLING SIDEWAYS—A REVIEW OF HORIZONTAL WELL TECHNOLOGY AND ITS DOMESTIC APPLICATION 10–11 (1993), available at http://www.eia.gov/pub/oil_gas/natural_gas/analysis_publications/drilling_sideways_well_technology/pdf/tr0565.pdf.

55. See *Oilfield Glossary: Matrix Acidizing*, SCHLUMBERGER LIMITED, http://www.glossary.oilfield.slb.com/en/Terms/m/matrix_acidizing.aspx (last visited Apr. 27, 2014) (explaining the process by which acid treatments improve the permeability of sandstone and carbonate formations).

for some time but have historically been performed at relatively small scales.⁵⁶ However, increasing experimentation with large-scale acidizing to stimulate certain oil and gas formations has raised awareness that other well stimulation techniques exist and may pose similar risks as hydraulic fracturing.⁵⁷ California, Ohio, and Wyoming, for instance, have chosen to require disclosure for all instances of well stimulation, but most states require disclosure only for fracking. On the opposite end of the spectrum, Illinois, Kansas, Michigan, Tennessee, and West Virginia have chosen to limit disclosure rules only to fracking treatments that exceed a certain volume. Pennsylvania requires disclosure only for fracking in certain oil and gas formations, which are more likely to be developed using horizontal drilling. Given the extremely low costs imposed by disclosure requirements, no credible policy justification has been advanced for limiting the scope of disclosure rules in these ways. Disclosure should be required for all well stimulation.

Table 1: Scope of Rules

	Regulation	Scope of rule
AL	ALA. ADMIN. CODE r. 400-1-9.04(3) (2013)	All hydraulic fracturing.
AR	178.00.1 ARK. CODE R. B-19 (a)(8), (b), (c) (LexisNexis 2013)	All hydraulic fracturing.
CA*	CAL. PUB. RES. CODE § 3215(a) (West 2014)	All well stimulation.
CO	COLO. CODE REGS. § 404-1:205A(a) (2013)	All hydraulic fracturing.
IL*	225 ILL. COMP. STAT. ANN. 732/1-98(a) (West 2013)	Hydraulic fracturing that uses more than 80,000 gallons per stage or 300,000 gallons total.
IN	IND. NAT. RES. COMM'N, LSA Doc. No. 12-292(E), EMERGENCY RULE § 2(b)(4) (2012)	All hydraulic fracturing.

56. See SANDRINE PORTIER ET AL., REVIEW ON CHEMICAL STIMULATION TECHNIQUES IN OIL INDUSTRY AND APPLICATIONS TO GEOTHERMAL SYSTEMS 2 (2007) (providing a brief history of the use of acidization in oil and gas production).

57. David R. Baker, *Acidizing Could Rival Fracking in Monterey Shale*, S.F. CHRON., Aug. 25, 2013, <http://www.sfgate.com/green/article/Acidizing-could-rival-fracking-in-Monterey-Shale-4760329.php>.

	Regulation	Scope of rule
KS	KAN. ADMIN. REGS. §§ 82-3-1401(a) (2013)	Hydraulic fracturing that uses more than 350,000 gallons of base fluid.
LA	LA. ADMIN. CODE tit. 43, § 118(A) (2012)	All hydraulic fracturing.
MI	MICH. DEP'T OF ENVTL. QUALITY, SUPERVISOR OF WELLS INSTRUCTION 1-2011, at 1 (2011)	Hydraulic fracturing that uses more than 100,000 gallons.
MS	60-040-002 MISS. CODE R. § 1.25(1)(h), (2) (LexisNexis 2014)	All hydraulic fracturing.
MT	MONT. ADMIN. R. 36.22.608(1), 36.22.1015(a) (2011)	All well stimulation, but disclosure requirements for hydraulic fracturing are more detailed.
NM	N.M. CODE R. § 19.15.16.2 (2013)	All hydraulic fracturing.
ND	N.D. ADMIN. CODE 43-02-03-27.1(1)(g), (2)(i) (2014)	All hydraulic fracturing.
OH	OHIO REV. CODE ANN. § 1509.10(A)-(B) (West 2013)	All well stimulation (also some disclosure requirements for drilling materials).
OK	OKLA. ADMIN. CODE. 165:10-3-10(b) (2013)	All hydraulic fracturing.
PA	58 PA. CONS. STAT. §§ 3203, 3222.1(a) (West 2013)	Hydraulic fracturing of "unconventional wells," defined as wells which target certain formations like the Marcellus and Utica shales.
SD	S.D. ADMIN. R. 74:12:02:19 (2013)	All hydraulic fracturing.
TN	TENN. COMP. R. & REGS. 0400-53-01-.03(1) (2013)	Hydraulic fracturing that uses more than 200,000 gallons of water-based liquids.
TX	16 TEX. ADMIN. CODE § 3.29(a)(18), (b), (c)(1)(A) (2014)	All hydraulic fracturing.
UT	UTAH ADMIN. CODE r. 649-3-39(1) (2013)	All hydraulic fracturing.

	Regulation	Scope of rule
WV	W. V.A. CODE R. § 35-8-5.6.a (2014)	Hydraulic fracturing in wells, other than coalbed methane wells, that disturb three acres or more of surface, excluding pipelines, gathering lines and roads, or stimulation that utilizes more than 210,000 gallons of water in any thirty-day period.
WY	055-003 WYO. CODE R. § 45(a) (LexisNexis 2014)	All well stimulation.

* Legislation was recently passed. Some requirements of the law may require implementing regulations before they are operative. Once promulgated, those regulations may include requirements not reflected here. This analysis includes only requirements that are clearly set out in the statute.

2. Accessibility of Disclosed Information

The benefits of public disclosure are unlikely to accrue unless the information is available when it is needed and in a form that facilitates its use and interpretation. States have made a number of different choices about how reporting data will be collected, stored, and managed, and in what form it will be made available to the public. Each of these choices affects the benefits that derive from a state's disclosure regime.

i. State Records Management and FracFocus.org

FracFocus.org is a website that provides chemical disclosure information for wells in some states. FracFocus receives funding for its operations from oil and gas industry trade groups, as well as the U.S. Department of Energy.⁵⁸ The site was developed with the goal of encouraging oil and gas companies to voluntarily disclose fracking chemical information.⁵⁹ However, FracFocus has now been incorporated

58. Mike Soraghan, *Hydraulic Fracturing: FracFocus has 'Serious Flaws,' Harvard Study Says*, ENERGY WIRE (April 23, 2013), <http://www.eenews.net/stories/1059979931> ("The administrative costs of the website are paid by the American Petroleum Institute and America's Natural Gas Alliance . . ."); SEC'Y OF ENERGY ADVISORY BD., DEP'T OF ENERGY, TASK FORCE REPORT ON FRACFOCUS 2.0, at 20 (Feb. 24, 2014) (draft for public comment), available at <http://energy.gov/sites/prod/files/2014/03/f8/FracFocus%20TF%20Report%20Final%20Draft.pdf>.

59. See Press Release, Interstate Oil & Gas Compact Comm'n, GWPC and IOGCC Unveil the Nation's First Single-Source Website Disclosing Additives on a Well-by-Well Basis at www.fracfocus.org (April 11, 2011), available at <http://iogcc.ok.gov/national-registry-provides-public-and-regulators-access-to-information-on-chemical-additiv> (explaining that participating companies

into mandatory disclosure requirements in fifteen states.⁶⁰ Ten of these states have adopted it as the primary or sole location for reporting fracking chemical information.⁶¹ Effectively, these states have entirely abdicated their responsibility to manage hydraulic fracturing chemical disclosure records by requiring or allowing reporting directly to FracFocus without any state policy which ensures that the state regulatory body takes control of the information and maintains it for posterity.

Generally, state agencies must comply with minimum standards for records retention and management—including both protections against unauthorized alteration or deletion, and controls such as audit trails to ensure records are complete and unaltered. Disclosure records may be needed years in the future, when problems arise. But FracFocus is a private website that could be taken down at any time. Additionally, FracFocus records contain no publication date and may be changed or updated by fracking companies at any time. When changes are made, the original record is not preserved, and nothing indicates that additions or deletions have occurred. In fact, FracFocus explicitly states that it “assume[s] no responsibility for the timeliness, deletion, misdelivery, or failure to store any” information.⁶² If data on the site were lost, corrupted, or deleted, public agencies would have little recourse. Four states that utilize FracFocus.org have required that a copy of each disclosure be submitted directly to the state.⁶³ Such a policy ensures that records will be available in the years to come when they are needed, even if FracFocus is no longer operating. FracFocus has also reportedly allowed some states to download data from the site directly.⁶⁴ A state policy that provides for the regular downloading of such reports would also serve the same function. Such a policy should ensure that past downloads are archived, so that changes to disclosures after the initial submission can be traced.

voluntarily report on the FracFocus website, and that one of the purposes of the site is to keep the public informed).

60. These are Alabama, Colorado, Kansas, Louisiana, Mississippi, Montana, North Dakota, Ohio, Oklahoma, Pennsylvania, South Dakota, Tennessee, Texas, Utah, and West Virginia. *See infra* Table 2.

61. Specifically, these states are Colorado, Louisiana, Mississippi, Montana, North Dakota, Oklahoma, South Dakota, Tennessee, Texas, and Utah. *See infra* Table 2.

62. *Website Terms and Conditions of Use*, FRACFOCUS.ORG, <http://fracfocus.org/terms-of-use> (last visited Apr. 27, 2014) [hereinafter *Website Terms*].

63. These states are Alabama, California, Ohio, and Pennsylvania. *See infra* Table 2.

64. *See* Mike Soraghan, *Hydraulic Fracturing: FracFocus Officials Defend Against Harvard Criticism*, ENERGY WIRE (Apr. 24, 2013), <http://www.eenews.net/energywire/stories/1059980022> (“States can also download data from FracFocus into their own systems.”).

ii. Ability to Search and Aggregate Data

In order to best fulfill the purposes of fracking chemical disclosure, data must be accessible to researchers, regulators, and members of the public and made available for their use without unnecessary barriers. Open-government advocates have long maintained that data provided to the public should meet a number of criteria in order to facilitate its usefulness, including that the data are in a format that is searchable, sortable, and machine-readable.⁶⁵ In fact, President Barack Obama recently directed the creation of a new “Open Data Policy” requiring that information the federal government collects, creates, and discloses be open and machine-readable.⁶⁶ The President justified this decision by arguing that “making information resources easy to find, accessible, and usable can fuel entrepreneurship, innovation, and scientific discovery that improves Americans’ lives.”⁶⁷ While states are not obligated to follow the federal government’s lead, the provision of data that cannot be searched and aggregated erects needless hurdles to the public’s ability to find, interpret, and analyze information.

If fracking chemical disclosure data are not searchable or machine-readable and cannot be downloaded in aggregated form, members of the public may not be able to find the information they need and researchers may be forced to manually enter information into a useable format. Many

65. See *Open Data Policy Guidelines*, SUNLIGHT FOUND., <http://sunlightfoundation.com/opendataguidelines/> (last visited Apr. 27, 2014).

For maximal access, data must be released in formats that lend themselves to easy and efficient reuse via technology. . . . Plainly, “open formats” refer to a rolling set of “open standards[.]” . . . that store information in a way that can be accessed by proprietary or non-proprietary software means. . . . “Machine-readability” simply refers to a format that a computer can understand. One step beyond machine-readable data is structured data (or machine-processable data), a format intended to ease machine searching and sorting processes. While formats such as HTML and PDF are easily opened for most computer users, these formats are difficult to convert the information to new uses. Providing data in structured formats, such as JSON and XML, add significant ease to access and allow more advanced analysis, especially with large amounts of information.

Id.; see also Joshua Tauberer, *Chapter 5.1.2—Principle 5: Data Format Matters*, OPEN GOVERNMENT DATA, <http://opengovdata.io/2012-02/page/5-1-2/principle-data-format-matters> (last updated June 2012) (referring to data that is not just readable by computers, but also “processable”).

66. Making Open and Machine Readable the New Default for Government Information, Exec. Order No. 13,642, 78 Fed. Reg. 28111, 28111 (May 9, 2013); Memorandum from Sylvia M. Burwell, Dir. of the Office of Mgmt. and Budget (No. M-13-13) on Open Data Policy to the Heads of Executive Departments and Agencies 1 (May 9, 2013) available at <http://www.whitehouse.gov/sites/default/files/omb/memoranda/2013/m-13-13.pdf>.

67. Exec. Order No. 13,642, 78 Fed. Reg. at 28111.

state disclosure websites are difficult to navigate. These states do not provide a user-friendly interface to search for fracked wells on a map or to search based on criteria like the fracturing dates or the well operator.⁶⁸ A number of states allow searches only by a well's identification number or by other geographical identifiers such as field, or township and range—information that members of the public are unlikely to know.⁶⁹ These states often allow searches by county, as well, but upon generating a list of wells in a county, most of them provide only latitude and longitude data (or information like township and range) to identify the more precise location of individual wells.⁷⁰ Without better search options, members of the public may find it extremely difficult to determine which wells are situated near their homes, schools, or workplaces.

Five states provide records only in image format.⁷¹ Quantitative research utilizing the disclosed chemical information from these states could require devoting thousands of hours to finding each report and then entering the information into a database by hand.⁷² States that adopt FracFocus as the sole or primary reporting location and do not provide the data in machine-readable form on their own site also inhibit access. FracFocus provides no way for users to download its database in aggregate but only allows access to a single PDF document at a time. The FracFocus site's official Terms of Use also put unnecessary restrictions on public use, sharing, and aggregation of the data on the site.⁷³ The Terms of Use state that a user “may not copy, reproduce, modify, republish, upload, post, transmit, or distribute any documents or information from this site in any

68. *E.g.*, *Material Safety Data Sheets (MSDS) for Hydraulic Fracturing Treatment Additives*, IND. DEPARTMENT OF NAT. RESOURCES, <http://www.in.gov/dnr/dnroil/6599.htm> (last visited Apr. 27, 2014) (displaying disclosure forms in PDF format on an unsearchable webpage).

69. *E.g.*, *Reporting*, MISS. ST. OIL & GAS BOARD, <http://gis.ogb.state.ms.us/MSOGBOnline/WebReportAccordion.aspx> (select “Menu,” then “Well Data,” then “Completion report” to access information) (last visited Apr. 27, 2014) (containing a form that allows users to search by county name, township, and well name, among other things).

70. *E.g.*, *Geological Survey of Alabama*, ST. OIL & GAS BOARD, <http://www.ogb.state.al.us/ogb/database.aspx> (last visited Apr. 27, 2014) [hereinafter *Survey of Alabama*] (choose “County,” then choose “Baldwin” under “County Search” drop-down menu, then click on an API number, and then select the “Location” tab) (giving the longitude and latitude of a well).

71. These are Arkansas, Indiana, Michigan, New Mexico, and Wyoming. *See infra* Table 2.

72. In some states, even finding fracturing reports may be extremely time-consuming, requiring someone to access every well file the state maintains to determine if a fracking disclosure report exists for that well. In Wyoming, for instance, which provides fracking disclosure reports only in image format, there were more than 37,000 active oil and gas wells in 2011. *See* W. ORG. OF RES. COUNCILS, LAW AND ORDER IN THE OIL AND GAS FIELDS: A REVIEW OF THE INSPECTION AND ENFORCEMENT PROGRAMS IN FIVE WESTERN STATES, 2013 UPDATE, at 4 fig.1 (2013), *available at* <http://www.worc.org/userfiles/file/Oil%20Gas%20Coalbed%20Methane/Law&Order2013.pdf> (indicating 37,252 active wells).

73. *See Website Terms*, *supra* note 62 (detailing restrictions on use of the data).

form or by any means without prior written permission.”⁷⁴ It is an open question whether these broad prohibitions are enforceable. However, the Justice Department has prosecuted violations of a website’s terms of use as a violation of the Computer Fraud and Abuse Act.⁷⁵ Public agencies should not use a site for public disclosure which purports to limit the public’s ability to share or republish data disclosed pursuant to law, or where there is any chance that doing so could subject a member of the public to criminal liability. Users cannot link to FracFocus disclosure documents directly (the site has made it impossible to do so) and are prohibited from reposting disclosures by the site’s terms of use. This makes it impossible to share a single disclosure without violating the site’s terms of use. Substantial changes must be made to the availability of data on FracFocus and to its terms of use before it is an appropriate regulatory tool for public disclosure.

Only California has bucked the trend, developing policies that ensure accessible data are publicly available.⁷⁶ California law requires chemical disclosure information to be made available on a website that allows users to easily search and aggregate the information. Given the recency of this policy, California has not completed its disclosure website to date.

Table 2: Accessibility of Information

Accessibility of Information	
AL	Disclosures submitted to FracFocus.org and state, and therefore subject to state recordkeeping requirements. ⁷⁷ Forms displayed on website as images only. ⁷⁸ Data not aggregatable nor machine-readable. ⁷⁹
AR	Disclosures submitted to state and subject to state recordkeeping requirements. ⁸⁰ Forms displayed on website as images only. ⁸¹ Data not aggregatable nor machine-readable. ⁸²

74. *Id.*

75. 18 U.S.C. § 1030 (2012); *see also* Ryan J. Reilly, *Zoe Lofgren Introduces ‘Aaron’s Law’ to Honor Swartz on Reddit*, HUFFINGTON POST, http://www.huffingtonpost.com/2013/01/15/zoe-lofgren-aarons-law-swartz_n_2483770.html (last updated Jan. 15, 2013) (describing an individual who faced up to 35 years in prison for violating JSTOR’s terms of service).

76. Illinois law requires that disclosures be made available on a public website developed by the state that includes a database searchable by well name and location. 225 ILL. COMP. STAT. ANN. 732/1-75(f) (West 2013). Depending on how the site is designed, it may also provide aggregate data. However, it is not clear from the law whether the website will allow aggregated data to be downloaded or, as is the case with FracFocus, if the website will allow searches but then provide users the ability to download only one record at a time.

77. ALA. ADMIN. CODE r. 400-1-9.04(6)-(7) (2013).

78. *See Survey of Alabama*, *supra* note 70 (choose “Well Status,” then choose “AC” under “Well Status Search” drop-down menu, then click on an API number, and then select the “Forms” tab) (displaying forms in TIF/image format rather than machine-readable/Excel format).

79. *Id.*

Accessibility of Information	
CA*	Disclosures submitted to state and subject to state recordkeeping requirements. ⁸³ Disclosures will be made available on a public website developed by the state that allows users to easily search and aggregate the information. ⁸⁴ Until state website is developed, FracFocus.org may be used. ⁸⁵
CO	Disclosures submitted to FracFocus.org and not subject to state recordkeeping requirements. ⁸⁶ Informal statements by state officials indicate that the state may download data from FracFocus, thus making it subject to recordkeeping requirements but no formal policy or procedure ensures this. Data not aggregatable nor machine-readable. ⁸⁷
IL*	Disclosures submitted to state and subject to state recordkeeping requirements. ⁸⁸ Disclosures will be made available on a public website developed by the state that includes a database searchable by well name and location, dates of fracturing and drilling operations, operator, and chemical. ⁸⁹
IN	Disclosures submitted to state and subject to state recordkeeping requirements. ⁹⁰ Forms displayed on website as images only. ⁹¹ Data not aggregatable nor machine-readable. ⁹²
KS	Disclosures submitted to FracFocus.org or state. ⁹³ Unclear whether disclosures to FracFocus must also be copied to state. If not, information sent to FracFocus will not be subject to state recordkeeping requirements. Unclear whether disclosures to state will be made available on a public website, and if so, how records will be presented.

80. 178-00-1 ARK. CODE R. § B-19(m)(3) (LexisNexis 2013).

81. See *Document Image System*, STATE OF ARK. OIL & GAS COMMISSION, http://www.aogc.state.ar.us/Document_Image_System_Intro.htm (last visited Apr. 27, 2014) (choose “Well File Cabinet,” then “Rule B-19,” then enter search criteria) (displaying forms in PDF/image format rather than machine-readable/Excel format).

82. *Id.*

83. See CAL. PUB. RES. CODE §§ 3160(b)(1)–(2), (g)(2)(A)–(B) (West 2014).

84. *Id.* § 3160(g)(2)(A).

85. *Id.* § (g)(2)(B); *Find a Well*, FRACFOCUS.ORG, <http://www.fracfocusdata.org/DisclosureSearch/SearchResults.aspx> (choose “California” under the “State” drop-down menu; then click “Search”) (displaying forms in PDF/image format rather than machine-readable/Excel format).

86. COLO. CODE REGS. §§ 404-1:100, 404-1:205A(b)(3) (2013).

87. See *Find a Well*, *supra* note 85 (choose “Colorado” under “State” drop-down menu, then click “Search”) (displaying forms in PDF/image format rather than machine-readable/Excel format).

88. 225 ILL. COMP. STAT. ANN. 732/1-75, 1-77 (West 2013).

89. See *id.* 1-75(f).

90. IND. NAT. RES. COMM’N, LSA Doc. No. 12-292(E), EMERGENCY RULE § 3 (2012), available at <http://www.in.gov/legislative/iac/20120627-IR-312120292ERA.xml.pdf>.

91. *Material Safety Data Sheets (MSDS) For Hydraulic Fracturing Treatment Additives*, IND. DEP’T OF NATURAL RESOURCES, <http://www.in.gov/dnr/dnroil/6599.htm> (last visited Apr. 27, 2014) (displaying forms in PDF/image format rather than machine-readable/Excel format).

92. *Id.*

93. KAN. ADMIN. REGS. §§ 82-3-1400(e), 82-3-1401(b), (f) (2013).

Accessibility of Information	
LA	Disclosures submitted to FracFocus.org or “any other similar registry” or state. ⁹⁴ Disclosures submitted to FracFocus or other registries not subject to state recordkeeping requirements. Disclosures to state may be available as images on state website, but data are not aggregatable nor machine-readable. ⁹⁵
MI	Disclosures submitted to state and subject to state recordkeeping requirements. ⁹⁶ Forms displayed on website as images only. ⁹⁷ Data not aggregatable nor machine-readable. ⁹⁸
MS	Disclosures submitted to FracFocus.org or “any other similar registry” or state. ⁹⁹ Disclosures submitted to FracFocus or other registries not subject to state recordkeeping requirements. Disclosures to state may be available as images on state website, but data are not aggregatable nor machine-readable. ¹⁰⁰
MT	Disclosures submitted to FracFocus.org or state. ¹⁰¹ Unclear whether disclosures to FracFocus must also be copied to state. If not, information sent to FracFocus will not be subject to state recordkeeping requirements. Disclosures to state are available as images on state website, but data are not aggregatable nor machine-readable. ¹⁰²
NM	Disclosures submitted to state and subject to state recordkeeping requirements. ¹⁰³ Forms displayed on website as images only. ¹⁰⁴ Data machine-readable but not aggregatable. ¹⁰⁵

94. LA. ADMIN. CODE tit. 43, § 118(C)(4) (2012).

95. See *Strategic Online Natural Resources Information System (SONRIS)*, LA. DEPARTMENT OF NAT. RESOURCES, <http://dnr.louisiana.gov/index.cfm?md=navigation&tmp=iframe&pnid=0&nid=340> (last visited Apr. 27, 2014).

96. MICH. DEP’T OF ENVTL. QUALITY, SUPERVISOR OF WELLS INSTRUCTION 1-2011, at 2 (2011), available at http://www.michigan.gov/documents/deq/SI_1-2011_353936_7.pdf.

97. See *Scanned Digital Oil & Gas Records*, MICH. DEPARTMENT OF ENVTL. QUALITY, http://www.michigan.gov/deq/0,4561,7-135-3311_4111_4231-150609--,00.html (choose “Application,” then click on the “Data Search” tab, then enter permit number and click on well file) (last visited Apr. 27, 2014).

98. *Id.*

99. 60-040-002 MISS. CODE R. §§ 1.23(a), 1.25(10) (LexisNexis 2014).

100. See *Reporting*, MISS. STATE OIL & GAS BOARD, <http://gis.ogb.state.ms.us/MSOGBOnline/WebReportAccordion.aspx> (select “Menu,” then “Well Data,” then “Completion report” to access information) (last visited Apr. 27, 2014) (containing a form that allows users to search for completion information for a single well).

101. MONT. ADMIN. R. 36.22.1015(4) (2011).

102. See *Well File Locator*, MONT. BOARD OF OIL & GAS CONSERVATION, <http://www.bogc.dnrc.mt.gov/WebApps/DataMiner/Wells/Wells.aspx> (enter criteria at top, click “search” and choose “View Well File”). See also *Find a Well*, *supra* note 85 (choose “Montana” under the “State” drop-down menu; then click “Search”) (displaying forms in PDF/image format rather than machine-readable/Excel format).

103. N.M. CODE R. § 19.15.16.19 (LexisNexis 2013).

104. *OCD Permitting*, N.M. OIL CONSERVATION DIV., <https://wwwapps.emnrd.state.nm.us/ocd/ocdpermitting//OperatorData/PermitStatusParameters.aspx> (last visited Apr. 27, 2014) (in the

Accessibility of Information	
ND	Disclosures submitted to FracFocus.org and not subject to state recordkeeping requirements. ¹⁰⁶ Informal statements by state officials indicate that the state may download data from FracFocus, thus making it subject to recordkeeping requirements, but no formal policy or procedure ensures this. Data not aggregatable nor machine-readable. ¹⁰⁷
OH	Disclosures submitted to FracFocus.org and state and therefore subject to state recordkeeping requirements. ¹⁰⁸ Forms displayed on state website as images only. ¹⁰⁹ Data not aggregatable nor machine-readable.
OK	Disclosures submitted to FracFocus.org or state. ¹¹⁰ Disclosures to state will be posted to FracFocus by state. ¹¹¹ Information sent to FracFocus directly is not subject to state recordkeeping requirements. Data not aggregatable nor machine-readable. ¹¹²
PA	Disclosures for unconventional wells available on FracFocus.org. ¹¹³ Disclosures for all wells submitted to state and subject to state recordkeeping requirements, but state records available only by physical inspection at agency offices or via a public records request. ¹¹⁴
SD	Disclosures submitted to FracFocus.org and not subject to state recordkeeping requirements. ¹¹⁵ Data not aggregatable nor machine-readable. ¹¹⁶

Permit Information “Type” drop-down menu, select “Hydraulic Fracturing Fluid Disclosure,” then click “Continue” button to display forms) (displaying forms in text format that can be copied and pasted into Excel format).

105. *Id.*

106. See N.D. ADMIN. CODE 43-02-03-27.1(1)(g), (2)(i) (2014).

107. See *Find a Well*, *supra* note 85 (choose “North Dakota” under the “State” drop-down menu; then click “Search”) (displaying forms in PDF/image format rather than machine-readable/Excel format).

108. OHIO REV. CODE ANN. § 1509.10(G) (West 2013).

109. See *Ohio Oil & Gas Well Database*, OHIO.GOV, <http://oilgas.ohiodnr.com/mineral/OHRbdmsOnline/WebReportAccordion.aspx> (last visited Apr. 27, 2014) (select “Completions” and search for desired well); e.g., BP AM. PROD. CO. EBUSINESS, POST JOB SUMMARY 3–7, 11–12, 16 (2013), available at <http://www.dnr.state.oh.us/mineral/oil/MRMImages/18/3/250488.pdf>.

110. OKLA. ADMIN. CODE § 165:10-3-10(b) (2013).

111. *Id.*

112. See *Find a Well*, *supra* note 85 (choose “Oklahoma” under the “State” drop-down menu; then click “Search”) (displaying forms in PDF/image format rather than machine-readable/Excel format); *OCC Imaging Web Application*, OKLA. CORP. COMMISSION., <http://imaging.occeweb.com/> (choose “Oil & Gas Well Records Forms” enter criteria, click “Search” and choose ID number) (last visited Apr. 27, 2014).

113. 58 PA. CONS. STAT. ANN. § 3222.1(a), (b)(1)–(2) (West 2013).

114. *Id.* §§ 3222(b)(3), 3222.1(b)(5) (West 2013).

115. S.D. ADMIN. R. 74:12:02:19 (2013).

116. See *Find a Well*, *supra* note 85 (choose “South Dakota” under the “State” drop-down menu; then click “Search”) (displaying forms in PDF/image format rather than machine-readable/Excel format).

Accessibility of Information	
TN	Disclosures submitted to FracFocus.org and not subject to state recordkeeping requirements. ¹¹⁷ Data not aggregatable nor machine-readable. ¹¹⁸
TX	Disclosures submitted to FracFocus.org and not subject to state recordkeeping requirements. ¹¹⁹ Data not aggregatable nor machine-readable. ¹²⁰
UT	Disclosures submitted to FracFocus.org and not subject to state recordkeeping requirements. ¹²¹ Data not aggregatable nor machine-readable. ¹²²
WV	Disclosures submitted to FracFocus.org and state and therefore subject to state recordkeeping requirements. ¹²³ Forms submitted to state only available through physical inspection or public records request. Data not aggregatable nor machine-readable. ¹²⁴
WY	Disclosures submitted to state and subject to state recordkeeping requirements. ¹²⁵ Forms displayed on website as images only. ¹²⁶ Data not aggregatable nor machine-readable. ¹²⁷

* Legislation was recently passed. Some requirements of the law may require implementing regulations before they are operative. Once promulgated, those regulations may include requirements not reflected here. This analysis includes only requirements that are clearly set out in the statute.

3. Requirements for Pre-Fracturing Notice and Disclosure

Requirements to notify local landowners and residents prior to fracking serve to ensure that those landowners and residents can perform baseline water testing and survey conditions before fracking takes place. Baseline

117. TENN. COMP. R. & REGS. 0400-53-01-.03(1)(b) (2013).

118. See *Find a Well*, *supra* note 85 (choose “Tennessee” under the “State” drop-down menu; then click “Search”) (displaying forms in PDF/image format rather than machine-readable/Excel format).

119. 16 TEX. ADMIN. CODE § 3.29(a)(8), (c)(2)(A) (2014).

120. See *Find a Well*, *supra* note 85 (choose “Texas” under the “State” drop-down menu; then click “Search”) (displaying forms in PDF/image format rather than machine-readable/Excel format).

121. UTAH ADMIN. CODE r. 649-3-39(1) (2013).

122. See *Find a Well*, *supra* note 85 (choose “Utah” under the “State” drop-down menu; then click “Search”) (displaying forms in PDF/image format rather than machine-readable/Excel format).

123. W. VA. CODE R. § 35-8-10.1.b (2014).

124. See *Find a Well*, *supra* note 85 (choose “West Virginia” under the “State” drop-down menu; then click “Search”) (displaying forms in PDF/image format rather than machine-readable/Excel format).

125. 055-003 WYO. CODE R. §§ 1(a), 45(d)–(f) (LexisNexis 2014).

126. See WYO. OIL & GAS CONSERVATION COMM’N, <http://wogcc.state.wy.us/> (choose “Wells,” choose criteria, search, and click on API number).

127. *Id.*

testing ensures that parties are made aware of preexisting problems and aids in tracing any contamination that does occur. While a number of states require notification at the drilling stage, fracking may occur much later and a well may be re-fractured many times throughout its lifetime. Thus it is essential that notification be provided prior to each occasion on which fracking will occur. Only California and Colorado require notification of fracking to both landowners and tenants near the well.¹²⁸ Illinois and West Virginia require notification of landowners but not tenants. The remaining eighteen states with disclosure rules provide no assurance that nearby landowners and tenants will be made aware of upcoming fracking.

Pre-fracturing disclosure of chemicals and their anticipated concentrations aids in baseline testing for substances that may be used and allows regulators to evaluate the risks posed. In addition, it ensures that information is available on what chemicals will be stored and used at the well site before fracking commences. This allows for emergency response planning and ensures that the information is available immediately if incidents occur. Pre-fracturing disclosure of information is required by six states, but only California and Illinois ensure that this information will be available to the landowner within a timeframe that allows for baseline testing prior to fracking. Illinois requires that the anticipated chemicals and their concentrations be submitted a minimum of twenty-one days in advance of fracking. California requires only chemical identities, but submissions must be made thirty days prior to fracking. West Virginia requires notification that a permit application has been filed for some hydraulic fracturing treatments, but provides no assurance that landowners will be able to obtain information in a timely fashion. Wyoming requires prior disclosure of anticipated well stimulation chemicals and concentrations in a permit application, but permits may be approved in the space of a few days, according to state officials. Indiana requires prior disclosure of anticipated chemicals, but only for coalbed methane wells, and there is no requirement that landowners or tenants are notified. Montana requires prior disclosure only of the “principle [sic] components” of the proposed fracking fluid, and the regulator need only be provided with

128. The general rule in Colorado is that owners of property or buildings within 500 feet of the well must be notified, and that owners must notify tenants that may own or have an interest in any crops or surface improvements that could be affected by the proposed operation. COLO. CODE REGS. §§ 404-1:100, 404-1:305(c)(1) (2013). In California, the operator must notify surface property owners and tenants within 1,500 feet of the wellhead and within 500 feet from the horizontal projection of all subsurface portions of the well to the surface. CAL. PUB. RES. CODE § 3160(d)(6) (West 2014).

this information forty-eight hours in advance of the commencement of fracking.¹²⁹

Arkansas takes a different approach to prior disclosure and gives a form of generalized notice of the chemicals to be used by providing a “master list” of chemicals used by each operator in the state. While this system is superior to a total lack of prior disclosure, some companies’ master lists contain well over a hundred chemicals, severely limiting their usefulness.¹³⁰ Additionally, it may not be clear which company will be performing the fracturing, and thus which list to consult. Fracking is usually performed by a third-party well services company, not the drilling company that is the operator of the site. Without any requirement to provide notification concerning who will perform the fracking treatment, it may be difficult or impossible to determine which of the master lists is relevant.

Disclosures made prior to hydraulic fracturing, especially anticipated chemical concentrations, are necessarily estimates because conditions encountered during fracking may require adjustment. However, regulatory provisions should ensure that prior disclosures are actual well-specific estimates, not merely boilerplate submissions. Only Illinois has done this, requiring companies to notify the state of changes and to explain the reason for the change.¹³¹

Table 3: Notice and Disclosure

	Notice to Nearby Parties	Pre-Fracturing Disclosure
AL	No	No
AR	No	No, but operators are required to provide the state with a master list of products and chemicals they may use. ¹³²

129. MONT. ADMIN. R. 36.22.608(2), 36.22.608(3)(c), 36.22.1015(2) (2011).

130. See, e.g., BAKER HUGHES OILFIELD OPERATIONS, INC., MASTER FRACTURING CHEMICAL LIST—ARKANSAS, at 1–5 (2013), available at http://aogc2.state.ar.us/B-19/1075_ChemConst.pdf; CUDD PUMPING SERVS., INC., MASTER LIST 1–6 (2011), available at http://www.aogc.state.ar.us/Well_Fracture_Companies.htm.

131. See 225 ILL. COMP. STAT. ANN. 732/1-77(a) (West 2013) (requiring the permittee to notify the Department of any alterations to the contents of the fracturing fluid “by electronic mail within 24 hours of the departure from the initial treatment design and [to] include[] a brief explanation of the reason for the departure”).

132. 178-00-1 ARK. CODE R. § B-19(m)(3) (LexisNexis 2013).

	Notice to Nearby Parties	Pre-Fracturing Disclosure
CA*	At least 30 days before commencement of well stimulation, permittee would be required to provide the permit and water testing information to surface property owners and tenants within 1,500 feet of the wellhead and 500 feet from the horizontal projection of all subsurface portions of the designated well to the surface. ¹³³	Anticipated chemicals and estimated concentrations must be provided in permit application, which would be available at least 30 days in advance of any well stimulation. ¹³⁴
CO	Advance notice must be provided to surface owners at least 30 days in advance of the commencement of operations and at least 7 days in advance of subsequent operations. ¹³⁵ Tenants must be notified by the surface owner if they may own or have an interest in any crops or surface improvements that could be affected by such proposed operation. ¹³⁶ While requirements differ somewhat across the state, the general rule is that owners of property or buildings within 500 feet of the well must be notified. ¹³⁷	No
IL*	Notification of landowners within 1,500 feet of the well at the permitting stage. ¹³⁸	Anticipated chemicals and concentrations must be provided at the permit application stage, but in no event less than 21 days in advance of fracking. ¹³⁹ Any alteration to the planned fracturing fluid contents during fracking requires notification of the state and an explanation. ¹⁴⁰

133. CAL. PUB. RES. CODE § 3160(d)(6) (West 2014).

134. *Id.* § 3160(d)(1)(D), (d)(6).

135. COLO. CODE REGS. § 404-1:305(f) (2013).

136. *Id.* § 404-1:305(c)(4).

137. *Id.* § 404-1:305(e)(1).

138. 225 ILL. COMP. STAT. ANN. 732/1-35(b)(16) (West 2013).

139. *Id.* § 1-77(a).

140. *Id.*

	Notice to Nearby Parties	Pre-Fracturing Disclosure
IN	No	For coalbed methane wells only, proposed products must be included in the permit application. ¹⁴¹
KS	No	No
LA	No	No
MI	No	No
MS	No	No
MT	No	At least 48 hours prior to commencement, the “principle [sic] components” must be disclosed to state. ¹⁴²
NM	No	No
ND	No	No
OH	No	No
OK	No	No
PA	No	No
SD	No	No
TN	No	No
TX	No	No
UT	No	No
WV	Notification of surface owners, and water purveyors who are known to own a water source, within 1,500 feet of the well at the permitting stage. ¹⁴³	Anticipated chemicals and CAS numbers (but not concentrations) must be submitted to the state at the permit application stage. ¹⁴⁴
WY	No	At the well stimulation permit application stage, anticipated chemicals and concentrations must be provided. ¹⁴⁵

* Legislation was recently passed. Some requirements of the law may require implementing regulations before they are operative. Once promulgated, those regulations may include requirements not reflected here. This analysis includes only requirements that are clearly set out in the statute.

141. IND. NAT. RES. COMM’N, *supra* note 90, § 1(a); 312 IND. ADMIN. CODE 16-3-1(a), 16-3-2(f) (2012), available at www.in.gov/legislative/iac/T03120/A00160.PDF.

142. MONT. ADMIN. R. 36.22.608(2), 36.22.608(3)(c), 36.22.1015(2) (2011).

143. W. VA. CODE R. § 35-8-15.2.b (2014).

144. *Id.* § 35-8-5.6.b.5.

145. 055-003 WYO. CODE R. § 45(a), (d) (LexisNexis 2014).

4. Post-Fracking Disclosure Requirements

Even if pre-fracturing disclosure is required, reporting after fracking is also necessary to ensure a full and accurate accounting of the actual base fluid and chemicals used. Fracturing service companies' systems monitor the fracking fluid mixture throughout the process and generate logs which generally contain most of the information required to be disclosed. Disclosure should occur shortly after fracking to prevent unnecessary delay in making the information available.

Louisiana requires reporting within twenty days of fracking. Five states require reporting within thirty days after fracking, and ten within sixty days. West Virginia allows ninety days for reporting. Indiana requires reporting “[i]mmediately upon completion,”¹⁴⁶ but without an enforceable deadline in the rule, it is unclear at what point delays may be penalized. In June of 2013, an investigation by the specialty news publication *EnergyWire* reviewed state records in Colorado and Pennsylvania, finding that more than one-fifth of the disclosures had been filed late but no penalties had been issued.¹⁴⁷ A follow-up in October 2013 found that Colorado had issued a notice to companies stating that “active enforcement” would begin on July 1, 2013, and had subsequently begun seeking fines from eleven companies for failure to meet the reporting deadline.¹⁴⁸ Pennsylvania, however, had not pursued any enforcement action for the failure to submit timely disclosures.¹⁴⁹ To ensure timely access to information, disclosure should occur promptly after fracking, and deadlines must be enforced.

Disclosure should include reporting on the type of the base fluid, its volume, and source. While most fracking uses water as the base fluid, other substances are sometimes used. If the base fluid is water, the disclosure should include information on whether the water is fresh or “recycled.” Recycled water is flowback,¹⁵⁰ produced water,¹⁵¹ or a combination of the

146. 312 IND. ADMIN. CODE 16-5-17(a) (2012), available at www.in.gov/legislative/iac/T03120/A00160.PDF.

147. Mike Soraghan, *Hydraulic Fracturing: One-Fifth of FracFocus Reports in Colo., Pa. Were Late in 2012*, ENERGY WIRE (June 7, 2013), <http://www.eenews.net/stories/1059982441>.

148. Mike Soraghan, *Hydraulic Fracturing: Colo. Starts Levying Fines for Late FracFocus Reports*, ENERGY WIRE (Oct. 18, 2013), <http://www.eenews.net/energywire/stories/1059989038> (internal quotation marks omitted).

149. *Id.*

150. Flowback is wastewater that reemerges from the well after fracking. THOMAS HAYES, GAS TECH. INST., SAMPLING AND ANALYSIS OF WATER STREAMS ASSOCIATED WITH THE DEVELOPMENT OF MARCELLUS SHALE GAS 2 (2009), available at <http://energyindepth.org/wp-content/uploads/marcellus/2012/11/MSCCommission-Report.pdf>. Flowback can contain fracking chemicals, as well as toxic substances that are naturally-occurring underground, including arsenic, barium, lead, mercury, and radioactive elements like radium. *See id.* at 2, 36 tbl.9; E. L. ROWAN ET AL., U.S. GEOLOGICAL SURVEY,

two that has typically been treated to reduce the concentration of salts and other contaminants. Information on the type of base fluid used and its source provides information about the use of fresh water resources. It also discloses whether constituents remaining in recycled water may be present in the fracking fluid. Illinois requires disclosure of the type and volume of base fluid, including each source from which water was drawn. California does not require permittees to report the source of base fluid, but the permittee must report whether water is “suitable for irrigation or domestic purposes.”¹⁵² Indiana, Ohio, and Pennsylvania require the volume and source of all water to be reported, but do not require explicit disclosure of whether it is recycled or not. Most other states require the volume and type of base fluid only, though a few require only that the total base fluid volume be reported.

Perhaps the most fundamental information required by a fracking chemical disclosure rule is the identities of chemical constituents and their concentrations in the fracking fluid. Generally, state disclosure rules differentiate between “products” and “chemicals.”¹⁵³ Products are substances made up of one or more chemical constituents. Products are generally sold under a “trade name” (for example, “Bactron K-31W” or “Scalesorb 7”) and serve a specific function in the fracking treatment (for example, biocide or scale inhibitor).¹⁵⁴ Chemical constituents generally have a Chemical Abstract Service (CAS) number, which is a unique numerical identifier for the chemical assigned by the American Chemical Society.¹⁵⁵ CAS numbers are the global standard for authoritative identification of chemicals and allow each chemical constituent to be unambiguously identified, which is essential to understanding the risks a

RADIUM CONTENT OF OIL- AND GAS-FIELD PRODUCED WATERS IN THE NORTHERN APPALACHIAN BASIN (USA): SUMMARY AND DISCUSSION OF DATA 1, 11 fig.6 (2011), available at <http://pubs.usgs.gov/sir/2011/5135/pdf/sir2011-5135.pdf> (graphing “total radium activity and total dissolved solids related to time since initiation of flowback” for two wells in Pennsylvania).

151. Produced water is water that naturally exists in subsurface geologic formations and is co-produced from a well along with the oil and gas. Produced water can contain the same naturally-occurring contaminants as flowback. See HAYES, *supra* note 150, at 7 (comparing the contaminants in flowback with those in produced water).

152. CAL. PUB. RES. CODE § 3160(b)(2)(D) (West 2014).

153. States often use the term “additive” in place of one of these terms. However, some states use the term to refer to products while others use the term to signify the individual chemical constituents of a product. To avoid confusion, this paper refers to “products” and “chemical constituents” or “chemicals.”

154. Other examples of the functions of products include: acid, foamer, gellant, surfactant, cross linker, corrosion inhibitor, pH control agent, gel breaker, and clay control agent.

155. *FAQs*, CHEMICAL ABSTRACTS SERVICES (CAS), <https://www.cas.org/about-cas/faqs#casnr> (last visited Apr. 27, 2014).

chemical may pose.¹⁵⁶ Only sixteen of the twenty-two states with chemical disclosure rules require companies to provide CAS numbers for all chemical constituents.¹⁵⁷ Three more require CAS numbers for only those chemicals deemed hazardous under OSHA rules—rules that are not designed to evaluate hazard in an environmental setting.¹⁵⁸ The remaining three states' chemical identification requirements are even weaker, not requiring that any CAS numbers be provided.¹⁵⁹ Only three states, Illinois, Montana, and Wyoming, require that the actual concentration of all chemical constituents in the fluid be provided.¹⁶⁰ Twelve more require that the “maximum” concentration of each chemical constituent be reported.¹⁶¹ Five states require no concentration information for any chemical constituents: Alabama, Arkansas, Indiana, Michigan, and Utah.¹⁶²

156. *See id.* Chemical names may cause confusion due to differences in nomenclature or may simply not provide enough information to identify the chemical with particularity. For instance, if “dichlorobenzene” is reported, it is impossible to determine whether 1,2 dichlorobenzene, 1,3 dichlorobenzene, or 1,4 dichlorobenzene was used. *See Agents Classified by the IARC Monographs, Volumes 1–109*, INT'L AGENCY FOR RES. ON CANCER (Oct. 30, 2013), <http://monographs.iarc.fr/ENG/Classification/index.php> (select “List of classifications by alphabetical order”) (showing the three different isotopes of dichlorobenzene). 1,4 dichlorobenzene is considered a carcinogen but the other two are not. *See id.* (showing that 1,2 and 1,3 dichlorobenzene are “not classifiable as to [their] carcinogenicity to humans,” while 1,4 dichlorobenzene is classified as “possibly carcinogenic to humans”). Each of the three has a separate CAS number—in addition to a fourth CAS number that refers to a mixture of the types—allowing an unambiguous identification of the substance being used.

157. These are Alabama, Arkansas, California, Colorado, Illinois, Kansas, Montana, North Dakota, Ohio, Oklahoma, Pennsylvania, South Dakota, Tennessee, Texas, West Virginia, and Wyoming. *See infra* Table 4.

158. These are Louisiana, Mississippi, and New Mexico. *See infra* Table 4. The requirements for what chemicals qualify as hazardous mirror the rules in EPCRA for which chemicals require the preparation of Material Safety Data Sheets. As previously discussed, these rules fit poorly when shoehorned into the fracking context. *See supra* Part III.A.

159. These are Indiana, Michigan, and Utah. *See infra* Table 4.

160. Illinois' rules have not yet been implemented. Both Montana and Wyoming regulators have accepted reports that provide a range of potential concentrations instead of the actual concentrations. At present, the requirement to provide actual concentrations does not appear to be enforced in any state.

161. These are California, Colorado, Kansas, Louisiana, Mississippi, North Dakota, Ohio, Oklahoma, Pennsylvania, South Dakota, Tennessee, and West Virginia. *See infra* Table 4. The choice to allow maximum concentrations rather than actual concentrations has apparently been made because members of the industry argued that they do not know the precise concentrations of chemicals in all the products they use. However, without any requirements to provide the actual concentration when it is available, or to closely approximate the actual concentration, these rules effectively allow industry to skirt the chemical concentration requirements with little recourse if they have reason to hide the information.

162. Some of these states require that the concentration of products be provided. But without information concerning the concentration of chemical constituents in the products, this information is largely useless. Knowing that a certain percentage of the fracking fluid is made up of a product called “GasFlo G2” provides little useful information without information on the contents of GasFlo G2.

Table 4: Chemical Disclosure

	Post-Fracturing Disclosure Timeline	Base Fluid Disclosure Requirements	Chemical Identification Requirements	Chemical Concentration Requirements
AL	Within 30 days after fracturing. ¹⁶³	Description of the fluid “identified by additive, e.g., acid, proppant, surfactant.” ¹⁶⁴	CAS number, if it exists, for all base fluid constituents. ¹⁶⁵	None
AR	Within 30 days of hydraulic fracturing. ¹⁶⁶	Types and volumes of base fluids for each stage of fracturing. ¹⁶⁷	All products by function and all chemical constituents and associated CAS numbers. ¹⁶⁸	Actual concentration of products, but concentration of chemical constituents not required. ¹⁶⁹
CA*	Within 60 days following cessation of the well stimulation. ¹⁷⁰	Identification of base fluid, and whether it is water suitable for irrigation or domestic purposes, water not suitable for irrigation or domestic purposes, or a fluid other than water. Must provide the source, volume, and specific composition for all water. ¹⁷¹	All products by function, trade name, and supplier, and all chemical constituents and associated CAS numbers. ¹⁷²	Concentration of products and the maximum concentration of all chemical constituents. ¹⁷³

163. ALA. ADMIN. CODE r. 400-1-9.04(7)(b) (2013).

164. *Id.* § 400-1-9.04(7)(a)(1).

165. *Id.* § 400-1-9.07(a)(2).

166. *See* 178-00-1 ARK. CODE R. § B-19(1) (LexisNexis 2013) (requiring disclosure within the time period of § B-5); *id.* § B-5(h) (requiring reports within 30 days).

167. *Id.* § B-19(1)(2).

168. *Id.* § B-19(1)(8).

169. *Id.* § B-19(1)(5).

170. CAL. PUB. RES. CODE § 3215(a) (West 2014).

171. *Id.* § 3160(b)(2)(D)–(E).

172. *Id.* § 3160(b)(2)(B)–(C).

173. *Id.* § 3160(b)(2)(B).

	Post-Fracturing Disclosure Timeline	Base Fluid Disclosure Requirements	Chemical Identification Requirements	Chemical Concentration Requirements
CO	Within 60 days following the conclusion of a hydraulic fracturing treatment, and in no case later than 120 days after the commencement of such hydraulic fracturing treatment. ¹⁷⁴	Type and total volume of base fluid. ¹⁷⁵	All products by function, trade name, and supplier, and all chemical constituents and associated CAS numbers. ¹⁷⁶	Maximum concentration of all chemical constituents. ¹⁷⁷
IL*	Within 60 days after completion of the high-volume hydraulic fracturing operations. ¹⁷⁸	Type and total volume of the base fluid and each source from which any water was drawn. ¹⁷⁹	All products by function, trade name, and supplier, and their associated Material Safety Data Sheet, and all chemical constituents and associated CAS numbers. ¹⁸⁰	Actual concentration of all chemical constituents. ¹⁸¹
IN	Immediately upon completion or recompletion. ¹⁸²	Base fluid type for coalbed methane wells only. Base fluid volume and source for all wells. ¹⁸³	All products by function and trade name, and their associated MSDSs. Chemical constituents and associated CAS numbers not required to be identified. ¹⁸⁴	Maximum concentration of products but concentration of chemical constituents not required. ¹⁸⁵

174. COLO. CODE REGS. § 404-1:205A(b)(2)(A) (2013).

175. *Id.* § 404-1:205A(b)(2)(A)(viii).

176. *Id.* § 404-1:205A(b)(2)(A)(ix), (x), (xii).

177. *Id.* § 404-1:205A(b)(2)(A)(xi).

178. 225 ILL. COMP. STAT. ANN. 732/1-75(f), 1-98(b) (West 2013).

179. *Id.* § 1-75(f)(6), (f)(9)(A).

180. *Id.* § 1-75(f)(9)(B)–(C).

181. *Id.* § 1-75(f)(9)(D).

182. 312 IND. ADMIN. CODE 16-5-17(a) (2012), available at www.in.gov/legislative/iac/T03120/A00160.PDF.

183. IND. NAT. RES. COMM'N, *supra* note 90, § 3(b)(1).

184. *Id.* § 3(b)(4).

185. *Id.* § 3(b)(3).

	Post-Fracturing Disclosure Timeline	Base Fluid Disclosure Requirements	Chemical Identification Requirements	Chemical Concentration Requirements
KS	Within 120 days of the spud date or date on which refracturing commences. ¹⁸⁶	Base fluid used and its total volume. ¹⁸⁷	All chemical constituents and associated CAS numbers. Note that CAS numbers for proppants are not required. ¹⁸⁸	Maximum concentration of all chemical constituents. ¹⁸⁹
LA	Within 20 days of fracturing. ¹⁹⁰	Types and volumes of base fluids. ¹⁹¹	All products by function, trade name, and supplier. Reporting of chemical constituents and associated CAS numbers is required only for those constituents listed as hazardous under OSHA regulations. ¹⁹²	Maximum concentration of chemical constituents in products and in fluid as a whole. ¹⁹³
MI	Within 60 days after well completion operations. ¹⁹⁴	Service company records showing volumes. ¹⁹⁵	MSDSs associated with each additive. ¹⁹⁶	Volume of products required. ¹⁹⁷

186. KAN. ADMIN. REGS. § 82-3-130(a) (2013).

187. *Id.* § 82-3-1401(b)(1).

188. *Id.* § 82-3-1401(b)(2)–(3).

189. *Id.* § 82-3-1401(b)(2).

190. *See* LA. ADMIN. CODE tit. 43, § 118(C)(1) (2012) (requiring disclosures in accordance with § 105); *id.* § 105 (requiring disclosures “within 20 days after the completion or recompletion of the well”).

191. *Id.* § 118(C)(1)(a).

192. *See id.* § 118(C)(1)(d) (requiring the disclosure of chemicals that are subject to the requirements of 29 C.F.R. § 1910.1200(g)(2) (2013)); 29 C.F.R. § 1910.1200(g)(1)–(2) (requiring the disclosure of “hazardous chemical[s]”).

193. *Id.* § 118(C)(1)(f).

194. MICH. ADMIN. CODE r. 324.418(b) (2014).

195. MICH. DEP’T OF ENVTL. QUALITY, *supra* at 96, at 3.

196. *Id.*

197. *Id.*

	Post-Fracturing Disclosure Timeline	Base Fluid Disclosure Requirements	Chemical Identification Requirements	Chemical Concentration Requirements
MS	Within 30 days following the completion of the hydraulic fracturing treatment. ¹⁹⁸	Types and volumes of base fluids. ¹⁹⁹	All products by function, trade name, and supplier. Reporting of chemical constituents and associated CAS numbers is required only for those constituents listed as hazardous under OSHA regulations. ²⁰⁰	Maximum concentration of chemical constituents in products and in fluid as a whole. ²⁰¹
MT	Within 30 days after completion. ²⁰²	Must report anticipated volume in advance, but actual volume of base fluid not explicitly required in post-completion report. ²⁰³	All products by function and all chemical constituents and associated CAS numbers. ²⁰⁴	Actual concentration of chemical constituents. ²⁰⁵

198. 60-040-002 MISS. CODE R. §§ 1.23(a), 1.25(6) (LexisNexis 2014).

199. *Id.* § 1.25(6)(B).

200. *See id.* § 1.25(6)(D)–(G) (requiring the disclosure of chemicals that are subject to the requirements of 29 C.F.R. § 1910.1200(g)(2) (2013)); *see also* 29 C.F.R. § 1910.1200(g)(1)–(2) (requiring the disclosure of “hazardous chemical[s]”).

201. 60-040-002 MISS. CODE R. § 1.25(6)(H).

202. MONT. ADMIN. R. 36.22.1011 (2011).

203. *Id.* at 36.22.608(1).

204. *Id.* at 36.22.1015(2).

205. *Id.* at 36.22.1015(2)(b).

	Post-Fracturing Disclosure Timeline	Base Fluid Disclosure Requirements	Chemical Identification Requirements	Chemical Concentration Requirements
NM	Within 45 days after completion. ²⁰⁶	Total volume of fluid pumped. ²⁰⁷	All products by function, trade name, and supplier. Reporting of chemical constituents and associated CAS numbers is required only for those constituents listed as hazardous under OSHA regulations. ²⁰⁸	Maximum concentration must be reported for only those products and chemical constituents listed as hazardous under OSHA regulations. ²⁰⁹
ND	Within 60 days after the hydraulic fracturing is performed. ²¹⁰	Total volume of water and non-water base fluid. ²¹¹	All products by function, trade name, and supplier, and all chemical constituents and associated CAS numbers. ²¹²	Maximum concentration of chemical constituents in products and in fluid as a whole. ²¹³

206. N.M. CODE R. § 19.15.16.19(B) (LexisNexis 2013).

207. *Id.*

208. *Id.*

209. *Id.*

210. N.D. ADMIN. CODE 43-02-03-27.1(1)(g), (2)(i) (2014).

211. *See id.* 43-02-03-27.1(1)(g) (requiring disclosure of “all elements made viewable by the fracfocus website”); *Find a Well*, *supra* note 85 (choose “North Dakota” under the “State” drop-down menu; then click “Search”) (displaying PDF forms listing total water volume for each well).

212. *See* N.D. ADMIN. CODE 43-02-03-27.1(1)(g) (requiring disclosure of “all elements made viewable by the fracfocus website”); *Find a Well*, *supra* note 85 (choose “North Dakota” under the “State” drop-down menu; then click “Search”) (displaying PDF forms listing chemical identification characteristics for each well).

213. *See* N.D. ADMIN. CODE 43-02-03-27.1(1)(g) (requiring disclosure of “all elements made viewable by the fracfocus website”); *Find a Well*, *supra* note 85 (choose “North Dakota” under the “State” drop-down menu; then click “Search”) (displaying PDF forms listing chemical concentrations for each well).

	Post-Fracturing Disclosure Timeline	Base Fluid Disclosure Requirements	Chemical Identification Requirements	Chemical Concentration Requirements
OH	Within 60 days after completion. ²¹⁴	Volume and source of water or volume of other base fluid. ²¹⁵	All products by function, trade name, and supplier, and their associated Material Safety Data Sheet, and all chemical constituents and associated CAS numbers. ²¹⁶	Maximum concentration of all products and chemical constituents. ²¹⁷
OK	Within 60 days after the conclusion of fracturing operations. ²¹⁸	Total volume and type of base fluid. ²¹⁹	All products by function, trade name, and supplier, and all chemical constituents and associated CAS numbers. ²²⁰	Maximum concentration of chemical constituents in fluid as a whole. ²²¹
PA	Within 60 days after conclusion of hydraulic fracturing. ²²²	Total volume and source of water and reused water. ²²³	All products by function, trade name, and supplier, and all chemical constituents and associated CAS numbers. ²²⁴	Maximum concentration of all chemical constituents. ²²⁵

214. OHIO REV. CODE ANN. § 1509.10(B)(3) (West 2013).

215. *Id.* § 1509.10(A)(9)(b).

216. *Id.* § 1509.10(A)(9)(a), (E).

217. *Id.* § 1509.10(A)(9)(a).

218. OKLA. ADMIN. CODE § 165:10-3-10(b) (2013).

219. *Id.* § 165:10-3-10(b)(1)(E).

220. *Id.* § 165:10-3-10(b)(1)(G)–(H).

221. *Id.* § 165:10-3-10(b)(1)(H).

222. 58 PA. CONS. STAT. ANN. § 3222.1(b)(2) (West 2013).

223. *Id.* § 3.222(b.1)(1)(v), (vi), (viii).

224. *Id.* § 3.222(b.1)(1)(ii)–(iii).

225. *Id.* § 3.222(b.1)(1)(iv).

	Post-Fracturing Disclosure Timeline	Base Fluid Disclosure Requirements	Chemical Identification Requirements	Chemical Concentration Requirements
SD	No time period specified. ²²⁶	Total volume of water. ²²⁷	All products by function, trade name, and supplier, and all chemical constituents and associated CAS numbers. ²²⁸	Maximum concentration of chemical constituents in products and in fluid as a whole. ²²⁹
TN	Within 60 days following the conclusion of hydraulic fracturing and in no case later than 120 days after the commencement of hydraulic fracturing. ²³⁰	Type and total volume of base fluid. ²³¹	All products by function, trade name, and supplier, and all chemical constituents and associated CAS numbers. ²³²	Maximum concentration of chemical constituents in fluid as a whole. ²³³
TX	Within 30 days after completion. ²³⁴	Total volume of water or the type and total volume of other base fluid. ²³⁵	All products by function, trade name, and supplier, and all chemical constituents and associated CAS numbers. ²³⁶	Maximum concentration for only those chemical constituents listed as hazardous under OSHA regulations. ²³⁷

226. S.D. ADMIN. R. 74:12:02:19 (2013).

227. *Id.* § 74:12:02:19(4).

228. *Id.* § 74:12:02:19(4)(b)–(e).

229. *Id.* § 74:12:02:19(4)(f)–(g).

230. TENN. COMP. R. & REGS. 0400-53-01-.03(1)(b) (2013).

231. *Id.* § 0400-53-01-.03(1)(b)(8).

232. *Id.* § 0400-53-01-.03(1)(b)(9), (10), (12).

233. *Id.* § 0400-53-01-.03(1)(b)(11).

234. *See* 16 TEX. ADMIN. CODE § 3.29(c)(2)(A) (2014) (requiring disclosure in accordance with 16 TEX. ADMIN. CODE § 3.16(b)); *see id.* § 3.16(b) (requiring operators to “report within 30 days after completion of the well”).

235. *Id.* § 3.29(c)(2)(A)(viii).

236. *Id.* § 3.29(c)(2)(A)(ix), (xii)–(xiii).

237. *Id.* § 3.29(c)(2)(A)(x)–(xi).

	Post-Fracturing Disclosure Timeline	Base Fluid Disclosure Requirements	Chemical Identification Requirements	Chemical Concentration Requirements
UT	Within 60 days of hydraulic fracturing completion. ²³⁸	None	“[A]mount and type of chemicals.” ²³⁹	Amount of chemicals. Without a requirement to report base fluid volume, concentration cannot be determined. ²⁴⁰
WV	Within 90 days of completing the permitted work. ²⁴¹	Total volume of base fluid. ²⁴²	All products by function, trade name, and supplier, and all chemical constituents and associated CAS numbers. ²⁴³	Maximum concentration of chemical constituents in products and in fluid as a whole. ²⁴⁴
WY	Within 30 days of well completion or recompletion. ²⁴⁵	Total well stimulation treatment volume by stage. ²⁴⁶	All products by function and trade name and all chemical constituents and associated CAS numbers. ²⁴⁷	Actual concentration of products and chemical constituents. ²⁴⁸

* Legislation was recently passed. Some requirements of the law may require implementing regulations before they are operative. Once promulgated, those regulations may include requirements not reflected here. This analysis includes only requirements that are clearly set out in the statute.

5. Trade Secrets: Rules and Procedures

State hydraulic fracturing disclosure rules generally provide an exception to the public reporting requirements for confidential “trade

238. UTAH ADMIN. CODE r. R649-3-39(1) (2013).

239. *Id.*

240. *Id.*

241. W. VA. CODE R. § 35-8-10.2.a (2014).

242. *Id.* § 35-8-10.1.a.

243. *Id.*

244. *Id.*

245. 055-003 WYO. CODE R. § 12 (LexisNexis 2014).

246. *Id.* §§ 12, 45(h)(i).

247. *Id.* § 45(d)(ii).

248. *Id.* § 45(d), (h)(ii).

secret” information.²⁴⁹ Despite the ubiquity of trade secret exemptions in fracking disclosure rules, there is good reason to question whether they should exist at all. A number of commentators have questioned whether such information should be protected from disclosure. Recently, ten law professors that specialize in intellectual property sent a letter to the Alaska Oil and Gas Conservation Commission. The professors were commenting on a proposed fracking disclosure rule for the state of Alaska and argued that the rule should not include trade secret protections:

While businesses engaged in hydraulic fracturing may have legitimate trade secrets, the public’s interest in assuring that hydraulic fracturing is managed in a manner that addresses all significant risks may legitimately outweigh commercial concerns. To impede debate and discussion of the use of public natural resources in the name of commercial secrecy is to put commercial interests above the prior and more general interest in careful stewardship of the environment.

* * *

[T]rade secrecy should not impede disclosure of information when the information describes public risks that the trade secret claimant is itself creating.

Indeed, when trade secret interests conflict with other values, confidentiality interests have been compromised or overridden. Here, a similar result should occur: the fact that a firm’s competitors might be interested in information does not insulate a firm from the implications of the activity that the information describes. Trade secret law does not and should not exempt a firm from participation in the larger legal system, including warning and harm prevention.²⁵⁰

Other commentators note that trade secrets arose in the common law to govern the behavior of market competitors and question whether the

249. The only states that do not provide such exceptions have such lax rules about what must be reported that trade secret information is never required. These states are Alabama, Indiana, Michigan, and Utah.

250. Letter from Thomas Field et al., to Cathy P. Foerster, Comm’r, Alaska Oil & Gas Conservation Comm’n at 1, 7 (April 1, 2013) (footnotes omitted) *available at* http://www.eenews.net/assets/2013/04/04/document_ew_01.pdf.

doctrine can appropriately be applied in the context of public disclosure.²⁵¹ Scholars have also raised doubts about whether trade secrecy encourages investment and innovation or instead leads to “wasteful duplication,” and asserted that the patent system would provide an alternative means for protecting information while also ensuring public transparency.²⁵² Finally, allowing companies to withhold trade secrets can undermine public confidence in the disclosure regime, giving rise to the perception that companies are avoiding disclosure requirements when they would prefer not to comply. Regardless of these concerns, states have incorporated trade secret exemptions in fracking chemical disclosure rules.

If a rule does contain a trade secret exemption, the rule should be strictly written to ensure that companies cannot subvert the disclosure requirements by using the exemption to avoid reporting undesirable information. Rules should require companies to substantiate trade secret claims, require the regulator to take possession of the information and evaluate each claim, and provide an opportunity for members of the public to challenge the withholding. Additionally, where a chemical’s identity is withheld as a trade secret, the chemical family should be disclosed.

i. Substantiation of Trade Secrets

To discourage illegitimate trade secret claims, a company should be required to provide factual justification in each case in which it asserts information is entitled to confidentiality. This justification should include information showing: (1) the information has not been published or shared, except with those bound to confidentiality, and it is not required to be disclosed under any other law; (2) the measures that have been taken to maintain its confidentiality; (3) the ease or difficulty with which the information could be acquired, duplicated, or discovered through reverse engineering; and (4) the extent of the harm that would occur if the

251. Echeverria & Kaplan, *supra* note 22, at 611; *see also* Pub. Citizen Health Research Grp. v. USDA, 704 F.2d 1280, 1289 n.25 (D.C. Cir. 1983). The D.C. Circuit wrote:

When the question of defining proprietary information appears in the public context of whether health and safety data submitted to an agency should be publicly disclosed, the interests of the public in disclosure and the protection of innovation incentives pose important considerations which the common law definition was not designed to handle.

Id.

252. Echeverria & Kaplan, *supra* note 22, at 614 (quoting Mary Lyndon, *Secrecy and Innovation in Tort Law and Regulation*, 23 N.M. L. REV. 1, 14 (1993)) (internal quotation marks omitted).

information were disclosed publicly. Particularized facts should be required for each of the four criteria.

Unfortunately, very few states require any factual substantiation of trade secret claims. Even states with relatively strong disclosure rules in other areas often allow companies total discretion to withhold information as a trade secret with no justification or oversight of any kind. Of twenty-two states with fracking chemical disclosure rules, only four require factual justification to be provided when making a claim of trade secret: Arkansas, California, Illinois, and Wyoming.²⁵³ Three more states require a form to be submitted that affirms that relevant trade secret criteria are met.²⁵⁴ However, these affirmations are of questionable value, and reports have identified affirmations that were demonstrably false.²⁵⁵

ii. Reporting of Trade Secret Information and Processes For Evaluation and Public Challenge

Companies should be required to report all information, including trade secrets, to the regulator. This ensures that the government agency can respond appropriately in case of emergency, or when spills or contamination must be addressed. Government agencies should also have possession of this information to ensure that the state can fulfill other responsibilities, such as the protection of public health. For example, rules should allow state public health officials to access the information if it is needed for research or to address specific concerns, such as a cluster of residents complaining of specific symptoms. Possession of trade secret information by the state also ensures that all information will be available for any of these purposes years in the future, even if a company can no longer be reached. Only California, Illinois, Pennsylvania, and Wyoming require that trade secret information be held by the state.

253. *See infra* Table 5.

254. These states are Colorado, Ohio, and Tennessee. *See infra* Table 5.

255. *See* KATE KONSCHNIK ET AL., HARVARD LAW SCH. ENVTL. LAW PROGRAM POLICY INITIATIVE, LEGAL FRACTURES IN CHEMICAL DISCLOSURE LAWS: WHY THE VOLUNTARY CHEMICAL DISCLOSURE REGISTRY FRACFOCUS FAILS AS A REGULATORY COMPLIANCE TOOL 9 & 15 n.cxiii (2013) (citing ten trade secret affirmations in Colorado that were obviously unjustified, because the information had been disclosed elsewhere on FracFocus). Note that the affirmation that information has not been disclosed elsewhere is the least subjective of the four affirmations required in Colorado, and also the only affirmation that can be reasonably verified by members of the public. *See* COLO. CODE REGS. § 404-1:205A(b)(2)(B), app. IX form 41 (2013) (listing items needed to substantiate a trade secret claim). Without factual justification, the public has no way of evaluating the veracity of the other affirmations made. Where there is little chance that assertions will be challenged or reviewed, there is little risk or downside to an operator asserting that the criteria are met in the affirmation, even if the claim is highly suspect.

Upon submission, trade secret claims should be evaluated to determine whether withholding is warranted. In addition to determining whether factual information has been provided to substantiate a claim that the information is, in fact, a trade secret, the evaluation should also balance the company's interest in confidentiality against the public's interest in disclosure.²⁵⁶ Factors to be considered in this analysis should include: the toxicity of the chemicals, the risks of a release given the environmental and geological context, and the potential for harm (for example, the potential for harm may vary based on the proximity to homes or important water sources). Unfortunately, no state has undertaken to evaluate whether the public interest in disclosure outweighs the private interest in confidentiality. Wyoming is the only state that currently performs an evaluation of trade secret claims,²⁵⁷ but the evaluations focus only on whether the information is a trade secret. Wyoming has also granted trade secret protection even where very little factual information has been provided to support claims, prompting a court challenge to the state's implementation of the rule from conservation organizations.²⁵⁸

Members of the public should also have the opportunity to challenge trade secret claims that may be unwarranted through the standard process provided in state public records laws. States have established processes for dealing with requests for information that involve potential trade secrets. Yet many states have chosen to put limitations on who can make such a challenge or prevent challenges to trade secrets altogether when it comes to hydraulic fracturing. Others have invented wholly new systems which impose limits not seen in other areas, rather than allowing members of the

256. In other contexts, states have implemented policies recognizing that trade secrets should be disclosed when disclosure serves the public interest. *See Black Panther Party v. Kehoe*, 117 Cal. Rptr. 106, 113 (Ct. App. 1974) (holding that the state public records act "endows the agency with discretionary authority to override any of the 14 statutory exemptions when some dominating public interest favors disclosure").

257. California and Illinois will also do so once their rules are implemented, but have not yet performed any such evaluations. Arkansas requires substantiation information to be submitted in conjunction with each claim, but they appear to simply post this information rather than performing any evaluation of the validity of a trade secret claim.

258. For instance, the Wyoming Supreme Court recently heard oral arguments in a case concerning the implementation of the trade secret evaluation requirements after the state approved trade secret status for upwards of thirty substances based on a single four-page letter. *See* Brief of Appellants at 39–40, *Powder River Basin Res. Council v. Wyo. Oil & Gas Conservation Comm'n*, No. S-13-0120 (Wyo. July 17, 2013); Letter from Thomas E. Doll, Supervisor, Wyo. Oil & Gas Conservation Comm'n, to Blaine D. Edwards, Att'y, BJ Servs. Co. at 1 (Nov. 23, 2010), available at http://wogcc.state.wy.us/tradesecrets/TS2010_12%20BJ%20Svc.pdf; Letter from Blaine D. Edwards, Att'y, BJ Servs. Co., to Thomas E. Doll, Supervisor, Wyo. Oil & Gas Conservation Comm'n at 1 (Nov. 11, 2010), available at http://wogcc.state.wy.us/tradesecrets/TS2010_12%20BJ%20Svc.pdf.

public to challenge withholdings through the standard state process.²⁵⁹ Fourteen states provide no ability to challenge claims at all.²⁶⁰ Only five states give any member of the public a right to challenge a trade secret claim.²⁶¹

iii. Reporting Chemical Family

Where a chemical identity is withheld under a claim of trade secret, states should require companies to report the chemical family. Because chemical compounds of the same chemical family tend to have similar properties, this substitute information provides the public with some indication concerning the hazards the chemical may pose without implicating a company's trade secrets. Nine states require that the chemical family be disclosed if a chemical's identity is withheld.²⁶² The remaining thirteen states with disclosure rules do not require this information.²⁶³

Table 5: Trade Secrets

	Substantiation of Trade Secrets	Regulator Holds Trade Secret Information	Evaluation or Challenge Process for Trade Secret Claims	Chemical Family of Trade Secret Chemical Disclosed
AL	None required	No	None	No
AR	Must fill out a form affirming that the criteria in 42 U.S.C. § 11042(a)(2) are met and attach substantiating information. ²⁶⁴	No	No evaluation process specified. No public challenge process.	Yes ²⁶⁵

259. See, e.g., 16 TEX. ADMIN. CODE § 3.29(f) (2014) (limiting challenges to the withholding of information as a trade secret to landowners on which the well is located, adjacent landowners, and state government bodies "with jurisdiction over a matter to which the claimed trade secret information is relevant" and requiring that such challenges be made within 2 years of the filing of the disclosure that made the trade secret claim).

260. These are Alabama, Arkansas, Indiana, Kansas, Louisiana, Michigan, Mississippi, Montana, New Mexico, North Dakota, Oklahoma, South Dakota, Utah, and West Virginia. See *infra* Table 5.

261. These are California, Colorado, Illinois, Pennsylvania, and Wyoming. See *infra* Table 5.

262. See *infra* Table 5.

263. See *infra* Table 5.

264. 178-00-1 ARK. CODE R. § B-19(1)(8) (LexisNexis 2013).

265. *Id.*

	Substantiation of Trade Secrets	Regulator Holds Trade Secret Information	Evaluation or Challenge Process for Trade Secret Claims	Chemical Family of Trade Secret Chemical Disclosed
CA*	Substantiation must include information on “(A) The extent to which the trade secret information is known by the supplier’s employees, others involved in the supplier’s business and outside the supplier’s business”; “(B) The measures taken by the supplier to guard the secrecy of the trade secret information”; “(C) The value of the trade secret information to the supplier and its competitors”; and “(D) The amount of effort or money the supplier expended developing the trade secret information and the ease or difficulty with which the trade secret information could be acquired or duplicated by others.” ²⁶⁶	Yes ²⁶⁷	The agency evaluates the claim of trade secret and approves or denies it. ²⁶⁸ Any member of the public may request records under the California Public Records Act and may then challenge any decision to withhold information as a trade secret through the normal process set out by the Act. ²⁶⁹	No

266. CAL. PUB. RES. CODE § 3160(j)(5) (West 2014).

267. *Id.* § 3160(j)(4)(A).

268. *Id.* § 3160(j)(7).

269. *Id.* § 3160(j)(1).

	Substantiation of Trade Secrets	Regulator Holds Trade Secret Information	Evaluation or Challenge Process for Trade Secret Claims	Chemical Family of Trade Secret Chemical Disclosed
CO	Submission of a form attesting to the fact that the information meets four criteria for trade secret status: (1) the company has not disclosed the information outside of the company except to certain government officials or those bound by a confidentiality agreement; (2) disclosure of the information is not required under any law; (3) disclosure is likely to cause harm to the competitive position of the company; and (4) the information is not readily discoverable through reverse engineering. ²⁷⁰ The form instructs claimants to provide additional substantiation but provides boilerplate sentences, without facts specific to the chemical or trade secret claimed, that can be used for this purpose. ²⁷¹	No	No evaluation made. Members of the public may challenge a trade secret claim under section 114 of the Oil and Gas Conservation Act. ²⁷²	Yes ²⁷³

270. COLO. CODE REGS. § 404-1:205A(b)(2)(B), app. IX (2013).

271. *Id.* app. IX, Form 41 § C.

272. *See* COLO. REV. STAT. ANN. § 34-60-114 (West 2013) (stating that any person adversely affected by the violation of a regulation under the Oil and Gas Conservation Act may, after notifying the Commission, file suit in district court).

	Substantiation of Trade Secrets	Regulator Holds Trade Secret Information	Evaluation or Challenge Process for Trade Secret Claims	Chemical Family of Trade Secret Chemical Disclosed
IL*	Substantiation must include: (1) a detailed description of the procedures used by the person to safeguard the information from becoming available to persons other than those selected by the person to have access to the information for limited purposes; (2) a detailed statement identifying the persons or class of persons to whom the information has been disclosed; (3) a certification that the person has no knowledge that the information has ever been published, disseminated, or has otherwise become a matter of general public knowledge; (4) a detailed discussion of why the person believes the information to be of competitive value; and (5) any other information that shall support the claim. ²⁷⁴	Yes ²⁷⁵	Evaluation includes only a determination by the Department that: (1) the information has not been published, disseminated, or otherwise become a matter of general public knowledge; and (2) the information has competitive value. Members of the public may challenge a trade secret claim. ²⁷⁶	No

273. COLO. CODE REGS. § 404-1:205A(b)(2)(B).

274. 225 ILL. COMP. STAT. ANN. 732/1-77(g) (West 2013).

275. *Id.* § 1-77(f).

276. *Id.* § 1-77(h).

	Substantiation of Trade Secrets	Regulator Holds Trade Secret Information	Evaluation or Challenge Process for Trade Secret Claims	Chemical Family of Trade Secret Chemical Disclosed
IN	N/A: No trade secret information is required by the rule.	N/A: No trade secret information is required by the rule.	N/A: No trade secret information is required by the rule.	No
KS	None required.	No	None	Yes ²⁷⁷
LA	None required.	No	None	Yes ²⁷⁸
MI	N/A: No trade secret information is required by the rule.	N/A: No trade secret information is required by the rule.	N/A: No trade secret information is required by the rule.	No
MS	None required.	No	None	Yes ²⁷⁹
MT	None required.	No	None	No
NM	None required.	No	None	No
ND	None required.	No	None	No
OH	Submission of a form prescribed by the Division of Oil and Gas Resources Management (but no factual justification). ²⁸⁰	No	No evaluation made. Challenges to trade secret claims may be brought by “a property owner, an adjacent property owner, or any person or agency of this state having an interest that is or may be adversely affected.” ²⁸¹	No

277. KAN. ADMIN. REGS. § 82-3-1401(d) (2013).

278. LA. ADMIN. CODE tit. 43, § 118(C)(2)(a)(i) (2012).

279. 60-040-002 MISS. CODE R. § 1.25(7)(A) (LexisNexis 2014).

280. OHIO REV. CODE ANN. § 1509.10(I)(1) (West 2013).

281. *Id.* § 1509.10(I)(2).

	Substantiation of Trade Secrets	Regulator Holds Trade Secret Information	Evaluation or Challenge Process for Trade Secret Claims	Chemical Family of Trade Secret Chemical Disclosed
OK	None required.	No	No process for evaluation as a matter of course, but the Division may require the claimant to file a written explanation. ²⁸²	Yes ²⁸³
PA	Submission of a “signed written statement” asserting confidentiality, but no specifics on what is required to be included. ²⁸⁴	Yes ²⁸⁵	No process for evaluation of trade secret claims specified. Members of the public may challenge a withholding under the state’s right-to-know law. ²⁸⁶	Yes ²⁸⁷
SD	None required.	No	None	No
TN	Submission of a form prescribed by the Supervisor (but no factual justification). ²⁸⁸	No	No evaluation process specified. Challenges to claims of trade secrets may be made by members of the public that are “adversely affected” by the claim. ²⁸⁹	Yes ²⁹⁰

282. OKLA. ADMIN. CODE § 165:10-3-10(b)(4) (2013).

283. *Id.*

284. 58 PA. CONS. STAT. ANN. § 3222.1(b)(3) (West 2013).

285. *See id.* (stating that a well operator must include information on all chemicals on its registry form, but may provide a signed written statement if the record contains trade secret information).

286. 65 PA. STAT. ANN. § 67.707(b) (West 2013). *Cf.* 58 PA. CONS. STAT. ANN. § 3222.1(e) (requiring department to prevent trade secrets from being disclosed under Pennsylvania’s right-to-know law).

287. 58 PA. CONS. STAT. ANN. § 3222.1(b)(3).

288. TENN. COMP. R. & REGS. 0400-53-01-.03(1)(c) (2013).

289. *Id.* at (4).

290. *Id.* at (1)(c).

	Substantiation of Trade Secrets	Regulator Holds Trade Secret Information	Evaluation or Challenge Process for Trade Secret Claims	Chemical Family of Trade Secret Chemical Disclosed
TX	None required.	No	No evaluation process specified. The only members of the public that may challenge claims of trade secrets are the landowner on which the well is located and adjacent landowners. A challenge must be filed within 2 years of the filing of the disclosure. ²⁹¹	Yes ²⁹²
UT	None required.	No	None	No
WV	None required.	No	None	No
WY	Written request “justifying and documenting the nature and extent of the proprietary information.” ²⁹³	Yes ²⁹⁴	Written requests are evaluated and approved or denied. The public may challenge an approval decision via court case but no administrative procedure is available. ²⁹⁵	No

* Legislation was recently passed. Some requirements of the law may require implementing regulations before they are operative. Once promulgated, those regulations may include requirements not reflected here. This analysis includes only requirements that are clearly set out in the statute.

291. 16 TEX. ADMIN. CODE § 3.29(f) (2014).

292. *Id.* § 3.29(e).

293. 055-003 WYO. CODE R. § 45(f) (LexisNexis 2014).

294. *Id.*

295. *Id.*; *see also* WYO. STAT. ANN. § 16-4-203(d)(v), (f) (West 2013) (recognizing the trade secret exemption and the right to appeal a record request denial to the district court).

6. Availability of Information to Emergency Responders and Health Professionals

Health professionals and first responders may need information on all chemicals, including those whose identity is withheld as a trade secret, to diagnose and treat patients, or to respond to an accident or emergency. This information should be available without delay, and if the company is unresponsive or unwilling to provide it, the state should immediately do so.²⁹⁶ Alabama, Arkansas, California, Montana, and West Virginia provide health professionals access but not to emergency responders. Seven other states provide access for the purposes of emergency response and to health professionals, although some limits do exist in certain states. For instance, Ohio, which does not hold trade secret information itself, requires companies to maintain records for only two years.²⁹⁷ And a number of states require that the state oil and gas regulator request the information and then pass it on to emergency personnel, rather than allowing them direct access. In an emergency, especially one that occurs outside of regular business hours, such a policy could significantly delay emergency responders' access to the information.²⁹⁸ Ten states provide no access to trade secret information to either emergency responders or health professionals.²⁹⁹

Table 6: Access for Health Professionals

	Access for Health Professionals / Emergency Responders
AL	“[I]nformation deemed to be a trade secret shall be disclosed as necessary for proper medical diagnosis and treatment or for spill response.” ³⁰⁰ Emergency responders might not be able to obtain information in case of an emergency that did not involve a spill. ³⁰¹
AR	Health professionals only. ³⁰²
CA*	Health professionals only, but access may be for reasons of treatment and diagnosis of individual patients or for public health purposes. ³⁰³

296. This, of course, requires that the state have possession of the information, as discussed *supra* Part III.B.5.ii.

297. OHIO REV. CODE ANN. § 1509.10(J)(1) (West 2013).

298. One of the more perplexing provisions of these rules appears in Tennessee, which requires the state Supervisor to request information needed to respond to a spill or release in writing, slowing the process of obtaining the information even further. TENN. COMP. R. & REGS. 0400-53-01-.03(3)(a) (2013).

299. *See infra* Table 6.

300. ALA. ADMIN. CODE r. 400-1-9.07(a)(3) (2013).

301. *See id.*

302. 178-00-1 ARK. CODE R. § B-19(l)(9) (LexisNexis 2013).

Access for Health Professionals / Emergency Responders	
CO	Access for health professionals. The Commission may request information needed for emergency response. ³⁰⁴
IL*	Access for health professionals. In emergency, department may provide information to county public health director or emergency manager and the relevant fire department chief. ³⁰⁵
IN	No
KS	Access for health professionals. The Director may request information needed for emergency response and provide to the relevant emergency manager. ³⁰⁶
LA	No
MI	No
MS	No
MT	Access for health professionals. The Board may request information if “necessary to respond to a spill or release,” however the rule appears to allow the Board to share the information only with parties involved in “analysis.” ³⁰⁷
NM	No
ND	No
OH	Access for health professionals. Chief may request information from company if “necessary to respond to a spill, release, or investigation,” but records must only be maintained by companies for two years. ³⁰⁸
OK	No
PA	Access for health professionals. If needed to respond to a spill or release, access for emergency managers, responders to a spill or release, public health officials, and any “person who may have been directly and adversely affected or aggrieved by the spill or release.” ³⁰⁹
SD	No
TN	Access for health professionals. The Supervisor may request trade secret information in writing if “necessary to respond to a spill or release or a complaint from a person who may have been directly and adversely affected or aggrieved by such spill or release.” ³¹⁰ Supervisor may disclose to the relevant county public health director or emergency manager, or to the Dept. of Public Health or Dept. of Environment and Conservation. ³¹¹

303. See CAL. PUB. RES. CODE § 3160(j)(10)(B)–(D) (West 2014).

304. COLO. CODE REGS. § 404-1:205A (2013).

305. 225 ILL. COMP. STAT. ANN. 732/1-77(m) (West 2013).

306. KAN. ADMIN REGS. § 82-3-1402(a)(1)(B), (a)(2), (b) (2013).

307. MONT. ADMIN. R. 36.22.1016 (2011).

308. OHIO REV. CODE ANN. § 1509.10(J)(1)–(2) (West 2013).

309. 58 PA. CONS. STAT. ANN. § 3222.1(d)(2)(ii)(A)–(D).

310. TENN. COMP. R. & REGS. 0400-53-01-.03(3)(a) (2013).

311. *Id.* § 0400-53-01-.03(3)(b).

Access for Health Professionals / Emergency Responders	
TX	Access for health professionals and emergency responders. ³¹²
UT	No
WV	Access for health professionals. Chief or designee may request information from company if “necessary in connection with an investigation by the office.” ³¹³
WY	No

* Legislation was recently passed. Some requirements of the law may require implementing regulations before they are operative. Once promulgated, those regulations may include requirements not reflected here. This analysis includes only requirements that are clearly set out in the statute.

IV. UNLEASHING THE FULL POTENTIAL OF FRACKING DISCLOSURE

In a relatively short time, twenty-two states have implemented rules requiring some level of disclosure of the chemicals used in fracking. These laws have led to modest improvements in the quality and quantity of information available to researchers and the public to help in understanding fracking and its effects on health and the environment. However, many questions still remain. To realize the benefits of disclosure in the fracking context, substantial improvements must be made.

A. Getting the Details Right: Authentic Disclosure Policies

Some have touted fracking chemical disclosure laws as a success story of state oil and gas regulation. But upon closer investigation, it is clear that many of these laws provide only a veneer of transparency. The differences between laws which seem calculated to prevent useful access to chemical information and those which offer *authentic* disclosure can appear minor to outside observers.³¹⁴ Whether information will be available in machine-readable format, for instance, is unlikely to merit mention in the news stories surrounding the enactment of a state’s disclosure policy. Yet, details like these will play a significant role in the information that is ultimately available to the public and to the quality of research that is conducted to

312. 16 TEX. ADMIN. CODE § 3.29(c)(4) (2014).

313. W. VA. CODE R. § 35-8-10.1.d (2014).

314. Credit for the term “authentic disclosure” is due to Mr. Shakeb Afsah. During the Vermont Law Review Symposium, Environmental Disclosure Panel Discussion, Mr. Afsah used the term “authentic disclosure” to draw a contrast with regimes that merely create “a perception of disclosure,” noting that features of FracFocus.org seemed to fall into the latter category. Vermont Law Review, *Panel 1: Environmental Law and Disclosure Requirements* at 1:05:00, YOUTUBE (Oct. 23, 2013), <https://www.youtube.com/watch?v=keLYqCQ4SDk>.

increase our understanding of fracking's impacts. Currently, most state rules earn failing grades on most criteria. For fracking disclosure policies to achieve their aim, this must change.

B. Information is Not Enough: The Importance of Tools for Interpretation

While increasing the availability of information is an important prerequisite to realizing the benefits of disclosure policies, often policymakers overlook the important job of ensuring that tools are available to assist in interpreting the data. For instance, members of the public may have little idea how to assess the relative hazards posed by various chemicals. Enabling them to do so might allow communities to negotiate to ensure that particularly hazardous chemicals are not used within their borders, and it might give landowners the knowledge they need to require the use of safer chemicals when bargaining for lease provisions. Even professionals may need tools to assist them. While rules require that health professionals be provided information on the identities of chemicals that patients may have been exposed to, healthcare practitioners may not know how to find information on the interactive effects of exposure to multiple chemicals. Further attention must be given to developing solutions to these problems. For instance, state environmental health officers, who are likely well-equipped to find and interpret chemical hazard information, could hold trade secret information and act as the point of contact for health professionals seeking it. This would allow the officers to provide important interpretive information along with data on chemical identities and concentrations. But this is only one potential proposal. To ensure that necessary tools are available to interpret the information provided, states must look to experts in a variety of fields with an eye toward achieving each of the many goals of fracking disclosure policies.

C. Achieving Broader Transparency in Oil and Gas Development

Hydraulic fracturing is a single step in the industrial oil and gas exploration and production process. Each stage of oil and gas development can pose risks to the environment and human health, including air and water pollution and soil contamination. And dangerous chemicals are used throughout the life of an oil and gas well, including during drilling, well workover, gas processing, and waste treatment. Chemicals used during any of these stages ought to be disclosed. Disclosure of other environmental performance data, including all releases into air and water, also ought to be required. Water use is an especially important impact of fracking in many

areas. To the extent that current rules fail to provide information about withdrawals from state surface and groundwater resources, this data should be disclosed. Broadening disclosure to encompass this wider range of chemical releases and other environmental performance data would have cascading benefits. This would allow more comprehensive research on the industry's impacts, ensure that companies do not focus on fracking chemicals to the exclusion of other releases, and provide a much more complete understanding of the energy tradeoffs we face.

