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THE PRIVATE ROLE IN PUBLIC FRACTURING DISCLOSURE AND REGULATION

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Abstract: Recent domestic growth in oil and gas natural gas production from shales and sandstones called "tight" formations—largely enabled by a modified technology called slickwater hydraulic fracturing—has driven both economic growth and environmental concerns. Public concerns have often focused on the chemicals used in the fracturing process, yet federal regulations requiring disclosure of chemicals are weak. In the midst of initial "threats" of federal intervention, industry—along with state regulators—developed a website that enabled chemical disclosure. State regulations later mandated disclosure through this website, or allowed it as one option within a mandatory disclosure regime. Independently, gas companies also have begun to experiment with less toxic fracturing chemicals and to take other substantive efforts toward identifying and limiting the risks of tight oil and gas development. This example of a public-private effort to enhance informational access in fracturing, and to make limited substantive changes, may offer important lessons for other oil and gas regulation moving forward. Agencies and policymakers must make independent assessments of risks and avoid directly adopting industry solutions if those solutions are incomplete or avoid needed change. But oil and gas operators have shown how public action, combined with industry coordination and innovation, can sometimes inspire productive responses to the risks of unconventional oil and gas production.

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Introduction

As 2012 drew to a close, the International Energy Agency declared that the United States had experienced a "renaissance" in energy.[1] Indeed, while we have long relied on imports to fulfill many of our energy needs, recent expansions of drilling and hydraulic fracturing technologies have opened up large reserves of oil and gas in shales and other "tight," densely packed formations underground, including sandstones. Becoming a major global supplier of oil and gas will have important economic, and some environmental, benefits for the United States, and potentially for the world; natural gas releases fewer conventional air pollutant emissions and greenhouse gas emissions than coal or oil, for example.[2] Yet domestic abundance of fuels also raises substantial concerns, including worries that gas will displace investments in the renewable technologies necessary to solve climate problems,[3] and that widespread extraction will cause environmental contamination.[4] Much of the initial public concern has focused on the chemicals used in fracturing and associated contamination risk.[5] Yet few federal environmental laws require disclosure of these chemicals in a manner accessible to the public.[6] Chemical use is not the only environmental concern associated with drilling and fracturing—indeed, it may be far from the largest concern.[7] But the potential for

[1] INT'L. ENERGY AGENCY, WORLD ENERGY OUTLOOK 74 (2012), *available at* http://www.oecd-ilibrary.org/error/authentication;jsessionid=hffgs367hw43.x-oecd-live-01 (not accessible by the public without payment; on file with author).

[2] U.S. ENERGY INFO. ADMIN., NATURAL GAS 1998: ISSUES AND TRENDS 53 fig.22 (1999), http://www.eia.gov/pub/oil_gas/natural_gas/analysis_publications/natural_gas_1998_issues_trends/pdf/it98.pdf. The extent of greenhouse gas emissions reductions is debated. however, in light of potent methane emissions from natural gas. *See* Mark Fulton et al., Worldwatch Institute, Comparing Life-Cycle Greenhouse Gas Emissions from Natural Gas and Coal 3 (Aug. 25, 2011), http://www.worldwatch.org/system/files/pdf/Natural_Gas_LCA_Update_082511.pdf (comparing lifecycle assessments).

[3] *See, e.g.*, *cf. See* INTERNATIONAL ENERGY AGENCY, ARE WE ENTERING A GOLDEN AGE OF GAS 8–9 (2011), *available at* http://www.worldenergyoutlook.org/media/weowebsite/2011/WEO2011_GoldenAgeofGasReport.pdf (noting that with a rise in global natural gas use through 2035, global carbon dioxide emissions would still rise and that problematic warming would likely occur); Thomas Friedman, Op-Ed, *Get It Right on Gas*, N.Y. TIMES (Aug. 5, 2012), http://www.nytimes.com/2012/08/05/opinion/sunday/friedman-get-it-right-on-gas.html (quoting Faith Birol, Chief Economist, International Energy Agency) ("[A] golden age for gas is not necessarily a golden age for the climate'—if natural gas ends up sinking renewables.").

[4] *See, e.g.*, Daniel J. Rozell & Sheldon J. Reaven, *Water Pollution Risk Associated with Natural Gas Extraction from the Marcellus Shale*, 32 RISK ANALYSIS 1382, 1384 (2011), http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2011.01757.x/pdf (estimating potentially large quantities of surface spills of contaminants as a result of drilling and fracturing in the Marcellus Shale).

[5] *See, e.g.*, Hannah J. Wiseman, *Risk and Response in Fracturing Policy*, 84 U. COLO. L. REV. (forthcoming 2013), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2017104 (describing concerns expressed by members of Congress, scientists, and citizens).

[6] *See infra* note 15 and accompanying text.

[7] *See, e.g.*, Wiseman, *supra* note 5 (discussing potential risks based on recent violations at well sites

chemicals to spill while being transported to well sites or mixed with fracturing chemicals,[8] or for fracturing wastewater to be improperly treated prior to disposal,[9] makes knowledge of chemicals used at well sites one important component of understanding and addressing fracturing risks.

In response to public concerns about the known and unknown risks of drilling and fracturing,[10] a growing number of states have required operators to disclose the type and quantity of chemicals used at fractured well sites.[11] Industry's involvement in driving and shaping these state regulations offers interesting initial lessons in public-private efforts at regulatory reform in drilling and fracturing,[12] and this Essay briefly explores this trend. Part I describes weak federal disclosure requirements, which, in part, drove public demands for change. Part II identifies public-private efforts to form a voluntary chemical disclosure website and explores state laws mandating disclosure—many of which require or allow disclosure through the website. Having identified this core public-private development, Part III describes other efforts, often instigated by coalitions of state regulators and industry members, to identify and respond to the risks of shale gas and oil development. Finally, Part IV draws from the literatures of new governance and voluntary industry behavior to analyze how industry might both inspire and constrain future substantive regulatory change, identifying both positive and negative lessons from the public-private experiment so far.

I. Federal Disclosure Laws

Slickwater fracturing—a now-common technique that injects water and chemicals down wells at high pressure—has driven both oil and gas development and demands for information about the chemicals used in this development. Existing federal informational disclosure requirements for oil and gas production are weak, however. The Occupational Safety and Health Act and Emergency Planning and Community Right-to-Know Act require operators to keep material safety data sheets for chemicals on their sites;[13] these

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and some of the initial literature on risk, and highlighting concerns in addition to the environmental impacts of fracturing chemicals).

[8] *See, e.g.*, *id.*; Rozell & Reaven, *supra* note 4.

[9] *See, e.g.*, Letter from Shawn M. Garvin, EPA Region III, Adm'r, to Michael Krancer, Acting Sec'y, Penn. Dep't of Envtl. Prot. (May 12, 2011), *available at* http://www.epa.gov/region03/marcellus_shale/pdf/letter/krancer-letter5-12-11.pdf. (expressing continuing concerns about inadequately-treated wastewater from fracturing).

[10] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-12-732, OIL AND GAS: INFORMATION ON SHALE RESOURCES, DEVELOPMENT, AND ENVIRONMENTAL AND PUBLIC HEALTH RISKS 4 (2012) (concluding that risks cannot currently be quantified due to a lack of adequate scientific information).

[11] *See infra* notes 26–40.

[12] This paper does not fully explore the new governance and self-regulatory implications of disclosure laws. Rather, it provides a brief introduction to industry initiatives in drilling and fracturing and simultaneous government responses and very briefly addresses these theoretical areas.

[13] Emergency Planning and Community Right-to-Know Act of 1986 §§ 311–312, 42 U.S.C.

sheets describe the chemicals on site and their effects. Under federal law, operators also must provide these sheets to local emergency planning coordinators.[14] The public benefit of these laws, however, is limited: curious citizens would often have to physically travel to a well site or local emergency agency to gain access to the sheets, and, more importantly, operators can claim trade secret status for these chemicals, thus potentially blocking public access.[15]

As fracturing has become more common, and environmental and health concerns have expanded, the federal government has begun to respond. As part of a national study of the effects of fracturing on drinking water, the Environmental Protection Agency (EPA) demanded chemical information from the largest U.S. fracturing companies.[16] In its recent progress report on the study, the agency indicates that it has received chemical information from nine companies and obtained additional information from 12,000 voluntary "well-specific chemical disclosures" on FracFocus.[17] The Agency also requested information from several major operators in Pennsylvania about the quantity of wastewater generated from drilling and fracturing and how the operators treated, recycled, and or disposed of it.[18] Several federal senators and representatives, in turn, proposed disclosure requirements as part of a "FRACAct," which died in committee.[19] The more meaningful efforts toward disclosing chemicals have occurred at the state and industry levels. Perhaps in part due to federal "threats,"[20] growing public demands for

§§ 11021–11022 (2011).

[14] *Id.* at § 311(c)(1), 42 U.S.C. § 11021(c)(1).

[15] *Id.* at §§ 312–313, 42 U.S.C. §§ 11021–11022; 29 C.F.R. § 1910.1200(i) (2010). *See also* Hannah Wiseman, *Trade Secrets, Disclosure, and Dissent in a Fracturing Energy Revolution*, 111 COLUMB. L. REV. SIDEBAR 1 (2011), http://www.columbialawreview.org/wp-content/uploads/2011/01/1_Wiseman.pdf (describing the limits of federally-required disclosure). Although public records requests might be successful, states sometimes require on-site file reviews in order for citizens to obtain records.

[16] Letter from the Envtl. Prot. Agency to BJ Services et al. (Sept. 9, 2010), *available at* http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/upload/HFvolu
ntaryinformationrequest.pdf.

[17] ENVTL. PROT. AGENCY, STUDY OF THE POTENTIAL IMPACTS OF HYDRAULIC FRACTURING ON DRINKING WATER RESOURCES: PROGRESS REPORT 2 (2012), http://www.epa.gov/hfstudy/pdfs/hf-report20121214.pdf.

[18] *See* Enclosure 1, Letter from Shawn M. Garvin, Regional Adm'r, EPA Region III, to Freddie Kotek, Chief Exec. Officer, Atlas Res., L.L.C. (May 12, 2011), *available at* http://www.epa.gov/region03/marcellus_shale/pdf/letter/enclosures5-12-11.pdf.

[19] Fracturing Responsibility and Awareness of Chemicals Act of 2011, S. 587, 112th Cong. (2011), *available at* http://www.govtrack.us/congress/bills/112/s587/text; H.R. 1084, 112th Cong. (2011), *available at* http://www.gpo.gov/fdsys/pkg/BILLS-112hr1084ih/pdf/BILLS-112hr1084ih.pdf.

[20] Tim Wu, *Agency Threats*, 60 DUKE L.J. 1841, 1844, 1849-51 (2011) (describing private threats, such as "a warning letter sent to a company," and public threats, such as a "threat of either new rulemaking or enforcement of an existing rule," and arguing that especially for industries "in a state of high uncertainty," threats can be superior to rules in terms of forcing entities to act in the public interest without entrenching rules that could be "bad law"). *But see id*. at 1846–48 (surveying the literature on

information, and competitive pressure, these entities took the lead in expanding the disclosure of chemicals used in hydraulically fractured wells.

II. Public and Private Efforts Toward Disclosure

One of the first major steps toward disclosure of the chemicals used at each well site is a website called FracFocus.[21] The Ground Water Protection Council (GWPC)—a 501(c)(6) organization comprised of state oil and gas and environmental administrators[22]—worked with energy companies to fund, develop, and operate this website.[23] On FracFocus, energy companies voluntarily disclose the type and quantity of chemicals that they use at each well site, and more than 200 oil and gas companies have registered more than 27,000 well sites.[24] Curious investigators can click on each site to reveal a list of the specific chemicals used at that well.[25]

As voluntary disclosure has expanded, so, too, has regulation of disclosure. From 2010 through 2012, Arkansas,[26] Colorado,[27] Louisiana,[28] Michigan,[29] Mississippi,[30] Montana,[31] New Mexico,[32] New York,[33] North Dakota,[34] Ohio,[35] Oklahoma,[36]

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threats and noting that it largely views threats as negative).

[21] FRACFOCUS CHEMICAL DISCLOSURE REGISTRY, http://fracfocus.org/ (last visited Nov. 24, 2012) [hereinafter FRACFOCUS].

[22] *About Us*, GROUNDWATER PROT. COUNCIL, http://www.gwpc.org/about-us (last visited Nov. 24, 2012).

[23] FRACFOCUS, *supra* note 21 (showing the Ground Water Protection Council and the Interstate Oil and Gas Compact Commission—which receives industry funding—as holders of the website copyright and as website sponsors).

[24] *About Us*, FRACFOCUS CHEMICAL DISCLOSURE REGISTRY, http://fracfocus.org/welcome (last visited Nov. 24, 2012).

[25] *Well Map*, FRACFOCUS CHEMICAL DISCLOSURE REGISTRY, http://www.fracfocusdata.org/fracfocusfind/ (last visited Nov. 24, 2012).

[26] 178 ARK. CODE R. § B-19(k) (LexisNexis 2012), *available at* http://www.aogc.state.ar.us/onlinedata/forms/rules%20and%20regulations.pdf (showing new rule effective January 15, 2011).

[27] 2 COLO. CODE REGS. § 404-1:205A (Westlaw 2012) (applying to "hydraulic fracturing treatments performed on or after April 1, 2012").

[28] LA. ADMIN. CODE tit. 43:XIX, § 118(C)(1) (Westlaw 2012) (promulgated October 2011).

[29] MICH. DEP'T OF ENVTL. QUALITY, SUPERVISOR OF WELLS INSTRUCTION 1-2011 3 (2011), *available at* www.michigan.gov/documents/deq/SI_1-2011_353936_7.pdf.

[30] Miss. Sec'y of State, Rule 1.26 Requirements for Hydraulic Fracture Stimulation—Report of Shooting or Treating, http://www.sos.ms.gov/ACProposed/00018951b.pdf.

[31] MONT. ADMIN. R. 36.22.1015(2) (Westlaw 2011).

[32] Proposed, N.M. CODE R. 19.15.16.18 (2011), *available at* http://www.emnrd.state.nm.us/ocd/documents/201111-2OCDModifications.pdf; Gabrielle A. Gerholt, N.M Oil Conservation Div., *Updated Information on NM Hydraulic Fracturing Disclosure Form*, INDEP. PETROL. ASS'N OF N.M, http://www.ipanm.org/article.php/OCD_HF_Disclosure (last visited June 18, 2012) (indicating that rules have been finalized).

[33] N.Y. DEP'T OF ENVTL. CONSERVATION, REVISED DRAFT SUPPLEMENTAL GENERIC

Pennsylvania,[37] Texas,[38] West Virginia,[39] and Wyoming[40] all updated, released, or proposed new statutes, agency directives, or regulations to require basic chemical disclosure. Nearly all of these laws require post-fracturing disclosure of the identity of chemicals used at well sites, a description of the quantity of each chemical used, and, often, a description of the quantity of water used.[41] Several of the laws provide that operators may either disclose information by submitting a form to the state oil and gas or environmental agency *or* by showing that they have submitted to FracFocus.org or other websites approved by the state.[42] North Dakota offers FracFocus as the sole means of disclosure and requires, within sixty days after fracturing, disclosure of all information "made viewable" by that website,[43] whereas Oklahoma allows submission on FracFocus or to the state oil and gas agency, which then posts on FracFocus.[44]

States are not simply incorporating FracFocus disclosure within public regulations; instead, they also appear to be modifying initial public-private efforts at disclosure. Colorado, for example, provides that if by 2013 FracFocus "does not allow the Commission staff and the public to sort the registry for Colorado information by geographic area, ingredient, chemical abstract service number, time period, and [well] operator" or "[t]here is no reasonable assurance that the registry will allow for such searches,"[45] then operators must use electronic forms created by the Colorado Oil and Gas Conservation Commission.[46]

ENVIRONMENTAL IMPACT STATEMENT ON THE OIL, GAS, AND SOLUTION MINING PROGRAM 8-30 to -31 (2011), *available at* http://www.dec.ny.gov/data/dmn/rdsgeisfull0911.pdf (proposed—not yet finalized).

[34] N.D. ADMIN. CODE 43-02-03-27.1(2)(i) (Westlaw 2012) (effective April 1, 2012).

[35] OHIO REV. CODE ANN. § 1509.10 (Westlaw 2012).

[36] OKLA. ADMIN. CODE § 165:10-3-10 (Westlaw 2012) (effective July 2012), *available at* http://www.occeweb.com/rules/Web%20Ready%20Ch10%20FY13%2007-01-12%20searchable.pdf.

[37] 58 PA. STAT. § 3222(b.1)(1)(i) (Westlaw 2012).

[38] 16 TEX. ADMIN. CODE § 3.29(c)(2)(A)(ix)–(xi) (Westlaw 2012).

[39] W. VA. CODE § 22-6A-7 (Westlaw 2012).

[40] 55-3 WYO. CODE R. § 45(d) (LexisNexis 2012). Note that this is not an exhaustive list. Other states also may have recently updated their disclosure laws. For a helpful recent summary, see BRANDON J. MURRILL & ADAM VANN, CONG. RESEARCH SERV., R42461, HYDRAULIC FRACTURING: CHEMICAL DISCLOSURE REQUIREMENTS (2012), http://www.fas.org/sgp/crs/misc/R42461.pdf.

[41] *See* sources cited *supra* notes 29–40. *See also* Hannah Wiseman & Francis Gradijan, *Regulation of Shale Gas Development, Including Hydraulic Fracturing* 88–89, tbl.7a (Univ. of Tulsa Legal Studies, Research Paper No. 11, 2011), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1953547 (describing the contents of the disclosure requirements).

[42] *See, e.g.* LA. ADMIN. CODE tit. 43:XIX, § 118(C)(4) (Westlaw 2012); MONT. ADMIN. R. 36.22.1015(4) (Westlaw 2012); Miss. Sec'y of State, *supra* note 30. *See also* FRACFOCUS, *supra* note 21 (showing a total of eight states that allow disclosure through FracFocus).

[43] *See* N.D. ADMIN. CODE 43-02-03-27.1(2)(i) (Westlaw 2012).

[44] OKLA. ADMIN. CODE 165:10-3-10(b) (effective July 2012).

[45] 2 COLO. CODE REGS. § 404-1:205A(b)(3)(A) (Westlaw 2012).

[46] 2 COLO. CODE REGS. § 404-1:205A(b)(3)(B) (Westlaw 2012).

The combination of voluntary industry disclosure and an expanding array of state disclosure laws—some of which are encouraging further innovation on the voluntary disclosure site—is promising. Nevertheless, some challenges remain. First, states consistently allow operators to claim that their chemicals retain trade secret protection and therefore should not be disclosed;[47] the federal laws allow the same claim.[48] It appears that only Texas has provided an appeal mechanism for trade secret claims—allowing surface owners near wells and certain state agencies to contest secrecy.[49] In a potentially more problematic development, states might view informational requirements as adequately addressing the new risks posed by higher levels of drilling and fracturing.[50] Comprehensive modifications of oil and gas regulations in some states, and the emerging literature on risks,[51] suggest that informational requirements will not be adequate, yet they could provide a false sense of security to regulators.

III. Other Private and Public-Private Efforts to Respond to Environmental Concerns

Perhaps in part due to the wave of disclosure, which could incentivize industry to reduce its environmental impacts,[52] private and quasi-private actors have begun to take

[47] *See* Wiseman & Gradijan, *supra* note 41, at 90 tbl.7b. *But see* W. VA. CODE § 22-6A-7 (Westlaw 2012). (appearing to not allow trade secret claims by simply requiring operators to submit "[a] listing of anticipated additives that may be used" and a "listing of the additives actually used"). I am grateful to Professor Keith Hall for flagging the West Virginia omission in a conversation on January 5, 2013.

[48] *See* Wiseman, *supra* note 15.

[49] 16 TEX. ADMIN. CODE § 3.29(c)(4), (f)(1)(Westlaw 2012).

[50] Three shale gas states, including Louisiana, Oklahoma, and Texas, have implemented disclosure requirements yet few other revisions. This may be changing, however. Oklahoma is considering revisions to regulations in its "five-year strategic plan." STRONGER, OKLAHOMA HYDRAULIC FRACTURING STATE REVIEW 4 (2011), *available at* http://www.strongerinc.org/documents/Final%20Report%20of%20OK%20HF%20Review%201-19-2011.pdf. Texas is considering relatively comprehensive revisions. *See* Memorandum from Cristina Self, Attorney, Office of Gen. Counsel, to Barry Smitherman, David Porter, and Buddy Garcia, Chairman and Comm'rs, R.R. Comm'n of Tex. (Aug. 21, 2012), www.rrc.state.tx.us/rules/prop-amend-3-13-Aug21-2012.pdf.

[51] *See, e.g.*, Daniel J. Rozell & Sheldon J. Reaven, *Water Pollution Risk Associated with Natural Gas Extraction from the Marcellus Shale*, 32 RISK ANALYSIS 1382 (2012), *available at* http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2011.01757.x/pdf (describing the total potential volume of spills from fracturing and drilling in the Marcellus); Wiseman, *supra* note 5, at 36–38 (describing spill incidents).

[52] There is a rich literature on how information disclosure requirements, or voluntary disclosure, encourages or fails to incentivize improved substantive performance, which I only touch upon in passing here. *See, e.g.*, David W. Case, *The Law and Economics of Environmental Information as Regulation,* 31 ENVTL. L. REP. 10,773 (2001) (providing a literature review); David W. Case, *Corporate Environmental Reporting as Informational Regulation: A Law and Economics Perspective*, 76 U. COLO. L. REV. 379, 385–86 (2005) (noting disagreement as to whether disclosure programs such as the Toxic Release Inventory—which requires certain industries to annually report their toxic emissions—lead to better

other steps to address concerns associated with the use of chemicals in tight oil and gas development. These efforts have been both informational and substantive.

On the informational end, several organizations have enhanced efforts to compare and describe the substance of state oil and gas regulations, including regulation to prevent contamination of water with drilling or fracturing chemicals. The GWPC published a white paper for the Department of Energy addressing state regulations that protect groundwater, including requirements for casing (lining) wells and properly cementing the casing.[53] It also operates a Risk Based Data Management System, in which "[m]ore than twenty-two regulatory agencies . . . [track] oil, gas, injection well, and source water protection activities."[54] Further, the Interstate Oil and Gas Compact Commission (IOGCC)—a group of state and international representatives that is Congressionally-commissioned but receives some industry funding[55]—has a website called "Groundwork," which allows viewers to compare state oil and gas laws.[56] FracFocus, operated by both the GWPC and the IOGCC, also contains some state regulations and updates on recent regulatory changes, as well as state agency contact information.[57] In one of the most comprehensive informational efforts to date, the Intermountain Oil and Gas Project—a partnership between the University of Colorado Law School and a number of NGOs, academic groups, and industry actors[58]—collects state and federal

environmental performance, but noting general agreement that TRI reporting "has induced significant voluntary reductions in covered releases well below levels otherwise required by existing command-and-control regulation" and has incentivized industry to periodically submit reports that describe all environmental performance in one document); *id.* at 381, n. 11 (citing to other sources); Bradley C. Karkkainen, *Information as Environmental Regulation: TRI and Performance Benchmarking, Precursor to a New Paradigm?*, 89 GEO. L.J. 257, 287 (2001) (noting that "[g]overnment regulation has long mandated information disclosure as a regulatory device" but that the TRI requires disclosure of "environmental performance of those parties most directly responsible for significant environmental impacts" and has been successful).

[53] GROUND WATER PROT. COUNCIL, STATE OIL AND NATURAL GAS REGULATIONS DESIGNED TO PROTECT WATER RESOURCES (2009), *available at* http://www.gwpc.org/sites/default/files/state_oil_and_gas_regula"tions_designed_to_protect_water_resources_0.pdf (prepared for DOE).

[54] *Risk Based Data Management System*, GROUND WATER PROT. COUNCIL, http://www.gwpc.org/programs/rbdms (last visited Nov. 25, 2012).

[55] *2012 Annual Meeting*, INTERSTATE OIL AND GAS COMPACT COMMISSION, http://www.iogcc.state.ok.us/sanantonio (last visited Nov. 25, 2012) (showing various energy companies as 2012 annual meeting sponsors); *Member States*, INTERSTATE OIL AND GAS COMPACT COMMISSION, http://www.iogcc.state.ok.us/member-states (last visited Nov. 25, 2012).

[56] Interstate Oil & Gas Compact Comm'n, GROUNDWORK, http://groundwork.iogcc.org/ (last visited Nov. 25, 2012).

[57] *Regulations by State*, FRACFOCUS, http://fracfocus.org/regulations-state (last visited Nov. 25, 2012).

[58] *Further Research*, INTERMOUNTAIN OIL AND GAS PROJECT, http://www.oilandgasbmps.org/resources/links.php (last visited Dec. 11, 2012) (listing project partners and resources).

regulations.[59]

These informational developments are important: because states currently have the primary responsibility for regulating oil and gas development, better information sharing is necessary if an effective laboratory of the states is to emerge in lieu of federal regulation. States and stakeholders must be aware of the substantial variations in regulation that exist,[60] and they must better understand how the "leader" states have developed new regulations to reduce risks. None of the existing regulatory information-sharing efforts, however, provide a comprehensive database that allows users to review and compare regulations among all states either by regulatory subject matter or state.[61]

Several of the private-public documents and websites comparing or describing information about regulation also contain normative statements about the "best" level of regulation or the importance of oil and gas development. The GWPC's document comparing state regulations concludes that "[s]tate oil and gas regulations are adequately designed to directly protect water resources."[62] Separately, the GWPC also has issued a resolution opposing federal regulation of the fracturing process.[63] The IOGCC's information page on state regulations, in turn, contains a link stating: "Why Environmentalists Should Support Oil Exploration in Alaska's Arctic Waters."[64] These normative statements detract from the value of the information provided, threatening to turn away certain users and, in some cases, potentially mis-portray the effectiveness of regulation based on the organization's political mission. The same risk, of course, attaches to nongovernmental organization (NGO) websites that describe state regulations and tend to oppose oil and gas development within these same descriptive efforts.[65]

Some public-private efforts have moved beyond informational initiatives: several nonprofits and quasi-private groups recommend or suggest specific types of regulation to reduce the risks of drilling and fracturing and, in some cases, these proposals become part of regulation. Through the IOGCC charter, states historically agreed to pass basic regulations to prevent oil and gas waste in the production process and basic safety and environmental problems, including regulations to prevent excessive fire hazards at oil and

[59] *Hydraulic Fracturing*, INTERMOUNTAIN OIL AND GAS PROJECT, http://www.oilandgasbmps.org/resources/fracing.php (last visited Dec. 11, 2012).

[60] *See* Wiseman & Gradijan, *supra* note 41 (describing variations).

[61] For an initial effort to provide this type of comparison, see Wiseman & Gradijan, *supra* note 41, comparing regulations by subject matter for fifteen states in tables throughout the document.

[62] GROUND WATER PROT. COUNCIL, *supra* note 53, at 7.

[63] GROUND WATER PROT. COUNCIL, RESOLUTION 03-5: REQUESTING LEGISLATIVE CLARIFICATION OF THE DEFINITION OF "UNDERGROUND INJECTION" IN THE SAFE DRINKING WATER ACT (2003), http://www.gwpc.org/sites/default/files/Res-03-5.pdf.

[64] Interstate Oil & Gas Compact Comm'n, *supra* note 56.

[65] *See, e.g.*, *Halliburton Loophole*, EARTHWORKS, http://www.earthworksaction.org/issues/detail/inadequate_regulation_of_hydraulic_fracturing (last updated Nov. 25, 2012).

gas sites and conserving oil and gas.[66] And under a more modern initiative, the GWPC has advocated against the use of diesel fuel in fracturing,[67] although the EPA, which has rare authority in this area, has not banned it.[68] The Secretary of Energy Advisory Board's Natural Gas Subcommittee, convened by the Secretary of Energy and including professors, environmental group representatives, and energy research groups,[69] similarly recommended banning the use of diesel in fracturing and suggested a number of other needed regulatory improvements in two reports issued in 2011.[70]

The State Review of Oil and Natural Gas Environmental Regulations (STRONGER)—a collaboration of state agency members, environmental NGOs, and industry representatives[71]—has larger sets of guidelines that encourage the proper disposal of oil and gas wastes.[72] Working from these guidelines, the organization voluntarily reviews state oil and gas regulatory programs to make recommendations for improvements.[73] The organization recently updated its guidelines to include fracturing-specific standards[74] and has reviewed a number of state hydraulic fracturing programs.[75] The organization often provides recommendations for substantive regulatory change after its review. In Louisiana, for example, STRONGER noted that the state lacked specific

[66] *See Interstate Oil and Gas Commission Charter*, INTERSTATE OIL AND GAS COMPACT COMMISSION, http://www.iogcc.state.ok.us/charter (last visited Nov. 25, 2012).

[67] GROUND WATER PROT. COUNCIL, RESOLUTION 02-2: CONCERNING THE USE OF DIESEL FUEL IN FRACTURING FLUIDS IN UNDERGROUND SOURCES OF DRINKING WATER (2002), http://www.gwpc.org/sites/default/files/Res-02-2.pdf.

[68] ENVTL. PROT. AGENCY, PERMITTING GUIDANCE FOR OIL AND GAS HYDRAULIC FRACTURING ACTIVITIES USING DIESEL FUELS – DRAFT: UNDERGROUND INJECTION CONTROL PROGRAM GUIDANCE # 84 (2012), http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/upload/hfdieselfuelsguidance508.pdf. *But see* Mike L. Krancer, Sec'y., Penn. Dep't of Envtl. Prot., Hydraulic Fracturing: Facts, History, Context and Perspective, Presentation at the American Bar Association Section of Environment, Energy, and Resources, 20th Section Fall Meeting 5–6 (Oct. 13, 2012) (arguing that the EPA has gone too far in regulating fracturing with diesel).

[69] *Members of the Subcommittee*, NAT. GAS SUBCOMMITTEE OF THE SECRETARY OF ENERGY ADVISORY BOARD, http://www.shalegas.energy.gov/aboutus/members.html.

[70] SEC'Y OF ENERGY ADVISORY BD., SHALE GAS PRODUCTION SUBCOMMITTEE 90-DAY REPORT 24–25 (2011), http://www.shalegas.energy.gov/resources/081811_90_day_report_final.pdf; SEC'Y OF ENERGY ADVISORY BD., SHALE GAS PRODUCTION SUBCOMMITTEE SECOND NINETY DAY REPORT 4, 17 (2011), http://www.shalegas.energy.gov/resources/111811_final_report.pdf.

[71] *Our Team*, STRONGER, http://www.strongerinc.org/content/voting-members (last visited Nov. 25, 2012).

[72] *STRONGER Guidelines*, STRONGER, http://www.strongerinc.org/stronger-guidelines (last visited Nov. 25, 2012).

[73] *State Reviews*, STRONGER, http://www.strongerinc.org/process (last visited Nov. 25, 2012).

[74] Memorandum from the STRONGER Board to Pers. Interested in the Hydraulic Fracturing Guidelines (Feb. 8, 2010), http://67.20.79.30/sites/all/themes/stronger02/downloads/HF%20Guideline%20Web%20posting.pdf.

[75] *Past Reviews*, STRONGER, http://www.strongerinc.org/past-reviews (last visited Nov. 25, 2012).

standards for the cementing of liners into wellbores that would be fractured and thus would experience higher pressures inside the well.[76] Adequate cementing of liners into the well is necessary to prevent wells from leaking oil, gas, or other substances into groundwater, but so far, the state has only updated its disclosure requirements in response to the STONGER review.[77] The American Petroleum Institute also has a variety of drilling and fracturing standards, best management practices, and guidelines[78] that some states have selectively incorporated into regulation,[79] and the Society of Petroleum Engineers has partnered with industry, government officials, and environmental groups to identify the risks of fracturing through organized "summits" of experts.[80] The GWPC has similarly organized forums on identifying risks and developing best practices in fracturing,[81]

These private and quasi-private efforts of course fail to address all of the potential risks of tight oil and gas development. Their guidelines, resolutions, and summits do not cover all of the chemicals used in drilling and fracturing, and they may miss or ignore many other relevant stages of well development.[82] Further, even for the risks identified through private and quasi-private initiatives, regulators have not always responded.[83]

In some cases, deficiencies in public-private efforts to encourage better regulation

[76] STRONGER, LOUISIANA HYDRAULIC FRACTURING STATE REVIEW 12 (2011), *available at* http://dnr.louisiana.gov/assets/OC/haynesville_shale/071311_stronger_review.pdf ("The review team recommends that the Office of Conservation develop casing standards to meet anticipated pressures and protect other resources . . . .").

[77] *See DNR Office of Conservation Adopts New Regulation for Hydraulic Fracture Operations in Louisiana*, LA. DEPARTMENT OF NAT. RESOURCES (Oct. 20, 2011) (showing that the new rule requires operators to acquire a work permit and disclose chemicals and that the rule was recommended in a STRONGER review); *See also* LA. ADMIN. CODE tit. XIX, § 118 (Westlaw 2012).

[78] *See* AM. PETROL. INST., OVERVIEW OF INDUSTRY GUIDANCE/BEST PRACTICES ON HYDRAULIC FRACTURING, http://www.api.org/~/media/Files/Policy/Exploration/Hydraulic_Fracturing_InfoSheet.pdf (pointing readers to several API documents containing guidelines and standards); *API - Drilling Collection*, IHS, http://www.ihs.com/products/industry-standards/org/api/drilling/index.aspx (last visited Dec. 11, 2012) (listing documents containing numerous drilling standards and recommended practices).

[79] *See, e.g.*, MD. CODE REGS. 26.19.01.10(P) (Westlaw 2012) (requiring API Class A cement); 25 PA. CODE § 78.85 (2011) (requiring surface casing cement "that meets or exceeds the ASTM International C 150, Type I, II or III Standard or API Specification 10"); W. VA. CODE R. § 35-4-11.5 (requiring "American Petroleum Institute Class A Ordinary Portland cement"); WYO. OIL & GAS CONSERVATION COMM'N, GUIDELINE FOR SPILL CLEANUP (2002), *available at* http://wogcc.state.wy.us/craig/spill.htm (requiring operators to follow API's "contaminated soil remediation ranking system" for certain spills).

[80] SOC'Y OF PETROL. ENG'RS, WHITE PAPER ON SPE SUMMIT ON HYDRAULIC FRACTURING 1, 5–6 (2011).

[81] *See, e.g.*, *Two National Water Events... ONE GREAT LOCATION!*, GROUND WATER PROT. COUNCIL, http://www.gwpc.org/sites/default/files/events/AF12_Agenda_Dev_0917.pdf (last visited Nov. 25, 2012) (agenda for an industry-sponsored event, showing best practices panels).

[82] *See* Wiseman, *supra* note 51.

[83] *See generally* Wiseman, *supra* note 5 (arguing that regulatory responses to certain risks have been inadequate).

may be offset by industry efforts at self-regulation. The American Petroleum Institute's (API) detailed guidelines[84] for drilling and fracturing may be very effective if consistently followed, for example. Some companies are also commencing substantive initiatives to use fewer toxic chemicals in fracturing, which may result from efforts to improve public image[85] and save money.[86] The program of one large energy actor "calls for the elimination of any additive not critical to the successful completion of the well" and "determines if greener alternatives are available for all essential additives."[87] Other companies have developed "low-footprint" fracturing operations that use less surface area and have implemented zero spill technology to avoid surface pollution during drilling and fracturing.[88]

All of these public-private efforts toward sharing regulatory information, suggesting better regulation, and developing industry best-practices are valuable but may fail to address all of the risks. Substantive efforts to self-regulate are voluntary, meaning that members may ignore best practices without penalty. These efforts also may be influenced by a strong interest, shared by industry and many state regulators, to keep

[84] AM. PETROL. INST., HYDRAULIC FRACTURING OPERATIONS—WELL CONSTRUCTION AND INTEGRITY GUIDELINES (2009), *available at* http://www.api.org/~/media/Files/Policy/Exploration/API_HF1.pdf; AM. PETROL. INST., WATER MANAGEMENT ASSOCIATED WITH HYDRAULIC FRACTURING (2010), *available at* http://www.api.org/~/media/Files/Policy/Exploration/HF2_e1.pdf; AM. PETROL. INST., PRACTICES FOR MITIGATING SURFACE IMPACTS ASSOCIATED WITH HYDRAULIC FRACTURING (2011), *available at* http://www.api.org/~/media/Files/Policy/Exploration/HF3_e7.pdf.

[85] See *supra* note 52 for a discussion of the broader legal literature on whether information disclosure incentivizes better performance. For a literature review of profit incentives associated with greener products, which may lead to industry self-regulation and improved performance, see Susan Summers Raines & Aseem Prakash, *Leadership Matters: Policy Entrepreneurship in Corporate Environmental Policy Making*, 37 ADMIN. & SOC'Y 3, 6–7 (2005).

[86] *See, e.g.* Erica Gies, *Race Is On to Clean Up Hydraulic Fracturing*, N.Y. TIMES (Dec. 4, 2012), http://www.nytimes.com/2012/12/05/business/energy-environment/race-is-on-to-clean-up-hydraulic-fracturing.html?src=recg (describing water as an emerging risk in the industry and how entrepreneurial firms have proposed less toxic fluids that could be more easily recycled at multiple wells).

[87] *Green Frac*, CHESAPEAKE ENERGY, http://www.chk.com/environment/drilling-and-production/pages/green-frac.aspx (last visited Nov. 25, 2012).

[88] *See* James Slutz, President and Managing Dir., Global Energy Strategies, LLC, Presentation to the Asan Institute for Policy Studies (Jan, 11, 2013) (on file with Author) (describing Halliburton's efforts to limit the number of surface tanks and other equipment needed and to increase their density and describing zero spill technologies such as "Kelly Kan"); Press Release, Halliburton, El Paso and Halliburton Pioneer the First Natural Gas Completion Using All Current Cleansuite™ "Green Technologies" for Hydraulic Fracturing and Water treatment (May 2, 2011), http://www.halliburton.com/public/news/pubsdata/press_release/2011/corpnws_050211_1.html?SRC=ElPasoandHalliburton; HALLIBURTON, MANUFACTURING APPROACH TO FRACTURING LIMITS ENVIRONMENTAL IMPACT 22 (2006), http://www.halliburton.com/public/pe/contents/Papers_and_Articles/web/A_through_P/FracFactory.pdf (noting techniques such as drilling wells in clusters and installing portable fracturing technologies in order to reduce environmental impact).

regulation at the state level.[89] And in the case of industry efforts, profit motives could potentially dampen best practices aimed to reduce environmental risks. Despite all of these drawbacks, public-private efforts beyond chemical disclosure in tight oil and gas development seem to be expanding the regulatory information available to the public, reducing the use of certain chemicals, and potentially lowering certain development risks.

IV. Lessons for Future Fracturing Regulation

The industry's information-based and substantive efforts in the drilling and fracturing area, coupled with formal public requirements, are interesting variations on several familiar themes, including new governance and voluntary improvement of environmental performance. This Part briefly explores how the evolution of disclosure laws and some substantive standards in drilling and fracturing may fit within these themes, and how further improvements will be needed to ensure effective regulation of oil and gas development through a combination of public and private controls.

A. Collaborative Governance

A broad environmental literature, and ever-growing scholarship within the field of new governance, has noted a move away from public law as we traditionally understand it. Whereas scholars previously envisioned legislatures and agencies implementing top-down, mandatory statutes and regulations to control various risks, many now understand the regulatory process as a more complex endeavor, involving multiple stakeholders in forming and implementing regulation. As Professor Bradley Karkkainen explains, new governance moves us "away from the familiar model of command-style, fixed-rule regulation by administrative fiat, and toward a new model of collaborative, multi-party, multi-level, adaptive, problem-solving."[90] This builds from, among other foundations, Jody Freeman's model of collaborative governance, which requires a "problem-solving orientation" focused on "solving regulatory problems; "[p]articipation by interested and affected parties in all stages of the decisionmaking process"; a view of rules as temporary, not fixed solutions; accountability of all parties to each other, including public and private parties; and a flexible agency that convenes negotiations among stakeholders and developers solutions based on participant contributions.[91]

In the environmental realm, one of the most common examples of new governance is Project XL, in which industry actors could avoid federal environmental regulation by showing that they had implemented alternative methods to achieve superior environmental protection.[92] Other examples come from rule*making* rather than rule

[89] *See* Wiseman, *supra* note 51.

[90] Bradley C. Karkkainen, *"New Governance" In Legal Thought and in the World: Some Splitting as Antidote to Overzealous Lumping*, 89 MINN. L. REV. 471, 473 (2004).

[91] Jody Freeman, *Collaborative Governance in the Administrative State*, 45 UCLA L. Rev. 1, 22 (1997).

[92] *See* Dennis D. Hirsch, *Project XL and the Special Case: The EPA's Untold Success Story*, 26

application. Through negotiated rulemaking, or reg-neg, agencies involve regulated actors and concerned parties more closely in the rule drafting process, often arriving at consensus standards.[93] Stakeholders share information about actual risks and industry's approaches to them, debate the merits of these approaches, and, if successful, arrive at a rule that better encompasses genuine concerns and does so in an effective and cost-efficient manner.[94]

Public-private efforts to improve environmental performance in drilling and fracturing exhibit several traits of potentially successful collaborative governance strategies. Industry's FracFocus website appears to have influenced the content of many state disclosure rules; even if formal negotiated rulemaking did not occur within these rulemaking processes,[95] state environmental and oil and gas agencies clearly took into account the FracFocus disclosure requirements and often incorporated them into disclosure requirements. This is important, in that agencies at least indirectly considered regulated actors' views about reasonable disclosure and, perhaps, what industry believed was most effective at informing the public.[96] In enacting disclosure laws, some states also specifically addressed recommendations by STRONGER.[97] Furthermore, many state disclosure rules are intentionally impermanent, with Colorado allowing disclosure on

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COLUM. J. ENVTL. L. 219, 223–25 (2001).

[93] Freeman, *supra* note 91, at 22–24.

[94] Freeman, *supra* note 91, at 50–52.

[95] More investigation into the decisionmaking processes behind agency disclosure rules will be required to determine the extent to which collaborative governance occurred, if at all. Many states engaged in traditional notice and comment rulemaking and held public hearings on proposed rules. *See, e.g.*, Mont. Dep't of Natural Res. & Conservation Bd. of Oil & Gas, Transcript of Public Hearing (June 23, 2011), http://bogc.dnrc.mt.gov/PDF/Hydraulic%20Fracturing%20Rule%20Hearing06152011.pdf; Mont. Dep't of Natural Res. & Conservation Bd. of Oil & Gas, Written and E-mailed Public Comments, http://bogc.dnrc.mt.gov/PDF/CombinedComments.pdf; R.R Comm'n of Tex., 16 TAC Chapter 3-Oil and Gas Division, http://www.rrc.state.tx.us/rules/signed-adopt-3-29-Dec13-2011.PDF (showing nine written comments from environmental groups and industry and describing additional comments from a public hearing).

[96] *See, e.g. Apache Supports Full Disclosure of Hydraulic Fracturing Information*, APACHE CORPORATION, http://www.apachecorp.com/News/Articles/View_Article.aspx?Article.ItemID=2554 (last visited Dec. 10, 2012) (suggesting that FracFocus was "designed to provide easy access by non-technical users").

[97] *See* Hydraulic Fracture Stimulation Operations, 37 La. Reg. 3064 (Oct. 20, 2011) (codified at LA. ADMIN. CODE tit. 43, pt. XIX, § 118), *available at* http://www.doa.louisiana.gov/osr/reg/1110/1110.pdf (introducing a rule with disclosure requirements for fracturing chemicals and pressures, indicating that "a review of Office of Conservation policies and regulations associated with the hydraulic fracturing process was conducted by the non-profit, multi-stakeholder organization, STRONGER, Inc. to assess the effectiveness and adequacy of current regulations. Their report . . . recommended some of the changes in this amendment."); STRONGER, LOUISIANA HYDRAULIC FRACTURING STATE REVIEW 14 (2011), *available at* http://dnr.louisiana.gov/assets/OC/haynesville_shale/071311_stronger_review.pdf ("The review team recommends that reporting should include the identification of materials used, aggregate volumes of fracturing fluids and proppant used, and fracture pressures recorded.").

FracFocus but only if the website eventually allows individuals to search by certain criteria.[98]

Despite these promising developments, there are important limitations in states' reliance on industry suggestions for disclosure. As introduced in Part II, all disclosure rules—with the exception of Texas (if appeals of trade secret status are successful), and possibly West Virginia[99]—appear to allow those reporting chemical use to retain trade secret status for chemicals,[100] and industry actors that can hide the identity of certain toxic substances may have few incentives to stop using these substances. Further, in crafting disclosure regulations, states may have ignored other important information that should be disclosed but has not been prioritized by industry, such as the type of soil at the well site, whether the site is above an aquifer or near surface water, and other environmental indicators that would determine the impact of the chemical if it spilled or leaked from the well.[101]

In the substantive realm, efforts by state regulators and industry to work together to identify risks, write guidelines, and propose regulatory changes have been impressive, although not comprehensive. Yet even agreed-upon suggestions for improved performance have not morphed into regulation in some cases, with the EPA rejecting the GWPC's proposal to ban diesel in fracturing, for example.[102] In sum, public-private efforts toward improving both information disclosure and drilling and fracturing practices have been important yet have occurred in a piecemeal fashion, and they are likely inadequate to fully address risks. More consistent efforts to compare gaps among states and regulatory change in response to suggestions from STRONGER, industry groups, scientists, and other stakeholders will be needed.

B. Voluntary Improvement of Environmental Performance

In another area of the literature that recognizes that command and control regulation is not in all cases the only means of achieving sound environmental performance, scholars have noted a variety of mechanisms that may drive industries to self-regulate or over-perform on a broad set of environmental measures. Professors Daniel Esty, Peter Appel, Dennis Hirsch and other environmental and administrative law scholars have pioneered this field, observing that sheer profit incentives,[103] as well as

[98] *See supra* text accompanying note 45.

[99] *See* source cited *supra* note 39.

[100] *See* source cited *supra* note 47.

[101] FracFocus disclosures do not include this information. *See, e.g.*, Hydraulic Fracturing Fluid Product Component Information Disclosure API Number 4212134065, Denton County (Sept. 14, 2011) (on file with author).

[102] *See* GROUND WATER PROT. COUNCIL, *supra* note 67.

[103] *See, e.g.*, Nicole Darnall et al., *Sponsorship Matters: Assessing Business Participation in Government- and Industry-Sponsored Voluntary Environmental Programs*, 20 J. PUB. ADMIN. RES. & THEORY 283, 284 (2009), *available at* http://mason.gmu.edu/~ndarnall/docs/sponsorship_matters.pdf (describing "voluntary environmental programs" under which "[i]n return for incurring private costs for

regulatory programs that encourage innovation, can inspire self-driven improvement. As Professor Appel notes, environmental problems are caused largely by corporate actors that generate externalities—many of which are diffuse and not immediately recognizable.[104] Yet corporations, including management and stockholders, can benefit immensely from improvements in environmental performance, and the challenge lies in creating the right incentives to encourage voluntary improvements.[105] Information disclosure regimes,[106] or requirements for enhanced technological monitoring of pollution,[107] could improve performance simply by embarrassing industry actors, or by creating better-informed regulation. Threats of regulation also may work by incentivizing industry to prove sound environmental performance and preempt the need for regulation,[108] while some corporations may reduce pollution or other environmental harms in response to shareholder concerns—or at least pretend to take such efforts.[109]

Industry actors, by voluntarily disclosing information about chemicals used at well sites, appear to have stepped up pressure on nonconforming actors, challenging them to follow the emerging norm of transparency. Industry—likely in part due to threats of regulation,[110] and in part due to public and peer pressure[111]—has voluntarily disclosed the

adopting . . . beyond-compliance policies, organizations can receive benefits such as goodwill from the external stakeholders, enhanced reputation, and improved external relations"); DANIEL C. ESTY & ANDREW S. WINSTON, GREEN TO GOLD: HOW SMART COMPANIES USE ENVIRONMENTAL STRATEGY TO INNOVATE, CREATE VALUE, AND BUILD COMPETITIVE ADVANTAGE 3 (2006) (explaining that "leading companies have learned to manage environmental risks and costs as closely as they do other risks and costs" and have accordingly reduced "the risk to the whole enterprise").

[104] Peter A. Appel, *Improving Corporate Environmental Performance: Encouraging Sustainable Commerce through Regulatory and Other Governmental Action*, (Univ. of Oslo Faculty of Law, Research Paper No. 2011-27, 2011), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1924808.

[105] *See* Dennis D. Hirsch, *Green Business and the Importance of Reflexive Law: What Michael Porter Didn't Say*, 62 ADMIN. L. REV. 1063, 1069 (2010) (describing the importance of "reflexive law," including "legal standards and regulatory policies that push private firms to: (1) internalize social goals (e.g., environmental performance goals) and adopt them as their own, and (2) creatively self-manage their operations so as better to achieve those goals" and providing examples, including requirements for "information disclosure, stakeholder involvement, and planning requirements").

[106] *See id*.

[107] *See* Daniel C. Esty, *Environmental Protection in the Information Age*, 79 N.Y.U. L. REV. 115 (2004) (explaining how enhanced technologies for sensing resource use and pollution can both improve decisionmaking and incentivize better industry performance); *supra* note 52 (identifying other prominent legal scholars who have argued that information incentivizes better performance).

[108] *See* Raines & Prakash, *supra* note 85 (summarizing the literature on firms' "incentives to self-regulate to forestall mandatory regulation").

[109] *See id*.

[110] The GWPC, which helped to form FracFocus, has argued against federal regulation. Scott Kell, President, Ground Water Prot. Council, Statement to House Subcommittee on Energy and Mineral Resources (June 4, 2009), *available at* http://www.dec.ny.gov/docs/materials_minerals_pdf/ogsgeisapp2.pdf (arguing that "[a] one-size-fits-all federal program is not the most effective way to regulate in this area").

[111] Many of the public demands for regulation of hydraulic fracturing have specifically addressed

chemicals that it uses at thousands of well sites[112] and has initiated efforts to employ less toxic fracturing chemicals and other environmentally beneficial practices.[113] And as discussed in Part II, many states have implemented mandatory disclosure regimes that rely on FracFocus. Under a metric that, in another context, Professor Karkkainen believes is important for enhancing substantive performance through regulation, the information collected allows direct comparison of environmental performance;[114] chemicals used are reported in the same units of volume,[115] and news reporters and other groups have begun to use the information to suggest areas where risk remains.[116]

As shown by private and quasi-private efforts toward informational and substantive changes in tight sands and oil and gas development, not all private initiatives lead to regulatory change. In some cases, this may be acceptable both from a risk and an efficiency perspective. If all companies followed a full suite of best practices, in which an industry leader verified compliance, then regulation might not be necessary. Similarly, if governments converted every voluntary agency initiative, such as FracFocus, into regulation, they might stifle industry innovation.

To the extent there remain risks from handling chemicals and engaging in the many stages of tight oil and gas development, however, public agencies need to become more proactive. In many cases, the oil and gas industry itself may be unaware of the risks as the scale of oil and gas drilling dramatically rises in certain regions and fracturing is used more frequently;[117] this uncertainty[118] will limit the effectiveness of self-regulation that might reduce the risk of pollution liability and other threats to a company's value. States and the federal government, also operating under uncertainty, need to expand efforts to work collaboratively with stakeholders, including industry, scientists, and nonprofit groups to conduct risk assessments and identify regulatory needs. If borrowing from industry efforts to substantively improve performance, states must ensure that they

chemical disclosure. *See, e.g.*, Mont. Dep't of Natural Res. & Conservation Bd. Of Oil & Gas, Written and E-mailed Public Comments*, supra* note 95, at 1 ("I want to know what is in the chemicals as they will end up in my food and water."); *id*. at 2 ("The chemical information for any fracturing fluids used needs to be easily accessible by the public in a common area such as the Board of Oil and Gas Conservation website."); *id*. at 4 ("We feel it is imperative that if there is to be any fracking in our vicinity there is full disclosure of chemicals being used in this process.").

[112] *See supra* note 21 and accompanying text.

[113] *See supra* notes 87–88 and accompanying text.

[114] Karkkainen, *supra* note 52*,* at 260–61.

[115] Reporting is in maximum ingredient concentration (% by mass). *See supra* note 101.

[116] *See, e.g.*, Mike Soraghan, *Diesel Still Used to "Frack" Wells, FracFocus Data Show*, E&E PUBLISHING, LLC. (Aug. 17, 2012), http://www.eenews.net/public/energywire/2012/08/17/1 ("Diesel fuel has been used to 'frack' at least 138 wells in the United States in the past year and a half, according to data filed by drillers with the FracFocus.org registry.").

[117] *See* U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 10 (concluding that the risks cannot currently be quantified).

[118] *See id.*

are not boxed in by the approach chosen by industry. The solution first implemented often becomes the long-term solution, yet it may not be the best one. Although FracFocus encourages energy companies to disclose a variety of information types, for example—from the volume of water used at each well to the names and types of chemicals—it does not have a space for describing the natural resources near the well site or soil conditions on the site, which could substantially influence the impact of a chemical spill.

Finally, agencies that incorporate industry standards into regulation must modify these standards to incorporate the views of non-industry actors. Public regulations, as opposed to best practices, exist for several reasons: they balance a number of interests, including public demands for environmental and public health protection and industry demands for efficiency; they often incorporate scientific data and careful calculations of costs and benefits; and they are mandatory. Generally, public regulations encourage all members of an industry to act consistently and thus to achieve the overall goal of the regulation, such as a maximum level of contaminants in air or water. While industry often holds the most technical knowledge in oil and gas, and thus is a key actor within the regulatory process, it is not and should not be the only voice that influences regulation.

Conclusion

As tight oil and gas development continues its rapid march toward domination of the U.S. energy market, both industry and government actors—often working in concert—are responding in a variety of ways. This Essay has introduced several of the private and public-private efforts to address the risks of this development and appease public concerns. One of the most successful efforts to date has involved the expansion of chemical disclosure, with voluntary industry efforts morphing into state regulations that require disclosure through a public-private website.

Similar initiatives have emerged in more substantive areas. Private and public-private efforts to disseminate information about the content of state oil and gas regulations have provided useful, although incomplete, means of comparing regulatory content. Similar efforts to identify risk and propose improved regulation—although not always implemented—also appear to be somewhat successful. And finally, private best practices provide some industry self-regulation of risks.

More action, both at the public and private levels and the grayer areas between them, will be needed to address the range of impacts introduced by a rapidly growing industrial practice. Local, state, and federal agencies implementing further change must account for and in some cases formalize the private progress already occurring, while recognizing that such action could disincentivize future industry efforts. At the same time, private actors seeking public acceptance of tight oil and gas would be wise to further improve information dissemination and show the extent to which industry actors follow the many best practices that already have been developed. Disclosure is a very important start, but much more collaborative work remains to be done.