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Fracking and the Rural Poor: Negative Externalities, Failing Remedies, and Federal Legislation

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Introduction

Hydraulic fracturing[1] may have a bright future, but many Americans are stuck in its shadow. For all of fracking's potential to provide jobs and energy, its current operations are imperfect. Pollution, adverse health effects, erosion, seismic activity, and water contamination have all been linked to fracking activities.[2] Much of this country's fracking occurs in poorer, rural areas, and the centralization of fracking's ills in these locales raises environmental justice concerns. As the rural poor often have limited access to legal assistance, the regulation of fracking should ensure an equitable balance between protecting their interests and promoting a healthy energy industry.

This Note first argues that the lower class is burdened with the lion's share of fracking's negative externalities. It then asserts that comprehensive federal regulation is needed, as current legal remedies are insufficient to internalize these costs. This Note (1) describes the negative externalities of fracking; (2) shows how they disproportionately affect members of the lower class; (3) evinces the failures of current legal regimes; and (4) explains how federal legislation can help internalize fracking's negative externalities. This Note is *not* a comparison of the benefits and detriments associated with fracking, and it does *not* take a position on

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1. This note refers to hydraulic fracturing as "fracking," one of the process's many short-hands.

2. *See, e.g.*, N.Y. Dep't of Health, A Public Health Review of High Volume Hydraulic Fracturing for Shale Gas Development 4 (2014); Hannah J. Wiseman, *Risk and Response in Fracturing Policy*, 84 U. Colo. L. Rev. 729, 736 (2013).

the merits of fracking. It simply recognizes the negative externalities present in fracking operations and proposes a legal framework for internalization that is fair to both the gas industry and the American people.

I. Hydraulic Fracturing and Its Negative Externalities

A. Background on Hydraulic Fracturing

Fracking is a method of oil and natural gas extraction used in low-permeability rock formations such as shale and coal.[3] It has succeeded conventional drilling techniques in areas with these geological characteristics. Fracking injects highly pressurized fluid composed of water, sand, and chemicals into rock formations.[4] The pressure cracks the formations, and the sand acts as a proppant.[5] The sand holds the microfissures open and allows petroleum products to flow to the production well.[6] This technique extracts resources that are referred to as "unconventional," because they are located in formations that were previously inaccessible.[7] The integration of horizontal drilling[8] and fracking is responsible for the recent boom in natural gas extraction,[9] and the increase in estimated U.S. oil and natural gas reserves.[10] The U.S. Energy Information Administration estimated that natural gas extracted by fracking will double in the next decade[11] and that it will account for approximately eighty percent of all domestic natural gas development within that time.[12]

B. Hydraulic Fracturing Creates Negative Externalities

A negative externality is a cost imposed on someone external to an activity rather than on the parties that decided to engage in the activity. In the present context, neighbors of landowners who engage in fracking are burdened with harms from the activity. Many of the negative externalities from fracking are associated with

3. Richard K. Lattanzio, Cong. Research. Serv., R42833, Air Quality Issues in Natural Gas Systems 1 (2013).
4. U.S. Dep't of Energy, Modern Shale Gas Development in the United States: A Primer ES-4 (2009), http://energy.gov/sites/prod/files/2013/03/f0/ShaleGasPrimer_Online_4-2009.pdf.
5. *Id.*
6. *Id.*
7. *See* Cong. Research. Serv., R42833 at 1−2.
8. This technique allows well operators to drill horizontally and to expand the area reached by fracking operations for a single well.
9. *See* Cong. Research. Serv., R42833 at 1.
10. *Id.*
11. U.S. Energy Info. Admin., Annual Energy Outlook 2013 with Projections to 2040, at 74 (2013).
12. Cong. Research. Serv., R42833 at 1.

three main categories of pollution: water, air, and land. Each devalues affected properties[13] and has the potential to cause adverse health effects.[14] For example, a study in rural Colorado analyzed 124,842 births from 1996 to 2009 and found that newborns from houses closest to natural gas operations had a thirty percent increase in congenital heart conditions.[15] The newborns' chance of developing neural tube defects also increased by one hundred percent.[16]

i. Water Contamination

Water contamination can result when fracking causes methane, sediment, or fracking fluid to migrate into an aquifer space.[17] Methane contamination is responsible for the often-televised footage of individuals lighting their tap water on fire,[18] and sediment-filled drinking water is equally unpotable. A study of fracking communities in Appalachia found methane in eighty-two percent of drinking water samples and found that concentrations of methane and ethane were six times and twenty-three times higher in homes close to natural gas wells, respectively.[19]

Fracking fluid has the potential to contaminate sources of drinking water. Of the two to four million gallons of fracking fluid injected underground during the fracking process,[20] only fifteen to twenty percent returns to the surface as "produced water" or "flowback."[21] The remainder is left underground, and significant disagreement exists regarding where these millions of gallons go

13. *See* BBC Research & Consulting, *Measuring the Impact of Coalbed Methane Wells on Property Values* 1−2 (Nov. 12, 2001) (BBC Research & Consulting, Working Paper), http://www.bbcresearch.com/reports/Impact%20of%20Coalbed%20Methane%20Wells%20on%20Property%20Values.pdf.

14. *See* Theo Colborn, Carol Kwiatkowski, Kim Schultz & Mary Bachran, *Natural Gas Operations from a Public Health Perspective*, 17 Hum. & Ecological Risk Assessment 1039, 1039 (2011), http://cce.cornell.edu/EnergyClimateChange/NaturalGasDev/Documents/PDFs/fracking%20chemicals%20from%20a%20public%20health%20perspective.pdf.

15. Lisa M. McKenzie, Ruixin Guo, Roxana Z. Witter, David A. Savitz, Lee S. Newman & John L. Adgate, *Birth Outcomes and Maternal Residential Proximity to Natural Gas Development in Rural Colorado*, 122 Envtl. Health Persp. 412 (2014).

16. *Id.* at 414.

17. *See*, N.Y. Dep't of Health, *supra* note 2, at 5; Wiseman, *supra* note 2, at 736.

18. *See* GasLand (HBO television broadcast 2010).

19. Robert B. Jackson, Avner Vengosh, Thomas H. Darrah, Nathaniel R. Warner, Adrian Down, Robert J. Poreda, Stephen G. Osborn, Kaiguang Zhao & Johnathan D. Karr, *Increased Stray Gas Abundance in a Subset of Drinking Water Wells Near Marcellus Shale Gas Extraction*, 110 Proc. Nat'l Acad. Sci. 11250, 11250 (2013).

20. U.S. Dep't of Energy, *supra* note 4, at ES-4.

21. Ohio Dept. of Nat. Res., Wastewater (Flowback) from Hydraulic Fracturing, http://oilandgas.ohiodnr.gov/portals/oilgas/pdf/Wastewater-flowback.pdf.

after they are pumped deep into the earth.[22] This fluid contains thousands of chemicals, some of which are known toxins and carcinogens.[23] These chemicals have contaminated drinking water supplies in multiple fracking areas,[24] and there is a growing body of evidence that links the contamination to fracking activity.[25]

ii. Air Contamination

Noxious fumes are the second category of negative externalities from fracking sites. They come from fugitive vapors, onsite natural gas combustion, onsite combustion of other fuels, and discharges of particulate matter from associated operations.[26] Common sources of emissions include "pad, road, and pipeline construction; drilling, completion, and flowback activities that occur during the development of a well; and gas processing and transmission equipment such as controllers, compressors, dehydrators, pipelines, and storage vessels."[27] These emissions release methane, volatile organic compounds, nitrogen oxides, sulphur dioxide, particulate matter, n-hexane, benzene, toluene, ethybenzene, xylene, and hydrogen sulphide,[28] all of which are harmful to humans.[29]

Various fracking practices pose a health risk to humans because they release compounds that cause smog, also known as ozone.[30] Flowback is often left in open-air pits to evaporate, which releases harmful volatile organic compounds into the air.[31] These volatile organic compounds react with sunlight and nitrogen oxides—

22. *See* Abrahm Lustgarten, *New Study: Fluids from Marcellus Shale Likely Seeping into PA Drinking Water*, ProPublica (July 9, 2012, 1:00 PM), http://www.propublica.org/article/new-study-fluids-from-marcellus-shale-likely-seeping-into-pa-drinking-water.

23. Colborn et al., *supra* note 14.

24. *See, e.g.*, Amy Mall, *Incidents Where Hydraulic Fracturing is a Suspected Cause of Drinking Water Contamination*, Nat. Res. Def. Council Staff Blog (Feb. 28, 2014), http://switchboard.nrdc.org/blogs/amall/incidents_where_hydraulic_frac.html.

25. *See, e.g.*, Dominic C. DiGiulio, Richard T. Wilkin, Carlyle Miller & Gregory Oberley, U.S. E.P.A., Draft: Investigation of Ground Water Pollution Near Pavillion, Wyoming, at xiii (Dec. 2011), http://www2.epa.gov/sites/production/files/documents/EPA_ReportOnPavillion_Dec-8-2011.pdf ("[W]hen considered together with other lines of evidence, the data indicates likely impact to groundwater can be explained by hydraulic fracturing.").

26. Richard K. Lattanzio, Cong. Research. Serv., R42833, Air Quality Issues in Natural Gas Systems 5 (2013).

27. *Id.*

28. *Id.*

29. Colborn et al., *supra* note 14.

30. *See* Cong. Research. Serv., R42833 at 9; Mead Gruver, *Wyoming's Natural Gas Boom Comes with Smog Attached*, Associated Press (Mar. 9, 2011, 12:54 PM), http://www.nbcnews.com/id/41971686#.Us2yDGRDseU.

31. *See* Wiseman, *supra* note 2, at 766; Dangers of Fracking, http://www.dangersoffracking.com (April 22, 2015).

which is also released by fracking—to produce ozone.[32] Breathing ozone can cause a variety of health problems and can have harmful effects on sensitive vegetation and ecosystems.[33] Fracking in rural areas has caused dangerous local levels of ozone so high that they exceeded levels found in America's most polluted cities.[34] For example, fracking operations in Wyoming's Upper Green River Basin caused ozone spikes in January 2010 that exceeded the worst ozone levels found in Los Angeles during the prior year.[35] Additionally, a study found that thirty-nine percent of residents in southern Pennsylvania who lived within one kilometer of fracking operations developed upper-respiratory problems compared to eighteen percent of residents who lived more than two kilometers away.[36]

iii. Land Contamination

Land contamination is the third main category of negative externalities from fracking. Leakages on fracking sites have contaminated neighboring lands with toxins,[37] and examples of these events include breaches of flowback holding ponds, spillage of chemicals during the fracking process, intentional dumping, and toxic runoff.[38] These contaminations have caused vegetation loss,[39] fish kills,[40] and other property damage.[41] The various adverse health effects associated with human exposure to leaked fracking chemicals include upper respiratory irritation, burning of the eyes, nausea, abdominal pain, rashes, nosebleeds, and headaches.[42]

II. Hydraulic Fracturing Disproportionately Impacts the Rural Poor

The negative externalities from hydraulic fracturing disproportionately burden members of lower socioeconomic classes. Fracking operations are

32. *See* Cong. Research. Serv., R42833 at 10; *Ground Level Ozone*, EPA, http://www.epa.gov/groundlevelozone/ (last updated Dec. 23, 2014).
33. *Ground Level Ozone*, *supra* note 32.
34. *See* Gruver, *supra* note 30.
35. *Id.*
36. Peter M. Rabinowitz, Ilya B. Slizovskiy, Vanessa Lamers, Sally J. Trufan, Theodore R. Holford, James D. Dziura, Peter N. Peduzzi, Michael J. Kane, John S. Reif, Theresa R. Weiss & Meredith H. Stowe, *Proximity to Natural Gas Wells and Reported Health Status: Results of a Household Survey in Washington County, Pennsylvania*, 123 Envtl. Health Persp. 21, 21 (2015).
37. *See* Wiseman, *supra* note 2, at 766−68.
38. *Id.*
39. *Id.* at 766−67.
40. Diana M. Papoulias & Anthony L. Velasco, *Histopathological Analysis of Fish from Acorn Fork Creek, Kentucky, Exposed to Hydraulic Fracturing Fluid Releases*, 12 Southeastern Naturalist 92, 92 (2013).
41. *See* Wiseman, *supra* note 2, at 766−67.
42. Michelle Bamberger & Robert E. Oswald, *Impacts of Gas Drilling on Human and Animal Health*, 22 New Solutions 51, 61 (2012); Colborn et al., *supra* note 14, at 1045.

predominantly performed in poor, rural areas, and the constituents of these communities bear the brunt of fracking's less-savory byproducts.[43]

Fracking operations are typically located in remote areas,[44] and many practical reasons explain this trend. It is advantageous to situate a well on rural land because it is more spacious, less burdensome, and cheaper than fracking in suburban or urban areas. Rural areas provide the significant amount of space needed for fracking operations, which can require access by hundreds of tractor-trailers. Intrinsically, there is more land per person in rural areas, and drilling rigs—along with the associated visual, auditory, and olfactory nuisances—can be situated farther from residences and other sensitive locations. This is simply not the case in suburban and urban areas, which have higher population densities and higher land values for the footprints of drilling sites. Accordingly, positioning wells in these more-populated areas would raise the cost of fracking operations.

An analysis of the primary hotbeds of fracking in the United States—the Marcellus formation beneath much of Appalachia, the Bakken formation under North Dakota, the Woodford formation underlying Oklahoma, and the Eagle Ford formation in Texas—highlight the relationship between fracking and the rural poor. Data from the U.S. Census[45] and state regulatory agencies evidence that many rural fracking areas lack the wealth of suburban and urban areas, especially prior to the fracking boom. For example, the counties with the most fracking activity in Kentucky, Virginia, Pennsylvania, North Dakota, Oklahoma, and Texas were some of the most impoverished counties in these states prior to fracking.[46]

The monetary incentive to lease land for fracking is higher for the poor in these rural areas, as their marginal utility for the signing payments and potential royalties is higher than the marginal utility of the wealthy for the same amount of money. Economic theory suggests that this incentive leads to fracking activity occurring more frequently on land owned by poorer members of these communities.[47] While some studies have found that economic conditions improve in areas where fracking is introduced,[48] these studies fail to negate the fact that the negative externalities

43. *See* N.Y. Dep't of Health, *supra* note 2, at 117 ("The health burdens of unconventional gas are likely to fall disproportionately on rural communities, the young and the elderly.").

44. 136 Cong. Rec. 35,010 (1990) (statement of Rep. Fields).

45. Data from the 2003 Small Area Income and Poverty Estimates is used as a benchmark for the conditions before the majority of fracking operations began. U.S. Census Bureau, Small Area Income and Poverty Estimates: State and County Estimates for 2003 [hereinafter 2003 Census], *available at* http://www.census.gov/did/www/saipe/data/statecounty/data/2003.html.

46. *See infra* text accompanying notes 49−56.

47. *See* Russell Gold, *The Fracking Fight's New Front Line: Cities States Begin to Limit Oil-and-Gas Drilling to Protect Residents, Scenic Areas*, Wall St. J. (June 4, 2014, 2:14 PM), www.wsj.com/articles/fracking-meets-new-resistance-from-communities-1401905185.

48. *E.g.*, Diana Furchtgott-Roth, *Can Fracking Save the U.S. Economy?*, Market Watch (Oct. 4, 2013, 6:16 AM), http://www.marketwatch.com/story/can-fracking-save-the-us-economy-2013-10-04.

from fracking are centralized in these regions and that they often burden those who do not receive economic benefits from fracking.

The localization of fracking operations in poor, rural areas is exemplified in Marcellus shale states. Virginia's three main fracking counties—Buchanan, Wise, and Dickenson—are all in the state's top ten most impoverished counties.[49] In Pennsylvania, only one of the seven counties with the most fracking wells has a poverty level above the state average, and only marginally so.[50] Of Kentucky's 120 counties, the sixteen with the most natural gas wells all fall within the state's thirty-one most impoverished counties.[51]

This trend is also seen in the Midwest, where the Bakken shale formation underlies North Dakota. The state's top four natural gas-producing counties—McKenzie, Montrail, Dunn, and Williams—rank forty-eighth, forty-seventh, thirty-ninth, and thirty third for worst poverty rates in the state, respectively.[52] In Oklahoma's Woodford formation, only one of the top five natural gas-producing counties has a poverty level above the state average; the others constitute some of the poorest in the state.[53] Even in Texas, with its unusual overlap of America's third largest landlocked shale reserve[54] and the Dallas-Fort Worth metropolis, the top four counties for natural gas production all fall in rural areas.[55] Moreover, three of these counties are in the poorest six percent of Texas's 254 counties.[56]

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49. Buchanan, Wise, and Dickenson had the ninety-fifth, ninety-first, and eighty-seventh worst poverty rates out of the ninety-five Virginian counties, respectively. *Compare* 2003 Census, *supra* note 45, *with* Va. Dep't of Mines, Minerals, & Energy, GIS Map of Virginian Gas Wells, http://dmme.virginia.gov/webmaps/DGO/.

50. The 9.7% poverty rate in Washington County, which ranked twenty-sixth out of sixty-seven Pennsylvanian counties, barely beat the state average of 10.6%. *Compare* 2003 Census, *supra* note 45, *with* FracTracker, PA Unconventional Drilled Wells, http://www.fractracker.org/downloads/.

51. *Compare* 2003 Census, *supra* note 45, *with* Ky. Div. of Oil and Gas, 2010 Gas Production Report (2010), http://oilandgas.ky.gov/Pages/ProductionReports.aspx.

52. *Compare* 2003 Census, *supra* note 45, *with* N.D. Dep't Mineral Resources, October 2013 Oil and Gas Prod. Report (2013), https://www.dmr.nd.gov/oilgas/mprindex.asp.

53. Roger Mills County had a poverty rate lower than the average in Oklahoma, whereas Latimer, Caddo, Coal, and Pittsburg counties ranked sixty-fifth, sixty-fourth, sixty-second, and forty-seventh worst, respectively, out of the seventy-seven counties in Oklahoma. *Compare* 2003 Census, *supra* note 45, *with* Okla. Corp. Comm'n, 2011 Report on Oil and Natural Gas Activity Within the State of Oklahoma (2011), http://www.occeweb.com/og/2011%20Annual%20Report.pdf.

54. The Barnett shale formation is America's third largest shale gas reserve. U.S. Energy Info. Admin., Review of Emerging Resources: U.S. Shale Gas and Oil Plays 5 (2011), http://205.254.135.7/analysis/studies/usshalegas/pdf/usshaleplays.pdf.

55. Hidalgo County, Zapata County, Webb County, and Panola County. Tex. R.R. Comm'n, Oil & Gas Production Data Query Jan. 1993 to Jan 2013, http://webapps.rrc.state.tx.us/PDQ/home.do (follow "General Production Query" hyperlink; then select "Lease," "Jan 1993" to "Jan 2013," "Gas Wells," "Statewide"; and "Submit") (last updated Jan. 17, 2015).

56. Hidalgo County, Zapata County, and Webb County. *Id.* (follow "General Production Query" hyperlink; then select "Lease," "Jan 1993" to "Jan 2013," "Gas Wells," "Statewide"; and "Submit").

The ills of natural gas operations are fractious: they are not confined to the land of a lessor. There are multiple incidences of air, water, and land contamination affecting neighboring residents.[57] While these non-lessors are exposed to the potential harms attendant to fracking, they are not entitled to the benefits granted to a lessor. A fracking operation involves quintessential negative externalities, as it is "a market production or consumption activity that reduces the wellbeing of persons, other than the producer or consumer, and those persons are not compensated for the reduction."[58]

The dynamics of compensation in fracking leases cause additional inequities. Fracking lessors are compensated for the contracted degradation of their land, and this benefit puts the leaseholders in a better position to move away from fracking's residual harms once the extraction is completed. In contrast, the surrounding community members who only receive the detriments of fracking are in a *worse* position to relocate. They miss out on the contractual benefits, and their potentially contaminated land is worth less than before the fracking operations began.[59] This is especially taxing on the many affected rural residents who are "land rich and cash poor" because fracking degrades and devalues their primary financial asset, their land.

III. The Common Law and Federal Statutes Fail to Provide Justice to Aggrieved Parties from Lower Socioeconomic Classes

The common law and current federal statutes do not afford aggrieved parties sufficient access to justice.[60] The doctrines of trespass, nuisance, negligence, and strict liability give affected individuals an inadequate avenue to compensation through the state courts.[61] The sundry federal laws that ostensibly regulate fracking similarly lack remedies for aggrieved parties in federal court.

A. The Failure of Common Law Remedies

While individuals harmed by fracking's negative externalities can bring common law tort claims against fracking companies,[62] the litigation to date shows

57. *See, e.g.*, N.Y. Dep't of Health, *supra* note 2; Amy Mall, *supra* note 24.

58. Tim Edgar, *Building a Better GAAR*, 27 Va. Tax Rev. 833, 853 (2008) (citing Jonathan Gruber, Public Finance & Public Policy 118 (2005)).

59. *See* BBC Research and Consulting, *supra* note 13.

60. *See* Hannah Wiseman, *Untested Waters: The Rise of Hydraulic Fracturing in Oil and Gas Production and the Need to Revisit Regulation*, 20 Fordham Envtl. L. Rev. 115, 146 (2009).

61. *See* Jason T. Gerken, *What the Frack Shale We Do? A Proposed Environmental Regulatory Scheme for Hydraulic Fracturing*, 41 Cap. U.L. Rev. 81, 97 (2013) ("[T]he search for a truly adequate regulatory framework is substantively important because the common law effectively shields polluters from meaningful regulation.").

62. *See, e.g.*, Tucker v. Sw. Energy Co., No. 1:11-cv-45-DPM, 2012 U.S. Dist. LEXIS 20697, at *4 (E.D. Ark. Feb. 17, 2012); Ginardi v. Frontier Gas Servs. LLC, No. 4:11-cv-00420-BRW, 2011 U.S. Dist. LEXIS 89054, at *2 (E.D. Ark. Aug. 10, 2011).

that the vast majority of these cases fail.[63] Causation is frequently the Achilles heel in tort actions involving fracking.[64] This and other impediments to the fruitful use of trespass, nuisance, negligence, and strict liability are analyzed in turn.

i. Trespass

Trespass is implicated by all three of fracking's primary categories of negative externalities, yet success via this doctrine remains elusive. Trespass is the intentional, unlawful entry upon the land of another.[65] To be guilty of trespassing, one must intend the act that caused the trespass rather than intend to trespass. The few fracking cases in which courts found trespasses typically involved continuing, physical invasions by drilling across property lines.[66]

Trespass claims have been largely unsuccessful in above-ground contexts as well. Plaintiffs have had little luck proving that air pollution from fracking that travels onto their land constitutes a trespass.[67] Traditionally, air pollution could not constitute a trespass; however, some states now allow the cause of action if injury can be shown.[68] Plaintiffs who own surface rights above mineral interests also have an uphill battle to show that an operator's use of the surface estate is a trespass. This difficulty stems from an operator's right to perform activities fairly incident to the extraction of natural gas.[69]

Alternative claims of underground trespasses are also futile. Due to the rule of capture,[70] courts have held that fracking operators are not liable in trespass for the removal of natural gas under the property of another.[71] The Texas Supreme Court ruled that the subterranean movement of fracking fluid from a state-authorized well onto neighboring parcels is not a trespass.[72] Moreover, it would be exceedingly

63. Christopher S. Kulander, *Common Law Aspects of Shale Oil and Gas Development*, 49 Idaho L. Rev. 367, 374 (2013).
64. *See* Wiseman, *supra* note 61, at 156.
65. *See* Kulander, *supra* note 63, at 374 ("Trespass by the operator generally encompasses intentional and unlawful intrusion upon real property owned by another.").
66. *See, e.g.*, R.R. Comm'n of Tex. v. Manziel, 361 S.W.2d 560, 567 n.2 (Tex. 1962).
67. *E.g.*, *Tucker*, 2012 U.S. Dist. LEXIS 20697, at *3.
68. Larry D. Scheafer, Annotation, *Recovery in Trespass for Injury to Land Caused by Air Pollutants*, 2 A.L.R. 4th 1054, 1054 (2008). *See also* Borland v. Sanders Lead Co., 369 So. 2d 523 (Ala. 1979); Miller v. Carnation Co., 516 P.2d 661 (Colo. App. 1973).
69. *See, e.g.*, Teel v. Chesapeake Appalachia LLC, 906 F. Supp. 2d 519, 523 (N.D. W. Va. 2012).
70. "A fundamental principle of oil-and-gas law holding that there is no liability for drainage of oil and gas from under the lands of another so long as there has been no trespass and all relevant statutes and regulations have been observed." Black's Law Dictionary 1531 (10th ed. 2014).
71. Coastal Oil & Gas Corp. v. Garza Energy Trust, 268 S.W.3d 1, 4 (Tex. 2008).
72. R.R. Comm'n v. Manziel, 361 S.W.2d 560 (Tex. 1962).

difficult to prove this claim in other states.[73] Fracking fluid is injected thousands of feet into the earth, where it can spend years before seeping into a well and providing a cause of action for trespass.[74] This leaves a plaintiff with the Sisyphean task of proving that—thousands of feet underground—a particular chemical from a particular operator leaked into her well and that no intervening or superseding causes existed.[75]

ii. Nuisance

Nuisance suits are "insufficient to adequately address the effects of fracing [sic]"[76] as they usually warrant only small damages and many cases are difficult to prove outside of the suburban and urban contexts.[77] A private nuisance is a substantial and unreasonable interference with a surface owner's use and enjoyment of land,[78] and an injury to persons or property must be shown.[79] Plaintiffs may make claims for disturbances from fracking operations, which include noises from compressor stations, light pollution from nighttime activities, and interference with viewsheds.[80] However, these claims will not provide damages for the major externalities of fracking: health problems and diminution of property value due to contamination.[81] Landowners experiencing problems related to underground activity may file claims for nuisances such as decreased water pressure or dried up wells, but they will encounter the same causation problems that ail trespass claimants.[82] Even if a claimant can prove nuisance, states courts like those in New York can simply refuse to provide injunctions when the damage to the defendant and the economic consequences of an injunction are larger than the damage to the

73. *See, e.g.*, Tucker v. Sw. Energy Co., No. 1:11-cv-45-DPM, 2012 U.S. Dist. LEXIS 20697, at *2 (E.D. Ark. Feb. 17, 2012); Gerken, *supra* note 61, at 97–98.
74. Wiseman, *supra* note 60, at 156.
75. *Id.* at 185*; see also* Jeffrey C. King, Jamie Lavergne Bryan & Meredith Clark, *Factual Causation: The Missing Link in Hydraulic Fracture-Groundwater Contamination Litigation*, 22 Duke Envtl. L. & Pol'y F. 341, 350 (2012).
76. Wiseman, *supra* note 60, at 156.
77. *See* Timothy Riley, *Wrangling with Urban Wildcatters: Defending Texas Municipal Oil and Gas Development Ordinances Against Regulatory Takings Challenges*, 32 Vt. L. Rev. 349, 354–55 (2007); Wiseman, *supra* note 60, at 156.
78. Restatement (Second) of Torts § 822 (1979); Black's Law Dictionary 1235 (10th ed. 2014).
79. Frank P. Grad, Treatise on Environmental Law § 2.02, at 2-37 (2014).
80. *See* Carl J. Pernicone, Michael J. Naughton & Samuel I. Reich, *Preliminary Insight: Legal Implication of Hydrofracking in the Marcellus Shale*, 2012 In-House Def. Q. 38, 40, http://www.wilsonelser.com/files/repository/hydrofracking-in-the-marcellus-shale.pdf.
81. *See* Wiseman, *supra* note 60, at 156.
82. *Id.*

plaintiff.[83] These states break rank with the traditional notion that the law does not tolerate any interference with the reasonable enjoyment of someone's property,[84] and instead they favor moneyed interests over the interests of those who are harmed.

iii. Negligence

The doctrine of negligence is ill-suited to fulfill the needs of injured parties. It is beleaguered by causation problems and also requires a plaintiff to show that the operator was not engaging in "reasonable and prudent" behavior.[85] "'[R]easonable and prudent' is a generous standard for operators in that courts rarely find a particular activity of a mineral owner or its lessee to be unreasonable."[86] Generally, an action is "reasonable and prudent" if it is what a normal operator would have done given the circumstances, which generally defaults to the industry standard.[87] Notwithstanding these legal obstacles, negligence cases have prevailed in limited circumstances, such as property damage from an operator's use of antiquated or malfunctioning equipment, the overflow of a disposal pit full of saltwater and used fracking fluid, the nonfulfillment of notification requirements, and the failure to complete a well in a way that prevents the escape of gas.[88]

A plaintiff's difficulty in bringing a negligence claim varies by state. Some courts have instituted modified case management orders that require plaintiffs to make a prima facie case of exposure, injury, and causation before allowing full discovery.[89] This added burden on plaintiffs can involve "submitting expert opinions regarding the nature of the substances to which the plaintiffs were allegedly exposed; allowing access to the plaintiffs' medical records; and providing other supporting data."[90] These orders unnecessarily raise an already high hurdle. Plaintiffs can also bring a negligence per se claim for the violation of federal or state regulations, but the federal regulatory scheme is weak and state regulations vary, which leaves many plaintiffs without an avenue to compensation.[91]

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83. *See* Boomer v. Atlantic Cement Co., 257 N.E.2d 870, 872 (N.Y. 1970); Grad, *supra* note 79, at 2-45.

84. *See* Grad, *supra* note 79, at 2-37, 2-45 to 2-46.

85. Kulander, *supra* note 63, at 375.

86. *Id.* (quoting Michael J. Mazzone, *Changing Times Bring Conflict with Surface Owners*, Am. Oil & Gas Rep. (Sept. 23, 2012), http://www.aogr.com/index.php/web-features/exclusive-story/changing-times-bring-conflict-with-surface-owners).

87. *Id.*

88. *Id.*

89. These modified orders "are commonly referred to as 'Lone Pine' orders." Adam Vann, Brandon J. Murrill & Mary Tiemann, Cong. Research. Serv., R43152, Hydraulic Fracturing: Selected Legal Issues 30 & n.250 (2014).

90. *Id.* at 30.

91. Rachael Rawlins, *Planning for Fracking on the Barnett Shale: Soil and Water Contamination Concerns, and the Role of Local Government,* 44 Envtl. L. 135, 164 (2014).

iv. Strict Liability

The doctrine of strict liability does not help in fracking cases. While imposing strict liability would significantly ease plaintiffs' burden of proof, no court has held that fracking is an "abnormally dangerous" activity to which the doctrine applies. If future cases change this, fracking operators would become subject to liability for harming another via fracking operations, even though the operator exercised the utmost care to prevent the harm.[92] However, cases to date have only held that strict liability is inapplicable to hydraulic fracturing.[93]

National legislation that incorporates a burden-shifting approach would be more useful than state-by-state designations of fracking as an "abnormally dangerous" activity. As common law designation is governed by individual states, they are free to eschew strict liability,[94] and its application to fracking can only advance one state at a time. This incremental, optional application would create a patchwork of applicability across the country, require a significant amount of time, and leave plaintiffs high and dry in the interim. The ensuing fragmentation would likely include a common law variant of the race to the bottom seen in other regulatory frameworks, which would aid neither plaintiffs' trials nor their tribulations. Federal legislation is preferable because it could simultaneously apply uniform standards to all states.

B. Exemptions in Federal Regulation Leave Plaintiffs Without Access to Justice

While some federal laws apply to hydraulic fracturing, most contain large exceptions and only apply to narrow parts of the operation. This hodgepodge of legal oversight leaves much of the fracking process unregulated and does not provide the needed legal framework to help the rural poor redress fracking's negative externalities. The major federal laws that apply, if only partially, to the three main categories of negative externalities from fracking—water, air, and land contamination—are analyzed in turn.

i. The Safe Water Drinking Act

The Safe Drinking Water Act (SDWA)[95] does not ensure safe drinking water to individuals near fracking operations. First, the SWDA generally exempts fracking from its regulation,[96] which otherwise requires the EPA to protect underground sources of

92. *See* Restatement (Second) of Torts § 519 (1977).
93. *E.g.*, Williams v. Amoco Prod. Co., 734 P.2d 1113, 1123 (Kan. 1987).
94. *See id.*
95. 42 U.S.C. §§ 300f–j (2012).
96. *Id.* § 300h(d)(1)(B)(ii).

drinking water by regulating the injection of fluids into the earth.[97] In 2005, Congress passed the Energy Policy Act, part of which amended the SDWA and clarified that the Underground Injection Control requirements in the SDWA did not apply to fracking unless diesel fuel was used in the fracking fluid.[98] Second, the underground injection of natural gas for storage purposes is also exempted from the SDWA's permitting requirements.[99] Third, the scope of the statute "addresses the quality of water provided by public water systems and does not address private, residential wells."[100]

While the SWDA generally does not apply to fracking operations, some activities related to the fracking process fall under its purview. The exclusions above do not apply to the underground injection of flowback or enhanced gas recovery operations, both of which require SDWA permits.[101]

ii. The Clean Water Act

The Clean Water Act (CWA)[102] does not provide sufficient protection to injured plaintiffs, as it can only aid them in limited circumstances. No court has held that discharges to underground aquifers are subject to CWA permits, and no regulatory agency has designated them as such. Additionally, neither the injection of flowback into underground wells[103] nor the stormwater runoff from oil and gas operations[104] is regulated by the Act. However, the CWA does require parties that

97. *Id.* § 300h (describing the EPA's authority to oversee local regulatory efforts).

98. *Id.* § 300h(d)(1)(B)(ii) ("The term 'underground injection' . . . excludes . . . the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities."); Cong. Research. Serv., R43152 at 1−3 (describing the 2005 amendment to the SDWA).

99. 42 U.S.C. § 300h(d)(1)(A)–(B) ("The term 'underground injection' means the subsurface emplacement of fluids by well injection; and excludes the underground injection of natural gas for purposes of storage. . ." (internal references omitted)).

100. Adam Vann, Brandon J. Murrill & Mary Tiemann, Cong. Research. Serv., R43152, Hydraulic Fracturing: Selected Legal Issues 2 (2014).

101. *Id.* at 2−3.

102. 33 U.S.C. §§ 1251−1387 (2012).

103. *Hydraulic Fracturing Background Information*, U.S. Envtl. Prot. Agency (May 9, 2012), http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/wells_hydrowhat.cfm ("Underground injection of flowback is regulated by either EPA Underground Injection Control (UIC) program or a state with primary UIC enforcement authority.").

104. 33 U.S.C. § 1342(l)(2) ("The Administrator shall not require a permit under this section . . . for discharges of stormwater runoff from mining operations or oil and gas exploration, production, processing, or treatment operations or transmission facilities, composed entirely of flows which are from conveyances or systems of conveyances (including but not limited to pipes, conduits, ditches, and channels) used for collecting and conveying precipitation runoff and which are not contaminated by contact with, or do not come into contact with, any overburden, raw material, intermediate products, finished product, byproduct, or waste products located on the site of such operations."). The definition of "oil and gas exploration and production" explains that construction of these oil and gas sites is also exempt. 33 U.S.C. § 1362(24).

seek to discharge flowback or other pollutants into Publicly Owned Treatment Works (POTW)[105] or navigable surface waters to apply for a permit under Section 402.[106]

Discharges of flowback into navigable waters require a National Pollutant Discharge Elimination System permit from the EPA.[107] These discharges are subject to both technology-based and water quality-based effluent limitations.[108] However, the CWA's restrictions do not provide protection for all plaintiffs, as the restrictions do not cover the pollution of certain water bodies. The CWA does not cover pollution of a plaintiff's intra-state lakes, impermanent streams, or isolated wetlands,[109] and it is unclear whether someone dumping pollutants by hand into any water body owned by a plaintiff would fall within the ambits of the CWA's jurisdiction.[110] A plaintiff is only able to recover damages for discharges from a point source into traditionally navigable waters, interstate waters, wetlands adjacent to traditionally navigable waters, or waters that have a "significant nexus" to traditionally navigable or interstate waters, such as their tributaries or wetlands adjacent thereto.[111]

105. Discharges to POTWs cannot include any chemical that "interferes with, passes through, or otherwise is incompatible with such works." 33 U.S.C. § 1317(b)(1). This does not provide much help to plaintiffs, as the majority of complaints are from discharges that are not sent to POTWs. The EPA is also creating additional pretreatment standards for oil and gas companies under its Effluent Guideline Program. *EPA Announces Schedule to Develop Natural Gas Wastewater Standards/Announcement is Part of Administration's Priority to Ensure Natural Gas Development Continues Safely and Responsibly*, EPA (Oct. 20, 2011), http://yosemite.epa.gov/opa/admpress.nsf/d0cf6618525a9efb85257359003fb69d/.

106. *See* 33 U.S.C. § 1311(a).

107. *See id.* § 1311; 40 C.F.R. § 125.3(a) (2014).

108. The technology-based requirements for direct discharges from oil and gas extraction facilities into surface waters are found in 40 C.F.R. § 435 (2013).

109. Rapanos v. United States, 547 U.S. 715 (2006) (plurality opinion) (interpreting the scope of the term "waters of the United States" as stated in the CFR provisions governing the U.S. Army Corps of Engineers' enforcement of the CWA); 40 C.F.R. § 203.2(a)(1) (2014) (stating that the EPA's application of the CWA may be specified through sections of the CFR that apply to the U.S. Army Corps of Engineers); *id.* § 230.3(s) (defining the term "waters of the United States" as it applies to the EPA when enforcing the CWA).

110. *See, e.g.*, United States v. Plaza Health Labs., Inc., 3 F.3d 643, 650 (2d Cir. 1993) (holding that the defendant did not violate the Clean Water Act by dumping pollutants into a river by hand because a human was not considered a point source under the Act).

111. EPA & U.S. Dep't of the Army, Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States* & *Carabell v. United States* (2007), http://www.epa.gov/owow/wetlands/pdf/RapanosGuidance6507.pdf. The EPA is in the process of writing a regulation that could alter its jurisdiction slightly. *See* Definition of "Waters of the United States" Under the Clean Water Act, 79 Fed. Reg. 22,188 (proposed Apr. 21, 2014) (amending the Clean Water Act).

iii. The Clean Air Act

The Clean Air Act (CAA)[112] does not guarantee clean air to those near fracking operations. While recent EPA regulations help to limit the amount of some fracking emissions, many pollutants leak through unregulated.

In 2012, the EPA updated the CAA's New Source Performance Standards (NSPS) to cover volatile organic compound emissions from fracking.[113] Many hydraulic fracturing sites must employ "green completions" or "reduced emissions completions" after January 1, 2015.[114] Green completions recapture, clean, and reuse natural gas that would have otherwise been vented into the atmosphere.[115] Both new and existing wells are subject to the regulations,[116] which are expected to reduce volatile organic compound emissions by ninety-five percent[117] and to reduce methane emission substantially.[118]

Most, but not all, wells are subject to these requirements. Natural gas exploratory wells, delineation wells, and low-pressure wells are not required to use green combustion devices.[119] These exempted natural gas operations comprise approximately twelve percent of the hydraulically-fractured gas wells,[120] and most of them are required to use combustion completion devices.[121] Combustion

112. 42 U.S.C. §§ 7401–7671 (2012).

113. Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews, 77 Fed. Reg. 49,490 (Aug. 16, 2012).

114. *Id.* at 49,492.

115. *See* Richard K. Lattanzio, Cong. Research. Serv., R42833, Air Quality Issues in Natural Gas Systems 17 (2013).

116. Oil and Natural Gas Sector, 77 Fed. Reg. at 49,493.

117. EPA, Overview of Final Amendments to Air Regulations for the Oil and Natural Gas Industry 1 (2012), http://epa.gov/airquality/oilandgas/pdfs/20120417fs.pdf.

118. *Id.* at 3.

119. Oil and Natural Gas Sector, 77 Fed. Reg. at 49,517. *See also* Cong. Research. Serv., R42833 at 17 n.47 ("Exploratory well is defined as a well outside known fields or the first well drilled in an oil or gas field where no other oil and gas production exists; delineation well is defined as a well drilled in order to determine the boundary of a field or producing reservoir; and low pressure well is defined as a well with reservoir pressure and vertical well depth such that 0.445 times the reservoir pressure (in psia) minus 0.038 times the vertical well depth (in feet) minus 67.578 psia is less than the flow line pressure at the sales meter.").

120. EPA, Regulatory Impact Analysis: Final New Source Performance Standards and Amendments to the National Emissions Standards for Hazardous Air Pollutants for the Oil and Natural Gas Industry 3-16 & tbl.3-3 (2012), http://www.epa.gov/ttnecas1/regdata/RIAs/oil_natural_gas_ final_neshap_nsps_ria.pdf.

121. Oil and Natural Gas Sector, 77 Fed. Reg. at 49,499. A complete combustion device employs a technique called flaring, which "burns off the gas that would otherwise escape during the well completion process." Adam Vann, Brandon J. Murrill & Mary Tiemann, Cong. Research. Serv., R43152, Hydraulic Fracturing: Selected Legal Issues 9 n.46 (2014). These wells need not use combustion completion devices when it is hazardous or prohibited by state or local laws or regulations. Oil and Natural Gas Sector, 77 Fed. Reg. at 49,499.

completions are only an incomplete solution, as combusting natural gas releases multiple air pollutants, including carbon dioxide, carbon monoxide, nitrogen oxides, sulfur dioxide, and particulate matter.[122]

The 2012 EPA air standards fail to regulate many harmful emissions from fracking. Emissions of methane, nitrogen oxides, particulate matter, and hydrogen sulfide are not covered by these standards.[123] The 2012 standards do not cover volatile organic compound emissions from new or modified compressors at natural gas well sites,[124] and they do not cover volatile organic compounds or SO_2 emissions from existing sources unless they are otherwise regulated under the Hazardous Air Pollutant criteria.[125] Furthermore, the EPA's 2012 standards do not cover: emissions from coal-bed methane production facilities; all field engines, drilling rig engines, and turbines; well-head and transmission and storage segment compressors; well-head activities; all pneumatic devices other than controllers; and storage vessels, such as skid-mounted vessels, mobile vessels, well cellars, sumps, and produced water ponds.[126]

Many sources of emissions are legislatively exempted from regulated CAA categories. Well completions, pneumatic controllers, compressors, and storage vessels are all exempted by the 2012 standards from being classified as "major sources" under the Title V permitting program of the CAA.[127] Section 112(n)(4) of the CAA further exempts "any oil or gas exploration or production well (with its associated equipment)" from "major source" aggregation under the National Emissions Standards for Hazardous Air Pollutants.[128] The same section also exempts "oil and gas production wells (with [their] associated equipment)" from being listed as an "area source."[129] While a variance to this area source exemption exists, it does not apply to rural areas.[130] These exemptions prevent the regulation of much of fracking's air pollution.

iv. The Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA)[131] provides inadequate regulation of fracking's negative externalities. Normally, Subtitle C of RCRA provides "cradle-to-the-grave" oversight of hazardous wastes.[132]

122. Cong. Research. Serv., R42833 at 6.
123. *Id.* at 25. Methane is a greenhouse gas and a precursor to ozone, which is a criteria pollutant under the CAA along with nitrogen oxides and particulate matter. *Id.* at 9.
124. *Id.* at 50 & tbl.A-1.
125. *Id.* at 25.
126. *Id.*
127. *Id.* at 26.
128. 42 U.S.C. § 7412(n)(4)(A) (2012).
129. *Id.* § 7412(n)(4)(B).
130. *Id.*
131. *Id.* §§ 6901–6992k.
132. *Id.* §§ 6921–6939e.

Unused fracking fluids and acids are not categorically exempted,[133] and they may be subject to Subtitle C regulation if they have hazardous characteristics.[134] However, produced water and drilling fluids are exempted from regulation.[135] These fluids contain hazardous constituents such as heavy metals,[136] yet they are exempt "[r]egardless of whether those fluids exhibit the regulatory characteristics of hazardous waste."[137]

v. The Comprehensive Environmental Response, Compensation, and Liability Act

Fracking's coverage under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)[138] is anything but comprehensive. While CERCLA generally applies strict liability to those who release or cause a threat of release of any "hazardous substance" into the environment, releases of petroleum and natural gas are excluded from the definition of a "hazardous substance."[139] This substance exclusion does not exempt a fracking facility as a whole.[140] Therefore, CERCLA can apply to fracking sites if other "hazardous substances" are released into the environment—either above or below ground—and they endanger the public health, the public welfare, or the environment.[141] For instance, CERCLA applies to the release of fracking fluid, flowback, or other substances involved in fracking operations if they satisfy the definition of a hazardous substance.[142]

133. EPA, Exemption of Oil and Gas Exploration and Production Wastes From Federal Hazardous Waste Regulations 10–11 (2002), http://www.epa.gov/osw/nonhaz/industrial/special/oil/oil-gas.pdf.

134. A waste may be deemed hazardous based on the characteristics of reactivity, ignitability, corrosivity, or toxicity, which are explained at 40 C.F.R. § 261.20–24 (2014).

135. 42 U.S.C. § 6921(b)(2)(A) ("[D]rilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil or natural gas or geothermal energy shall be subject only to existing State or Federal regulatory programs in lieu of [Subtitle C].").

136. U.S. Dep't of Energy, *supra* note 4, at 66−71.

137. Adam Vann, Brandon J. Murrill & Mary Tiemann, Cong. Research. Serv., R43152, Hydraulic Fracturing: Selected Legal Issues 11 (2014).

138. 42 U.S.C. §§ 9601–9675.

139. CERCLA's definition of a "hazardous substance" explains that it "does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance . . . and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel . . . ." *Id.* § 9601(14).

140. Cong. Research. Serv., R43152 at 13.

141. *See Reportable Quantities: What Substances are Covered?*, EPA, http://www.epa.gov/osweroe1/content/reporting/faq_subs.htm (Apr. 22, 2015).

142. Cong. Research. Serv., R43152 at 13. The definition of a hazardous substance can be found at 42 U.S.C. § 9601(14).

An additional CERCLA clause immunizes fracking operations from liability resulting from a "federally permitted release."[143] This includes releases permitted pursuant to the CAA, the CWA, the RCRA, or the SDWA.[144] This exemption also applies to:

> [A]ny injection of fluids or other materials authorized under applicable State law (i) for the purpose of stimulating or treating wells for the production of crude oil, natural gas, or water, (ii) for the purpose of secondary, tertiary, or other enhanced recovery of crude oil or natural gas, or (iii) which are brought to the surface in conjunction with the production of crude oil or natural gas and which are reinjected . . . .[145]

Accordingly, the only way a fracking operation could be subject to CERCLA is if it released a non-petroleum hazardous substance without federal or state authorization.

vi. Other Federal Legislation

Multiple other federal laws contain exclusions for fracking. The National Environmental Policy Act (NEPA)[146] requires a governmental assessment of the effects of major federal actions affecting the quality of the human environment.[147] However, NEPA contains a rebuttable presumption that many activities undertaken "for the purpose of exploration or development of oil or gas" are exempt from traditional requirements.[148] Oil and gas extraction are also immune to the reporting requirements of the Toxic Release Inventory under the Emergency Planning and Community Right to Know Act.[149] Lastly, it is currently unclear how the Toxic Substances Control Act (TSCA)[150] applies to fracking, given the multiple existing exemptions and EPA's pending rulemaking regarding Sections 8(a) and (d) of the Act.[151]

143. 42 U.S.C. § 9607(j).
144. *Id.* § 9601(10).
145. *Id.*
146. *Id.* §§ 4321–4370.
147. *Id.* § 4332(C).
148. *Id.* § 15942(a).
149. *Id.* §§ 11001–11050. The Toxic Release Inventory imposes reporting requirements on facilities that fall under certain Standard Industrial Classification (SIC) codes, but not for oil and gas operations, which are in SIC code 13. *See id.* § 11023(b)(1)(A).
150. 15 U.S.C. §§ 2601–2697 (2012).
151. Act of Oct. 11, 1976, Pub. L. No. 94-469, 90 Stat. 852 (codified at 15 U.S.C. § 2607(a), (d)). For updated information on the rulemaking, see *Natural Gas Extraction–Hydraulic Fracturing*, EPA, http://www2.epa.gov/hydraulicfracturing (last updated Mar. 23, 2015). For an analysis of the possible outcomes of the rulemaking, see Arnold & Porter LLP, Advisory: Additional Fracking Chemical Substance Reporting Requirements Under TSCA May Further Complicate Landscape (2012), http://www.arnoldporter.com/resources/documents/Advisory%20Additional_Fracking_Chemical_Substance_Reporting_Requirements_Under_TSCA_May_Further_Complicate_Landscape.pdf.

IV. Federal, Not State, Statutory Regulation Is Needed

For those who are afflicted with the negative externalities of fracking, statutory protections are preferable to reliance on the common law alone. While common law tort litigation can provide remedies after the fact, legislation helps to prevent problems before they occur.[152] Statutes can provide causes of action to aid injured parties who seek relief and potentially integrate equitable burdens of proof and liability schemes.[153] These statutes can employ additional techniques—such as monitoring, whistleblower protections, criminal liability, and standing for environmental groups—that potentiate the internalization of social and environmental costs.

A. State Regulation is Inadequate

New or amended federal legislation is needed, as the existing state regulation and oversight is insufficient. Currently state and local governments "are responsible for virtually all of the day-to-day regulation and oversight of natural gas systems,"[154] which varies widely between states.[155] Each state typically has one or more agencies that regulate various aspects of well permitting and environmental compliance,[156] and state laws can address multiple aspects of environmental issues associated with fracking.[157] While some argue that regulation should be left to the states,[158] this is inadequate, as it involves multiple shortcomings not present in federal regulation.

State regulation of fracking sets the regulatory stage for an undesirable, legislative race to the bottom.[159] This is a situation in which states adopt increasingly lax regulations in an effort to entice industry to the area.[160] Evidence of this can

152. *See* Charles D. Kolstad, Thomas S. Ulen & Gary V. Johnson, Ex Post *Liability for Harm vs.* Ex Ante *Safety Regulation: Substitutes or Complements?*, 80 Am. Econ. Rev. 888, 888 (1990).
153. *See id.*
154. Richard K. Lattanzio, Cong. Research. Serv., R42833, Air Quality Issues in Natural Gas Systems 46 (2013).
155. *Id.* at 2.
156. *Id.* ("In general, each state has one or more regulatory agencies that may permit wells, including their design, location, spacing, operation, and abandonment, and may regulate for environmental compliance.").
157. *Id.* ("With respect to pollution controls, state laws may address many aspects of water management and disposal, air emissions, underground injection, wildlife impacts, surface disturbance, and worker health and safety.").
158. *E.g.*, Jeff Bell, *Chamber of Commerce to Obama: Hands Off Fracking*, Columbus Bus. First (Oct. 8, 2013, 12:34 PM), http://www.bizjournals.com/columbus/blog/2013/10/chambers-of-commerce-ask-obama-team-to.html.
159. Gerken, *supra* note 61, at 128–29.
160. *See id.* at 129; Wiseman, *supra* note 2.

be seen in recent fracking regulation.[161] A race to the bottom is undesirable to parties negatively affected by fracking, as it is well within the prerogative of state legislatures to enact minimal pollution regulations or deny standing to plaintiffs.

Federal legislation is better suited to regulate pollution from fracking. First, water and air pollution from fracking migrates freely across state lines, and states are not in a position to regulate such interstate pollution.[162] Second, state oversight in many states simply cannot keep pace with the fracking boom due to budgetary constraints.[163] The increase in drilling drastically outpaces the increase in enforcement personnel.[164] Third, federal standards can assist the industry by providing uniformity. Federal, not state, legislation can provide this benefit.

B. Federal Regulation Is Needed and Should Incorporate Existing Regulatory Schemes

Comprehensive federal legislation is needed to provide citizens their fair day in court. Such legislation would help internalize the negative externalities associated with fracking by setting a uniform regulatory floor that could be implemented simultaneously throughout the states.[165] This is nothing new, as federal agencies such as the EPA have long exercised jurisdiction over activities that produce pollution and have the potential to cause environmental harm, including some aspects of fracking.[166] The authors of new legislation should draw from the well of similar state and federal regulations to create a regulatory floor that provides wronged parties with a legal path to compensation.

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161. *See* Gerken, supra note 61, at 129 & n.366 ("Indeed, some states appear to have avoided certain regulation expressly to attract industry—with Pennsylvania, for example, initially opposing a severance tax on gas and citing concerns about its effects on the rate of well development." (citing Wiseman, *supra* note 2)).

162. Gianna Cricco-Lizza, *Hydraulic Fracturing and Cooperative Federalism: Injecting Reality into Policy Formation*, 42 Seton Hall L. Rev. 703, 730 (2012).

163. Hannah Wiseman, *Fracturing Regulation Applied*, 22 Duke Envtl. L. & Pol'y F. 361, 371–77 (2012) ("Some state agencies tasked with executing environmental regulations—often in addition to ensuring oil and gas conservation and protecting mineral rights—have been overwhelmed by the pace and volume of new well development.").

164. Gerken, *supra* note 61, at 116–17.

165. "[T]he Federal Government has an important role to play by . . . setting sensible, cost-effective public health and environmental standards to implement Federal law and augment State safeguards." Exec. Order No. 13,605, 77 Fed. Reg. 23,107 (Apr. 13, 2012).

166. The Clean Air Act, 42 U.S.C. §§ 7401–7671q (2013), Clean Water Act, 33 U.S.C. §§ 1251–1387 (2013), Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901–6992k (2013), Safe Drinking Water Act, 42 U.S.C. §§ 300f–300k (2013), and Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601–9675 (2013), are all examples of federal regulation of pollution.

i. Federal Legislation Should Incorporate Proven State Regulatory Schemes

States have developed various legal tools to manage fracking operations, and any new or amended federal legislation on fracking should look to proven state regulatory schemes for guidance. Of the many policies adopted by states, robust disclosure requirements and burden-shifting rules are some of the most promising resources for federal implementation.

Borrowing disclosure requirements from state regulations would help federal legislation internalize the negative externalities of fracking. For example, Texas employs mandatory disclosure requirements, which include the amount of water used to frack new wells.[167] Colorado's disclosure requirements have been hailed as the "most comprehensive in the country"[168] and provide another useful strategy. They mandate that drilling companies disclose a list of all chemical ingredients in their fracking fluid,[169] and these lists are made available online. Drilling companies may still withhold some information about proprietary chemicals, but they must swear under penalty of perjury that a withheld chemical is indeed proprietary[170] and must list its family and concentration.[171] Federal legislation should mimic these rules and extend them to existing wells. This would help plaintiffs verify contamination claims, and it could also improve citizen participation in fracking policy, empower public monitoring, assist medical professionals, aid cleanup efforts, and encourage the use of safer chemicals.[172]

Federal legislation similar to the burden-shifting rules in some states would also help internalize negative externalities. Pennsylvania's Oil and Gas Act of 1984 presumes that fracking operators are responsible for the pollution of private water sources within 1,000 feet of their gas well for six months after drilling is completed if no pre-drilling water samples were taken from the private water supply.[173] Similar burden-shifting provisions in federal legislation would help internalize costs because "rational actors who bear the costs of the harms that they cause will take all cost-effective measures that are available to economize on that liability."[174] Creating the presumption that operators are responsible for any harm caused by their actions

167. 16 Tex. Admin. Code § 3.29 (2013).

168. Mark Jaffe, *Colorado Approval of Fracking Fluids' Full Disclosure Came After Long Negotiations and Nudge from Governor*, Denver Post (Dec. 14, 2011, 1:00 AM), http://www.denverpost.com/business/ci_19542430.

169. 2 Colo. Code Regs. § 404-1 (LexisNexis 2014).

170. *Id.* § 216(D)(6).

171. *Id.* § 205A(b)(2)(B)−(C).

172. Hannah Wiseman, *Trade Secrets, Disclosure, and Dissent in a Fracturing Energy Revolution*, 111 Colum. L. Rev. 1, 10 (2011).

173. 58 Pa. Cons. Stat. § 3218(c)(1) (2014).

174. Alan O. Sykes, *Strict Liability Versus Negligence in* Indiana Harbor, 74 U. Chi. L. Rev. 1911, 1919 (2007).

will incentivize both efficient market decisions and policies that internalize the cost of damages.[175]

ii. Federal Legislation Should Incorporate Existing and Proposed Regulatory Schemes

Fracking's negative externalities can be internalized by incorporating strategies from existing and proposed environmental laws into new federal legislation. Cooperative federalism has served as a cornerstone of other successful federal legislation of pollution,[176] and it should be included in any new fracking laws. First, the EPA should set national regulatory baselines. Second, it should use cooperative federalism with the states to enforce the federal floor and to allow for additional, state-specific regulation.[177] Mandatory monitoring systems should be used to incentivize accurate reporting, to keep monitors operating properly, and to prevent concealment of high levels of emissions. As in parts of the Clean Air Act, an assumption that emissions levels are higher during gaps in monitoring data should be considered.[178] Such monitoring systems are particularly appropriate for methane emissions, as leak prevention is relatively cheap;[179] it is good for the industry,[180] local residents,[181] and the environment;[182] and the profits gained from methane retention could offset or outweigh compliance costs.[183] Incorporating whistleblower protections frequently found in similar environmental legislation

175. *See* Hannah Coman, *Balancing the Need for Energy and Clean Water: The Case for Applying Strict Liability in Hydraulic Fracturing Suits*, 39 B.C. Envtl. Aff. L. Rev. 131, 147 (2012).

176. For example, the CAA and CWA both employ cooperative federalism. *See* 42 U.S.C. § 7411(c)−(d); 33 U.S.C. § 1313.

177. Both the CAA and CWA currently use this regulatory scheme. For additional arguments in favor of cooperative federalism, see generally Cricco-Lizza, *supra* note 162.

178. A similar scheme is employed in the CAA monitoring under section 412(d). 42 U.S.C. 7651k(d). The EPA rule assumes that emissions are at a higher level "the longer the gap in the recorded data and/or the lower the annual monitor availability . . . ." 58 Fed. Reg. 3590, 3635 (1993).

179. *See* Gerken, *supra* note 61, at 130−31 ("leak-tight couplings, compressors, and pumps are inexpensive"); Susan Harvey, Vignesh Gowrishankar & Thomas Singer, Nat'l Res. Def. Council, Leaking Profits: The U.S. Oil and Gas Industry Can Reduce Pollution, Conserve Resources, and Make Money by Preventing Methane Waste 18 tbl.4 (2012), http://www.nrdc.org/energy/files/Leaking-Profits-Report.pdf.

180. *See* Harvey et al., *supra* note 179, at 18 & tbl.4.

181. Pete Spotts, *Fracking Study Sends Alert About Leakage of Potent Greenhouse Gas*, Christian Sci. Monitor (Feb. 13, 2012), http://www.csmonitor.com/USA/2012/0213/Fracking-study-sends-alert-about-leakage-of-potent-greenhouse-gas.

182. *See* Richard K. Lattanzio, Cong. Research. Serv., R42833, Air Quality Issues in Natural Gas Systems 9 (2013) ("Methane—the principal component of natural gas—is both a precursor to ground-level ozone formation (*i.e.*, smog) and a potent greenhouse gas . . . .").

183. Harvey et al., *supra* note 179.

would also aid plaintiffs by facilitating the disclosure of dangerous fracking activities.[184] Other common provisions—such as criminal liability for false reporting,[185] bounties for evidence leading to criminal conviction or civil penalty,[186] and citizen suit provisions[187]—minimize negative externalities by incentivizing compliance with regulations.

Pending and failed legislative efforts also provide useful regulatory schemes to minimize negative externalities and to reduce pollution. Common approaches in such legislation are to regulate fracking with the Underground Injection Control program of the SDWA;[188] to create a disclosure requirement and website listing similar to those employed by some states;[189] to mandate the disclosure of proprietary chemicals to medical professionals during medical emergencies;[190] and to require groundwater testing before, during, and after fracking.[191] Other useful regulatory schemes include eliminating the Clean Air Act's aggregation exemptions for oil and gas development, listing hydrogen sulfide as a hazardous air pollutant, and permitting the EPA Administrator to list oil and gas production wells as an area source category of hazardous air pollutants.[192]

Legislators should also look to industry practices and agency reports in formulating any new laws. This includes incorporating best management practices[193] and incentivizing progressive techniques used by those in the industry such as recycling produced wastewater[194] or conducting waterless

184. Whistleblower protections are found in many environmental statutes. *E.g.,* Toxic Substances Control Act, 15 U.S.C. § 2622 (2012); Occupational Safety and Health Act, 29 U.S.C. § 660(c); Clean Water Act, 33 U.S.C. §1367; Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §9610(a); Safe Drinking Water Act, 42 U.S.C. § 300j–9(i); Solid Waste Disposal Act, 42 U.S.C. § 6971; Clean Air Act, 42 U.S.C. § 7622.

185. *E.g.*, 33 U.S.C. § 1319(c)(4); 42 U.S.C. § 7413(c)(2)(A).

186. *E.g.*, 42 U.S.C. § 7413(f); 42 U.S.C. § 9609(d).

187. *E.g.*, 42 U.S.C. § 6972; 42 U.S.C. § 7604.

188. *E.g.*, Fracturing Responsibility and Awareness of Chemicals Act of 2013, H.R. 1921, 113th Cong. (2013).

189. *E.g.*, *id.*

190. *E.g.*, *id.*

191. *E.g.*, Safe Hydration is an American Right in Energy Development Act of 2013, H.R. 2983, 113th Cong. (2013).

192. Bringing Reductions to Energy's Airborne Toxic Health Effects Act, H.R. 1204, 112th Cong. (2011).

193. *See* Richard Liroff, Interfaith Ctr. on Corporate Responsibility, Investor Envtl. Health Network, Extracting the Facts: An Investor Guide to Disclosing Risks from Hydraulic Fracturing Operations (2011), http://www.iccr.org/issues/subpages/ExtractingTheFacts121311LR.pdf.

194. *See* Adam Vann, Brandon J. Murrill & Mary Tiemann, Cong. Research. Serv., R43152, Hydraulic Fracturing: Selected Legal Issues 8 (2014); Terry W. Roberson, *Environmental Concerns of Hydraulically Fracturing a Natural Gas Well*, 32 Utah Envtl. L. Rev. 67, 125–26 (2012).

fracking.[195] Particular attention should be given to the EPA's *Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources*.[196] For this study, Congress directed the EPA to "to assess the potential impacts of hydraulic fracturing on drinking water resources and to identify the driving factors that affect the severity and frequency of any impacts."[197] However, legislators should seek supplemental industry and agency guidance on air impacts, ecological effects, seismic risks, public safety, and occupational risks, as this is beyond the scope of the study.[198]

Conclusion

Pollution and contamination from fracking are more than trivial negative externalities; they harm the public health and welfare of the country. They disproportionately burden the rural poor, who have inadequate access to justice under the common law and extant federal laws. New or amended federal legislation that utilizes cooperative federalism has the potential to avoid many of the pitfalls of current legal regimes and is preferable to exclusively state-based regulation. Comprehensive federal legislation is needed to ensure that aggrieved individuals have their fair day in court, and it will incentivize fracking operators to internalize many of these social and environmental costs. At a minimum, the writers of any new fracking law should consider closing existing loopholes, or at least enough of them so that federal regulation ensures safety at every step of the fracking process. Legislators should look to state and federal laws for examples of proven regulatory schemes and also to proposed legislation for potentially useful regulatory tactics. Federal regulation has the potential to provide individuals injured by fracking with their fair day in court, and it can ensure that the nation reaps the economic benefits of fracking under the aegis of equitable regulation.

195. *See Our Proprietary Process*, GasFrac, http://www.gasfrac.com/proven-proprietary-process.html (Apr. 26, 2015).
196. EPA, Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources (2011), http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/upload/hf_study_plan_110211_final_508.pdf.
197. *Id.* at viii.
198. *Id.* at xi.