

# Hydraulic Fracturing Contamination Claims: Problems of Proof

KEITH B. HALL\*

## TABLE OF CONTENTS

I.	INTRODUCTION .....	71
II.	WHAT IS HYDRAULIC FRACTURING? .....	72
III.	WHY IS IT DIFFICULT TO PROVE THE CAUSE OF CONTAMINATION? .....	73
IV.	BASELINE TESTING .....	76
V.	<i>LONE PINE ORDERS</i> .....	80
VI.	CONCLUSION.....	85

## I. INTRODUCTION

Hydraulic fracturing is controversial. Many people believe that hydraulic fracturing has caused contamination of groundwater and that the process should be prohibited because it is likely to cause additional contamination if it continues to be used. Many other people believe that hydraulic fracturing has not caused contamination and that little additional regulation is needed because fracturing is a useful process that poses little risk. Notably, this disagreement is not merely a difference of opinion regarding how society should balance economic development and environmental protection. Instead, the disagreement concerns facts—whether fracturing already has caused contamination and how much risk the process entails.

In part, the disagreement about facts arises from the difficulties in proving whether water is contaminated and, if so, what caused the contamination. It is important to consider ways to deal with these difficulties because determining whether hydraulic fracturing has caused contamination in specific circumstances can shed light on the general

---

\* Keith B. Hall is the Director of the Louisiana Mineral Law Institute and an Assistant Professor of Law at Louisiana State University, where he teaches Mineral Rights, Advanced Mineral Law, International Petroleum Transactions, and an Energy Law Seminar that focuses on environmental issues relating to the oil and gas industry. Before joining LSU Law School, he was member of Stone Pigman Walther Wittmann in New Orleans, where he practiced law for sixteen years, focusing his practice on oil and gas law, environmental law, and toxic tort litigation. He is a member of the Board of Editors for the Oil & Gas Reporter, Co-Chair of the New Orleans Bar Association's Oil & Gas Section, Chair of the Louisiana State Bar Association's Environmental Law Section, and a member of the Board of Trustees for the Rocky Mountain Mineral Law Foundation. Mr. Hall earned a J.D. from Loyola Law School and a B.S. in Chemical Engineering from LSU.

level of risk involved in using fracturing. It also can be important for purposes of resolving the numerous individual lawsuits in which plaintiffs allege that their groundwater has been contaminated by hydraulic fracturing.

This Essay contains five Parts. Parts II and III discuss what hydraulic fracturing is and the reasons why proving contamination claims is often difficult. The remaining Parts discuss ways to deal with two “problems of proof.” Specifically, Part IV examines new state regulations that require or encourage baseline testing of groundwater before oil or gas drilling takes place. In the past, the lack of such testing has often been a problem when evaluating contamination claims. The fifth Part of this Essay discusses *Lone Pine* orders, a procedure that courts can use in an effort to quickly resolve cases in which plaintiffs lack evidence to support an essential element of their claim.

## II. WHAT IS HYDRAULIC FRACTURING?

When oil or gas is found underground, it generally is not found in underground caverns. Instead, it is found in the pore spaces of subsurface rock formations.<sup>1</sup> Thus, in order to reach the wellbore or an oil and gas well, the oil or gas must travel through rock.<sup>2</sup> In many formations, the oil or gas can easily do this by moving from one pore space to the next through interconnections between the pores, or by flowing through natural fractures in the rock.<sup>3</sup> But in some formations, the natural fractures and interconnections between pores are not sufficient for oil or gas to flow at a significant rate.<sup>4</sup> In such cases, it is uneconomical to drill for oil or gas using conventional methods.<sup>5</sup>

---

<sup>1</sup> RICHARD C. SELLEY, *ELEMENTS OF PETROLEUM GEOLOGY* 238–39 (2d ed. 1998); JAMES G. SPEIGHT, *THE CHEMISTRY AND TECHNOLOGY OF PETROLEUM* 103 (2d ed. 1991). Indeed, the word “petroleum” is Latin for “rock oil.” See Merriam-Webster’s Ninth New Collegiate Dictionary 822, 879, 880 (1987), (822 (“oleum”), 879 (“petr”), 880 (“petroleum”).

<sup>2</sup> SPEIGHT, *supra* note 1, at 142; see also MARTIN S. RAYMOND & WILLIAM L. LEFFLER, *OIL AND GAS PRODUCTION IN NONTECHNICAL LANGUAGE* 167 (2006).

<sup>3</sup> RAYMOND & LEFFLER, *supra* note 2, at 39.

<sup>4</sup> The interconnections between pores sometimes are called “pore throats.” See NORMAN J. HYNE, *NONTECHNICAL GUIDE TO PETROLEUM GEOLOGY, EXPLORATION, DRILLING AND PRODUCTION* 158 (2d ed. 2001).

<sup>5</sup> See DANIEL YERGIN, *THE QUEST: ENERGY, SECURITY, AND REMAKING THE MODERN WORLD* 326 (2011).

Hydraulic fracturing or “fracing”<sup>6</sup> is the process of using hydraulic pressure to create additional fractures in an underground rock formation.<sup>7</sup> Those fractures can then serve as supplemental pathways for oil or gas to flow to a well that has been drilled to the formation.<sup>8</sup> This allows oil or gas to flow to the well at faster rates, thereby making it economical to drill in locations where it otherwise would not be economical.<sup>9</sup> The fluid used to impose the hydraulic pressure that fractures the formation is typically a mixture of water,<sup>10</sup> proppants,<sup>11</sup> and various additives.<sup>12</sup>

### III. WHY IS IT DIFFICULT TO PROVE THE CAUSE OF CONTAMINATION?

One of the reasons why different people reach different conclusions regarding whether hydraulic fracturing has contaminated groundwater is that it can be difficult to prove the cause of alleged contamination.<sup>13</sup> For

---

<sup>6</sup> Hydraulic fracturing is sometimes called by various other terms, such as: “fracing”; “fracking”; “hydrofracturing”; and “hydrofracking.” Hannah Wiseman, *Fracturing Regulation Applied*, 22 DUKE ENVTL. L. & POL’Y F. 361, 361 (2012). “Fracking” has become the shortened term most often used in the media, but “fracing” is more traditional and still is often used by persons who regularly do oil and gas law or other work in the industry. HYNÉ, *supra* note 4, at 423–26 (illustrating a petroleum geologist using “fracing”); Christopher S. Kulander, *Environmental Effects of Petroleum Production: 2010–2011 Texas Legislative Developments*, 44 TEX. TECH. L. REV. 863, 869–77 (2012) (illustrating an oil and gas law professor repeatedly using “fracing”); Bruce M. Kramer & Owen L. Anderson, *The Rule of Capture: An Oil and Gas Perspective*, 35 ENVTL. L. 899, 933–36 (2005) (illustrating two oil and gas law professors repeatedly using “fracing”).

<sup>7</sup> NAT’L ENERGY TECH. LAB., U.S. DEP’T OF ENERGY, MODERN SHALE GAS DEV. IN THE UNITED STATES: A PRIMER 56 (April 2009) [hereinafter SHALE GAS PRIMER].

<sup>8</sup> David E. Pierce, *Carol Rose Comes to the Oil Patch: Modern Property Analysis Applied to Modern Reservoir Problems*, 19 PENN. ST. ENVTL. L. REV. 241, 259–60 (2011).

<sup>9</sup> See DANIEL YERGIN, *THE QUEST: ENERGY, SECURITY, AND REMAKING THE MODERN WORLD*, 327, 329 (2011).

<sup>10</sup> SHALE GAS PRIMER, *supra* note 7, at 62; David E. Pierce, *Developing a Common Law of Hydraulic Fracturing*, 72 U. PITT. L. REV. 685, 689 n.21 (2011).

<sup>11</sup> Proppants are small granular particles. During hydraulic fracturing, the fracturing fluid carries the proppants into the newly-created fractures. When the fracturing fluid is removed from the well, the proppants remain behind, propping open the fractures, which otherwise would close after the fracturing fluid is removed. Kurth et al., *infra* note 33, at § 4.05; SPEIGHT, *supra* note 1, at 141. The most common proppant is sand, though other substances, such as small ceramic spheres and sintered bauxite are sometimes used. Robin Beckwith, *Proppants: Where in the World*, JPT, Apr. 2011, at 36–40, available at <http://www.spe.org/jpt/print/archives/2011/04/11ProppantShortage.pdf>.

<sup>12</sup> The additives include biocides, corrosion inhibitors, friction reducers, and viscosity adjusters. SHALE GAS PRIMER, *supra* note 7, at 61–64.

<sup>13</sup> Another reason is misinformation. There is no dispute that oil and gas activity sometimes causes contamination. TIMOTHY M. KRESSE, ET AL., U.S. GEOLOGICAL SURVEY, SHALLOW GROUNDWATER QUALITY AND GEOCHEMISTRY IN THE FAYETTEVILLE SHALE GAS-

example, sampling and analysis is necessary to prove whether water is contaminated. Further, even if testing shows that groundwater is contaminated, it can be difficult to prove the cause of that contamination. Some harmful substances are naturally found in the groundwater in certain areas.<sup>14</sup> Also, there might be several types of human activity that

---

PRODUCTION AREA, NORTH-CENTRAL ARKANSAS 22(2011), available at <http://pubs.usgs.gov/sir/2012/5273/sir2012-5273.pdf>.

But the available evidence clearly suggests that hydraulic fracturing itself (as opposed to surface spills, blowouts, and well construction failures) poses very little risk of contaminating groundwater, notwithstanding frequent claims to the contrary by those who oppose hydraulic fracturing. Industry is not alone in saying this or saying similar things. Marc Bern is a New York lawyer who is plaintiffs' counsel in several of the pending cases in which plaintiffs allege that their land or groundwater has been contaminated by hydraulic fracturing or other types of oil and gas activity. One would not expect Mr. Bern to expressly exonerate hydraulic fracturing, and he has not, but in 2011 he co-authored an article in which he stated, "[I]f there is one piece of advice our firm has learned and can pass on, it is that plaintiff's counsel should stay away from the term 'fracking.'" He goes on to explain: "Most of the contamination documented to date arising from natural gas wells was caused by activities on the surface or by the construction of the gas well itself." Marc J. Bern & Tate J. Kunkle, *A Plaintiff's Primer On Litigating Natural Gas Cases*, WESTLAW J. ENVTL., June 8, 2011, at 3, 4.

Scott Anderson is a Senior Policy Advisor for the Environmental Defense Fund, an organization that has called for stricter regulation of the oil and gas industry. He authored a blog post in which he listed multiple environmental issues raised by hydraulic fracturing and shale gas development generally, and in which he said it is not "impossible" for fracturing to cause contamination, but in which he also acknowledged that multiple studies of hydraulic fracturing have "not [ou]nd any confirmed cases of drinking water contamination due to pathways created by hydraulic fracturing." Scott Anderson, *If the Problem Isn't Hydraulic Fracturing, Then What Is?*, ENERGY EXCHANGE (Feb. 16, 2012), <http://blogs.edf.org/energyexchange/2012/02/16/if-the-problem-isnt-hydraulic-fracturing-then-what-is/>.

Lisa Jackson, former Administrator of the Environmental Protection Agency under President Barack Obama, testified before Congress that she was unaware of any proven cases of groundwater contamination caused by hydraulic fracturing. See *EPA Administrator Lisa Jackson Tells Congress "No Proven Cases Where Fracking Has Affected Water"* (Fox News television broadcast May 24, 2011), <http://www.youtube.com/watch?v=L4RLzLcox5c>. Regulatory agencies in multiple states have made similar statements. See, e.g., DIV. OF OIL & GAS RES. MGMT., OHIO DEP'T OF NATURAL RES., THE FACTS ABOUT HYDRAULIC FRACTURING (2013), available at <http://oilandgas.ohiodnr.gov/portals/oilgas/pdf/Facts-about-HFracturing.pdf>; MICH. DEP'T OF ENVTL. QUALITY, QUESTIONS AND ANSWERS ABOUT HYDRAULIC FACTURNG IN MICHIGAN, available at [http://www.michigan.gov/documents/deq/deq-FINAL-frack-QA\\_384089\\_7.pdf](http://www.michigan.gov/documents/deq/deq-FINAL-frack-QA_384089_7.pdf); *Hydraulic Fracturing Frequently Asked Questions*, R.R. COMM'N OF TEX., <http://www.rrc.state.tx.us/about/faqs/hydraulicfracturing.php> (last visited Apr. 16, 2013).

<sup>14</sup> See, e.g., MARTHA G. NIELSEN, ET AL., U.S. GEOLOGICAL SURVEY, ASSESSMENT OF ARSENIC CONCENTRATIONS IN DOMESTIC WELL WATER, BY TOWN, IN MAINE, 2005-09 1 (2010), available at [http://pubs.usgs.gov/sir/2010/5199/pdf/sir2010-5199\\_nielsen\\_arsenic\\_report\\_508.pdf](http://pubs.usgs.gov/sir/2010/5199/pdf/sir2010-5199_nielsen_arsenic_report_508.pdf) (noting that arsenic is found naturally in the groundwater in some areas).

can cause a particular type of contamination.<sup>15</sup> Further, there might have been multiple persons engaged in the types of activity that can cause contamination.

For example, consider methane, which is the principal component of natural gas.<sup>16</sup> In several of the disputes in which landowners allege that hydraulic fracturing caused groundwater contamination, the alleged contaminant is methane.<sup>17</sup> There are several potential causes of methane contamination. First, it is well established that there are many locations in which the groundwater naturally contains methane. This is illustrated by a recent U.S. Geological Survey report regarding the presence of methane in New York groundwater.<sup>18</sup> That report states that “[m]ethane naturally discharges to the land surface at some locations in New York.”<sup>19</sup> The report describes the locations of several “surface seeps of natural gas” in New York, and notes “[m]ethane occurs locally in the groundwater of New York . . . [A]s a result, it may be present in drinking-water wells, in the water produced from those wells, and in the associated water-supply systems.”<sup>20</sup> Recent reports from other sources have noted the widespread natural occurrence of methane in water wells in upstate New York and parts of Pennsylvania.<sup>21</sup> Other studies have found naturally occurring methane in groundwater in other areas.<sup>22</sup>

---

<sup>15</sup> *Id.* at 1 (noting use of arsenic as a pesticide on crops); U.S. GEOLOGICAL SURVEY, FACT SHEET NO. 2006-3011 METHANE IN WEST VIRGINIA GROUND WATER, 1 (2006), available at [http://pubs.usgs.gov/fs/2006/3011/pdf/Factsheet2006\\_3011.pdf](http://pubs.usgs.gov/fs/2006/3011/pdf/Factsheet2006_3011.pdf) (noting multiple human activities that can cause methane to be present in groundwater) [hereinafter METHANE].

<sup>16</sup> SPEIGHT, *supra* note 1, at 120–22 (natural gas typically 70 to 98% methane); HYNE, *supra* note 4, at 10 (same).

<sup>17</sup> See, e.g., Roth v. Cabot Oil & Gas Corp., 287 F.R.D. 293, 294–95 (M.D. Pa. 2012).

<sup>18</sup> U.S. GEOLOGICAL SURVEY, OPEN-FILE REPORT NO. 2012-1162, DISSOLVED METHANE IN NEW YORK GROUNDWATER 1 (2012), available at [http://pubs.usgs.gov/of/2012/1162/pdf/ofr2012-1162\\_508\\_09072012.pdf](http://pubs.usgs.gov/of/2012/1162/pdf/ofr2012-1162_508_09072012.pdf).

<sup>19</sup> *Id.* at 1.

<sup>20</sup> *Id.*

<sup>21</sup> One recent study of methane in water wells in northeastern Pennsylvania and upstate New York concluded that average methane concentrations in water wells were higher in wells located in the vicinity of oil and gas activity, though the study noted that a large portion of drinking water wells contained methane “regardless of gas industry operations,” and that “[p]revious studies have shown that naturally occurring methane in shallow aquifers.” Stephen G. Osborn, et al., *Methane Contamination of Drinking Water Accompanying Gas-Well Drilling And Hydraulic Fracturing*, 108 Proceedings of the Nat’l Acad. of Sci. of the U.S. 8172, 8173, 8175 (May 9, 2011). The authors of that study, the “Duke study,” conclude that natural gas exploration and production activities are the likely cause of the elevated methane concentrations, though they speculated that poorly constructed, leaking wells was more likely the cause of methane contamination, rather than

Methane contamination of groundwater can also be caused by coal mining, oil and gas activity, or other human activities (such as landfill operations),<sup>23</sup> and there might be more than one company that has been involved in such activities in a given area. The multiple potential causes of methane contamination complicate the task of proving the cause. Another complicating factor is that landowners rarely have data that shows the quality of their water prior to activity that they suspect of causing contamination. The absence of such “baseline data” prevents a “before and after” comparison of water quality.

#### IV. BASELINE TESTING

If a landowner alleges that his groundwater has been contaminated by hydraulic fracturing, a significant hurdle to proving that claim can be the lack of baseline data—that is, data on the quality of water prior to the activity that the plaintiff alleges caused contamination. The absence of such data is unfortunate for everyone, including the landowner who believes his groundwater has been contaminated by the fracturing, the defendant who believes otherwise, and the policymakers and public who have difficulty reconciling those conflicting claims.

A few states have taken steps to address this by enacting provisions that either require or encourage baseline testing before an oil or gas well is drilled or fractured. For example, Colorado has enacted a regulation, which mandates that “[i]nitial baseline samples” be collected from “all Available Water Sources, up to a maximum of four (4), within a one-half

---

migration of methane from the formations being fractured upward through the formations above. *Id.* at 8175.

The authors of another recent report disagreed with the Duke study, concluding that the data shows no correlation between the level of methane in water wells and the proximity of oil and gas activity. Lisa J. Molofsky, et al., *Methane in Pennsylvania Water Wells Unrelated to Marcellus Shale Fracturing*, OIL & GAS J., Dec. 5, 2011, at 54–55, available at <http://www.cabotog.com/pdfs/MethaneUnrelatedtoFracturing.pdf>. Those authors stated that methane occurs naturally in many water wells in Susquehanna County, Pennsylvania. *Id.*

<sup>22</sup>TIMOTHY M. KRESSE ET AL., U.S. GEOLOGICAL SURVEY, SCI. INVESTIGATIONS REPORTS NO. 2012-5273, SHALLOW GROUNDWATER QUALITY AND GEOCHEMISTRY IN THE FAYETTEVILLE SHALE GAS-PRODUCTION AREA, NORTH-CENTRAL ARKANSAS, 2011, 27 (2012), available at <http://pubs.usgs.gov/sir/2012/5273/sir2012-5273.pdf>; J.C. THOMAS & P.B. McMAHON, U.S. GEOLOGICAL SURVEY, SCI. INVESTIGATIONS REPORT NO. 2012-5198, OVERVIEW OF GROUNDWATER QUALITY IN THE PICEANCE BASIN, WESTERN COLORADO, 1946–2009, 40, 45 (2012), available at <http://pubs.usgs.gov/sir/2012/5198/SIR12-5198.pdf>; METHANE, *supra* note 15, at 1. Experts can attempt to determine the source of the methane by examining the hydrogen and carbon isotopes in the methane, and by analyzing what other hydrocarbons are present. See Osborn, *supra* note 21, at 8173–76; Molofsky, *supra* note 21, at 59–61.

<sup>23</sup>METHANE, *supra* note 15, at 1.

(1/2) mile radius of a proposed Oil and Gas Well” prior to drilling the well.<sup>24</sup> The regulation includes substantial additional detail about the initial sampling and testing requirements.<sup>25</sup> After the drilling operation, the operator must collect and analyze two rounds of “subsequent samples,” with one round being collected sometime between six and twelve months after completion of the well and another round being collected between sixty and seventy-two months following completion.<sup>26</sup> An Ohio statute also requires baseline testing.<sup>27</sup>

Pennsylvania law does not require baseline testing, but a Pennsylvania statute strongly encourages it.<sup>28</sup> The statute provides that, if a groundwater supply located within 2,500 feet of the vertical section<sup>29</sup> of an unconventional oil or gas well<sup>30</sup> becomes contaminated within twelve

---

<sup>24</sup> 2 COLO. CODE REGS. § 404-1:609(b) (2012). Initial samples must be collected within twelve months of setting the conductor pipe, an early stage in the drilling process. 2 COLO. CODE REGS. § 404-1:609(d)(1) (2012) (timing of sampling); HYNE, *supra* note 4, at 241 (describing drilling and noting setting of conductor pipe early in process).

<sup>25</sup> For example, the operator is directed to collect samples from both down-gradient and up-gradient sample locations if they are available and the direction of groundwater flow is known. 2 COLO. CODE REGS. § 404-1:609(b)(3) (2012). If the direction of flow is uncertain, the operator should attempt to collect samples from locations in a radial pattern around the proposed oil and gas well. *Id.* If more than four Available Water Sources exist, the operator should sample those that are closest. 2 COLO. CODE REGS. § 404-1:609(b)(1) (2012). If aquifers exist at different depths, the operator should attempt to sample from the shallowest and the deepest depth. 2 COLO. CODE REGS. § 404-1:609(b)(4) (2012).

<sup>26</sup> 2 COLO. CODE REGS. § 404-1:609(d)(2) (2012). The regulation also specifies certain substances for which the samples must be analyzed and requires certain actions if the substances are found in concentrations higher than specified levels. 2 COLO. CODE REGS. § 404-1:609(e) (2012).

<sup>27</sup> OHIO REV. CODE ANN. § 1509.06(A)(8) (West 2012).

<sup>28</sup> *See* 58 PA. CONS. STAT. ANN. § 3218 (West 2012).

<sup>29</sup> Many of the oil and gas wells drilled into shale formations—a classic unconventional formation—are drilled vertically downward until drilling nearly reaches the desired depth, then the direction of drilling is gradually turned from vertical to horizontal, with the drilling then proceeding horizontally for perhaps a mile or more within the shale formation. Hannah Wiseman, *Regulatory Adaptation in Fractured Appalachia*, 21 VILL. ENVTL. L.J. 229, 236–37 (2010); *see also* Keith B. Hall, *Regulation of Hydraulic Fracturing Under the Safe Drinking Water Act*, 19 BUFF. ENVTL. L.J. 1, 7–8 (2011–2012). “Shale gas” is natural gas produced from a shale formation. *Glossary*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/tools/glossary/index.cfm?id=S> (last visited Apr. 18, 2013).

<sup>30</sup> The Energy Information Administration’s “glossary of terms” defines “unconventional oil and natural gas production” as “[a]n umbrella term for oil and natural gas that is produced by means that do not meet the criteria for conventional production.” *Id.* In turn, it defines “[c]onventional oil and natural gas production” as being production from “a well drilled into a geologic formation in which the reservoir and fluid characteristics permit the oil and natural gas to readily flow to the wellbore.” *Id.* Hydraulic fracturing often is used in unconventional formations. Thomas E. Kurth, et al., *American Law and Jurisprudence on Fracing*, 58 ROCKY MT. MIN. L. INST. 4-1, 4-5 (2012) (“Hydraulic

months after completion or hydraulic fracturing of the well, there is a “rebuttable presumption” that the oil and gas operations caused the contamination.<sup>31</sup> A similar rebuttable presumption applies for conventional wells, though it applies for a smaller area and for a shorter period of time than the presumption for unconventional wells.<sup>32</sup>

An operator can rebut the presumption that he caused the contamination by “affirmatively prov[ing]” that something else caused the contamination,<sup>33</sup> or by showing that the owner of the water supply refused to allow the operator to sample the water.<sup>34</sup> But the Pennsylvania statute also states that “[a]n operator electing to preserve a defense [based on rebutting the presumption] shall retain an independent certified laboratory to conduct a predrilling . . . survey of the water supply,” and shall provide the survey results to state regulators and the owner of the water supply that is sampled.<sup>35</sup> This provision arguably makes the

---

fracturing is generally viewed as a completion technique that is a practical necessity to promote development of unconventional ‘tight’ shale reservoirs, particularly oil shale and gas shale.”).

<sup>31</sup> 58 PA. CONS. STAT. ANN § 3218(c)(2) (West 2012). For unconventional wells, the statute provides that the rebuttable presumption will apply if contamination occurs within twelve months after completion or “stimulation” of the well. Hydraulic fracturing is a form of “well stimulation.” The Manual of Oil and Gas Terms does not define “well stimulation,” but it notes that “stimulate” is defined by a West Virginia statute as “any action taken by well operator to increase the inherent productivity of an oil or gas well, including, but not limited to, fracturing, shooting or acidizing, but excluding cleaning out, bailing or workover operations.” W. VA. CODE ANN. § 22-6-1 (West 2011).

<sup>32</sup> 58 PA. CONS. STAT. ANN § 3218(c)(1) (West 2012). For a conventional oil and gas well (one that is not hydraulically fractured), the rebuttable presumption applies whenever a water supply located within 1,000 feet of the well becomes contaminated within six months of completion of the well. *Id.*

<sup>33</sup> *Id.* at § 3218(d). The operator also can rebut the presumption by proving that the contaminated water supply is located outside the area for which the presumption is established, that the contamination occurred either before the operator’s drilling activity or after the time period for which the presumption applies, or that “the landowner or water purveyor refused to allow the operator access to conduct a predrilling . . . survey.” *Id.* If the defendant rebuts the presumption by proving that something other than his operations caused the contamination, that proof probably will be sufficient to defeat liability. If, on the other hand, the defendant rebutted the presumption by proving that the contamination occurred after the time period for which the presumption applies or that the owner of the water refused to allow the operator to sample the water, a court might allow the owner of the water supply to attempt to prove (without the aid of a rebuttable presumption) that the operator caused contamination.

<sup>34</sup> *Id.* at § 3218(e.1). The statute requires the operator to inform the landowner that he will lose the benefit of the rebuttable presumption if he refuses to grant the operator access to perform a predrilling survey.

<sup>35</sup> *Id.* at § 3218(e). The regulation does not specify the chemicals for which an operator should test, but given the rebuttable presumption established by the statute, operators have an incentive to conduct a reasonably thorough analysis.



presumption irrebuttable in the event that the operator does not perform the required baseline testing.<sup>36</sup>

The West Virginia Horizontal Well Act<sup>37</sup> contains somewhat similar provisions that apply to “horizontal” oil and gas wells.<sup>38</sup> The Act provides that, if a water supply located within 1,500 feet of the vertical section of a horizontal well becomes contaminated, there will be a rebuttable presumption that the operator of the oil and gas well caused the contamination.<sup>39</sup> The operator of the well can rebut the presumption, but if the operator wishes to rebut it by proving that the “pollution existed prior to the drilling,” he must perform baseline testing.<sup>40</sup>

Other states should consider enacting regulations to require baseline testing.<sup>41</sup> As between the two approaches to baseline testing regulations

---

<sup>36</sup> Perhaps a court would interpret this language as merely precatory. Otherwise, this provision could lead to unjust results. Assume, for example, that an operator did not perform the required baseline testing using an independent laboratory, but there is irrefutable evidence that something else caused the contamination. It would be unfair in such a situation to impose an irrebuttable presumption that the operator caused the contamination.

<sup>37</sup> W. VA. STAT. ANN. §§ 22-6A-1 to 22-6A-24 (West 2011).

<sup>38</sup> *Id.* at § 22-6A-3.

<sup>39</sup> *Id.* at § 22-6A-18(b).

<sup>40</sup> *Id.* at § 22-6A-18(c)(1). Under the West Virginia Horizontal Well Act, an operator’s failure to perform baseline testing would not appear to preclude the operator from rebutting the presumption altogether, as the Pennsylvania statute arguably does. An operator can rebut the presumption by proving that the contamination was caused by something other than the operator’s drilling activity, that the contamination occurred more than six months after the operator’s drilling operations, or that the contaminated water supply is not within 1,500 feet of the oil and gas well. *Id.* at § 22-6A-18(c).

<sup>41</sup> In addition, several organizations have endorsed baseline testing. Both the American Petroleum Institute and the Canadian Association of Petroleum Producers have adopted “best practices” that include baseline testing. AM. PETROLEUM INST., API GUIDANCE DOCUMENT HF1, HYDRAULIC FRACTURING OPERATIONS—WELL CONSTRUCTION AND INTEGRITY GUIDELINES 20 (1st ed. 2009), *available at* [http://www.api.org/~media/Files/Policy/Exploration/API\\_HF1.pdf](http://www.api.org/~media/Files/Policy/Exploration/API_HF1.pdf); CANADIAN ASS’N OF PETROLEUM PRODUCERS, CAPP HYDRAULIC FRACTURING OPERATING PRACTICE: BASELINE GROUNDWATER TESTING (2012), *available at* <http://www.capp.ca/getdoc.aspx?DocId=218135&DT=NTV>. The U.S. Secretary of Energy appointed an advisory board to examine shale gas development issues. Memorandum from Steven Chu to William J. Perry, Chairman, Sec’y of Energy Advisory Bd. (May 5, 2011), *available at* [http://energy.gov/sites/prod/files/edg/news/documents/Fracking\\_subcommittee\\_charge.pdf](http://energy.gov/sites/prod/files/edg/news/documents/Fracking_subcommittee_charge.pdf). That group issued a report that included various recommendations, including a recommendation for baseline testing. SEC’Y OF ENERGY ADVISORY BD., U.S. DEP’T OF ENERGY, SHALE GAS PRODUCTION SUBCOMMITTEE SECOND NINETY DAY REPORT 7 (Nov. 18, 2011), *available at* [http://www.shalegas.energy.gov/resources/111811\\_final\\_report.pdf](http://www.shalegas.energy.gov/resources/111811_final_report.pdf). Also, the Center for Sustainable Shale Development, a group that includes both environmentalist and industry stakeholders, also developed best practices regulations that call for baseline testing. CTR. FOR SUSTAINABLE SHALE DEV., PERFORMANCE STANDARDS 3 (2013), *available at* <http://037186e.netsolhost.com/site/wp-content/uploads/2013/03/CSSD-Performance-Standards-3-27-GPX.pdf>.

described above—the Colorado and Ohio approach (requiring baseline testing) and the Pennsylvania and West Virginia approach (imposing a rebuttable presumption against oil and gas operators as a means of encouraging baseline testing)—the Colorado and Ohio approach is better for at least two reasons. First, the public interest is best served by rules that require baseline testing. The Colorado and Ohio rules do that; the Pennsylvania and West Virginia rules merely encourage it. Second, the traditional rule in civil litigation throughout the United States is that plaintiffs have the burden of proving their claims.<sup>42</sup> It is bad public policy to deviate from that traditional rule with respect to members of a single industry, requiring them to disprove claims asserted against them.<sup>43</sup>

#### V. LONE PINE ORDERS

A second “problem of proof” is faced by courts—how to manage cases in which plaintiffs allege that hydraulic fracturing has contaminated their land or groundwater. Such cases typically will involve complicated scientific and technical evidence, the use of multiple experts from different scientific and technical disciplines, and significant discovery.<sup>44</sup> Further, some of the cases in which plaintiffs allege contamination from hydraulic fracturing have been filed as putative class actions, further adding to the complexity of the case.<sup>45</sup> Such factors can make cases expensive for the parties to litigate, and can cause such cases to consume

---

<sup>42</sup> Another potential problem is that Pennsylvania does not keep a registry of private water wells. *Private Water Wells*, BUREAU OF POINT & NON-POINT SOURCE MGMT. [http://www.depweb.state.pa.us/portal/server.pt/community/private\\_water\\_wells/20690](http://www.depweb.state.pa.us/portal/server.pt/community/private_water_wells/20690) (last visited Apr. 19, 2013).

<sup>43</sup> A third approach would be to give companies some flexibility, yet encourage baseline testing, by creating a rebuttable presumption against oil and gas well operators unless they perform baseline testing and make it available to regulators and the owner of the water supply tested.

<sup>44</sup> To prove damages, a plaintiff that claims personal injury and lost property value will need medical experts and real estate experts. *See, e.g.,* *Strudley v. Antero Res. Corp.*, No. 2011-cv-2218, 2012 WL 1932470, at \*1–2 (Colo. Dist. Ct. Denver Cnty. May 9, 2012); *Lore v. Lone Pine Corp.*, No. L-33606-85, 1986 WL 637507, at \*2–3 (N.J. Super. Ct. Nov. 18, 1986). The plaintiff might also need a petroleum engineer or other expert who can testify how the defendant’s well could have caused contamination and a hydrologist to explain how the contamination would have been transported to plaintiff’s water supply. The plaintiff likely will need a chemist to verify that her water is contaminated. And, if she alleges methane contamination and she lives in an area where the groundwater sometimes naturally contains methane, the plaintiff likely would need a chemist to perform isotopic analyses to rule out the possibility that the methane in the plaintiff’s water well is methane that was naturally present.

<sup>45</sup> *See, e.g.,* *Tucker v. Sw. Energy Co.*, Nos. 11-cv-44-DPM, 11-cv-45-DPM, 2012 WL 528253, at \*1 (E.D. Ark. Feb. 17, 2012).

a disproportionate amount of the court's resources and attention. In that sense, hydraulic fracturing contamination claims are like many other cases that involve complex technical evidence, such as pharmaceutical litigation and other toxic tort litigation.

Often, courts have expressed concern about the expense and burden that litigating such cases imposes on the parties and the court.<sup>46</sup> Sometimes, that burden will be unavoidable because the plaintiffs have sufficient evidence to defeat any summary judgment motion (perhaps even enough to prevail at trial) and the parties cannot reach an early settlement. But in some of the cases involving complex technical or scientific issues, as in some of the cases in any other type of litigation, the plaintiffs lack sufficient evidence to support an essential element of their claim.<sup>47</sup> Further, sometimes the critical evidence that the plaintiffs lack will not be a type of evidence for which they need to conduct discovery. Sometimes the essential evidence will be a type of evidence that would be in the control of the plaintiffs and their experts, assuming such evidence exists.<sup>48</sup>

Given the significant expense of litigating cases involving complex technical or scientific issues, courts sometimes have reasoned that, before such a case proceeds, the plaintiffs should be required to produce certain types of evidence—specifically, evidence that should be available to the plaintiffs without formal discovery (or for which the plaintiffs already have been given a chance to conduct discovery) and which is essential to some required element of the plaintiff's case.<sup>49</sup> An order requiring the plaintiffs to produce such evidence before the case proceeds is sometimes called a *Lone Pine* order.<sup>50</sup>

The term “*Lone Pine* order” comes from a New Jersey case, *Lore v. Lone Pine Corp.*,<sup>51</sup> in which a large number of plaintiffs alleged that polluted waters from a landfill had caused them to suffer personal

---

<sup>46</sup> *Strudley*, 2012 WL 1932470, at \*1; *Lore*, 1986 WL 637507, at \*4.

<sup>47</sup> *Id.* In contamination litigation, as in most litigation, the plaintiff generally will have the burden of proof. *See, e.g.*, *Hinchee v. Soloco, L.L.C.*, 971 So. 2d 478, 482–83 (La. Ct. App. 2007); *Mitchell Energy Corp. v. Bartlett*, 958 S.W.2d 430, 446 (Tex. App. 1997).

<sup>48</sup> *Strudley*, 2012 WL 1932470, at \*2 (plaintiffs unable to produce evidence supporting injury claims); *Lore*, 1986 WL 637507, at \*3 (plaintiffs unable to produce medical evidence to support personal injury claims or expert testimony to support claims that property values had declined).

<sup>49</sup> *Strudley*, 2012 WL 1932470, at \*2; *Lore*, 1986 WL 637507, at \*1–2.

<sup>50</sup> *Roth v. Cabot Oil & Gas Corp.*, 287 F.R.D. 293, 299–300 (M.D. Pa. Oct. 15, 2012); *Kamuck v. Shell Energy Holdings GP, LLC*, No. 11-CV-1425, 2012 WL 3864954, at \*7 (M.D. Pa. Sept. 5, 2012); *Hagy v. Equitable Prod. Co.*, No. 10-cv-01372, 2012 WL 713778, at \*4 (S.D. W.Va. Mar. 5, 2012); *Strudley*, 2012 WL 1932470, at \*2.

<sup>51</sup> No. L-33606-85, 1986 WL 637507 (N.J. Super. Ct. Nov. 18, 1986).

injuries and to incur a decrease in property values. The court entered a case management order that required the plaintiffs to produce certain evidence that would be essential for plaintiffs to prove their claims, including:

- facts of each plaintiff's exposure to alleged toxic substances from the landfill;
- reports of treating physicians or medical experts, supporting each plaintiff's claim of injury and causation;
- the address for each property alleged to have declined in value; and
- reports of real estate or other experts supporting each plaintiff's claim of diminution of property value, including the timing, amount, and cause of diminution.<sup>52</sup>

After the plaintiffs failed to submit the information requested, the court dismissed their claims with prejudice, explaining that the plaintiffs had failed to establish a "prima facie" case.<sup>53</sup>

The content of *Lone Pine* orders will vary from one order to the next, but such orders commonly require plaintiffs to present evidence to support certain required elements of their claims, such as causation, damages, or both.<sup>54</sup> Many of the cases in which *Lone Pine* orders are used are class actions, mass joinders, or "MDL" actions,<sup>55</sup> but such orders sometimes have been used in litigation involving only a few plaintiffs.<sup>56</sup> Discovery often is restricted, or stayed altogether, while a *Lone Pine* order is pending.<sup>57</sup>

Plaintiffs often argue that *Lone Pine* orders unfairly require them to present too much evidence too early in the case, before they have had a chance to conduct discovery.<sup>58</sup> Certainly, it is conceivable that a court

---

<sup>52</sup> *Id.* at \*1–2.

<sup>53</sup> *Id.* at \*1,\*4.

<sup>54</sup> *Strudley*, 2012 WL 1932470, at \*2; *Lore*, 1986 WL 637507, at \*1–2.

<sup>55</sup> "MDL" refers to multidistrict litigation. *See* 28 U.S.C. § 1407 (2011).

<sup>56</sup> *See, e.g., Strudley*, 2012 WL 1932470, at \*1 (family alleging health problems from exposure to hydraulic fracturing and natural gas operations); *Pinares v. United Techs. Corp.*, No. 10-80883-CIV, 2011 WL 240512, at \*1 (S.D. Fla. Jan. 19, 2011) (two plaintiffs alleging health injuries from toxic wastes allegedly from the defendant's manufacturing process); *Schelske v. Creative Nail Design, Inc.*, 933 P.2d 799, 803 (Mont. 1997) (two plaintiffs alleging health injuries from toxic substances allegedly from cosmetic manufacturing).

<sup>57</sup> *See e.g., In re Vioxx Prods. Liab. Litig.*, 388 F. App'x 391, 393 & n.1, 394 (5th Cir. 2010).

<sup>58</sup> *See, e.g., id.* at 397. In an Ohio case, a state appellate court expressed concern about a plaintiff's right to discovery being curtailed by a *Lone Pine* order. *Simeone v. Girard City Bd. of Educ.*, 872 N.E.2d 344, 350–51 (Ohio Ct. App. 2007).

could issue a *Lone Pine* order that required a plaintiff to produce evidence relating to issues on which the plaintiff needs to conduct discovery (or conduct more discovery). Or, in evaluating a plaintiff's response to a *Lone Pine* order, a court could expect the plaintiff to produce more evidence than would be needed to survive a summary judgment motion. Either of those things would be erroneous and unfair, and should be a sufficient basis to reverse any dismissal that is based on such error.

But if a court issues a *Lone Pine* order that merely requires a plaintiff to produce evidence that should be within his control (or on which he has had a chance to conduct discovery) and that is essential to some required element of his claim, and the court only requires the plaintiff to produce as much evidence as would be sufficient to defeat a motion for summary judgment, then such an order is not unfair. Further, such orders can save the parties and the court itself from spending significant resources litigating claims on which plaintiff can have no hope of prevailing at trial.

Some plaintiffs and courts have questioned whether a court has authority to issue a *Lone Pine* order.<sup>59</sup> Perhaps parties' use of the phrase "*Lone Pine* order" makes such an order sound exotic, but a typical *Lone Pine* order is simply a case management order that simultaneously sets a summary judgment hearing on specified issues and restricts discovery pending resolution of that hearing. There should be no doubt that the Federal Rules of Civil Procedure, as well as most states' rules of procedure, provide sufficient authority to issue such orders.

For example, Federal Rule of Civil Procedure 56 explicitly authorizes summary judgments and gives courts significant discretion as to when to hear summary judgment motions.<sup>60</sup> Rule 16 authorizes courts to issue

---

<sup>59</sup>Most federal courts conclude that they possess such authority, though they sometimes conclude such an order is not appropriate under the circumstances. *See, e.g.*, In re Digitek Prod. Liab. Litig., 264 F.R.D. 249, 259 (S.D. W.Va. 2010) (stating that a court's inherent authority might provide sufficient authority for a *Lone Pine* order, but, "I believe it more prudent to yield to the consistency and safeguards of the mandated rules [providing for dispositive motions and sanctions] especially at this stage of this litigation. Claims of efficiency, elimination of frivolous claims and fairness are effectively being addressed using the existing and standard means."); *McManaway v. KBR, Inc.*, 265 F.R.D. 384, 385 (S.D. Ind. 2009).

<sup>60</sup>When courts issue *Lone Pine* orders, the orders often are granted at the request of defendants. *See, e.g.*, *Pinares*, 2011 WL 240512, at \*1. In such cases, a motion requesting a *Lone Pine* order requiring the plaintiff to produce evidence on certain issues can be interpreted as a motion for summary judgment on those issues. But even if the *Lone Pine* order is granted *sua sponte*, that does not mean it is improper. The United States Supreme Court had held that courts may set summary judgment hearings *sua sponte*. *Celotex Corp. v.*

case management orders to modify the order, timing, and scope of discovery, and to “take appropriate action” to “formulat[e] and simplify[] the issues, and eliminate[] frivolous claims or defenses.”<sup>61</sup> Courts also on occasion have noted that *Lone Pine* orders are justified by Federal Rule of Civil Procedure 11, which provides for the possibility of sanctions against a party or attorney that files a claim without having a sufficient evidentiary basis.<sup>62</sup> In short, though the rules of procedure do not refer to “*Lone Pine*,” the rules provide ample authority for the substance of the typical *Lone Pine* order.

In at least four recent cases in which plaintiffs allege that hydraulic fracturing or other oil and gas activity has caused contamination, courts have considered whether to grant *Lone Pine* orders. One of those is *Strudley v. Antero Resources Corp.*,<sup>63</sup> which appears to be the first hydraulic fracturing contamination or personal injury claim to go to final judgment. In it, a family alleged various health problems that they contend were caused by the defendants’ activities relating to the exploration for and production of natural gas.<sup>64</sup> The court issued a *Lone*

---

Catrett, 477 U.S. 317, 326, 106 S. Ct. 2548, 2554 (1986); see also *United States v. 14.02 Acres of Land More or Less in Fresno Cnty.*, 547 F.3d 943, 955 (9th Cir. 2008); *Bridgeway Corp. v. Citibank* 201 F.3d 134, 139–41 (2nd Cir. 2000); *Leatherman v. Tarrant Cnty. Narcotics Intelligence & Coordination Unit*, 28 F.3d 1388, 1397 (5th Cir. 1994) (noting that the district court can grant summary judgment *sua sponte* against a party that had notice that the court would consider doing so, and that a court’s grant of summary judgment *sua sponte* could be affirmed even in the absence of notice if failure to give notice was harmless error under the circumstances). State rules of civil procedure also contain provisions authorizing courts to grant summary judgment. See, e.g., LA. CODE CIV. PROC. ANN. art. 966 (2012); OHIO CIV. R. 56; PA. R.C.P. NO. 1035.2. One state court noted a similarity between *Lone Pine* orders and summary judgment. *Simeone*, 872 N.E.2d at 350.

<sup>61</sup>FED. R. CIV. P. 16. Indeed, several federal courts have cited Rule 16 as authority for issuing a *Lone Pine* order. See, e.g., *Avila v. Willits Env’tl. Remediation Trust*, 633 F.3d 828, 833 (9th Cir. 2011); *Acuna v. Brown & Root Inc.*, 200 F.3d, 335, 340 (5th Cir. 2000) (“In the federal courts, such orders are issued under the wide discretion afforded district judges over the management of discovery under Fed.R.Civ.P. 16.”). State rules of procedure typically have provisions similar to Federal Rule 16. See, e.g., LA. CODE CIV. PROC. ANN. art. 1551 (2009); OHIO CIV. R. 16.

<sup>62</sup>See, e.g., *McMunn v. Babcock & Wilcox Power Generation Grp.*, Nos. 10-143, 10-368, 10-650, 10-728, 10-744, 10-908, 10-1736, 11-898, 11-1381, 2012 WL 4006135, at \*1, \*3 (W.D. Pa. Sept. 12, 2012). State rules of procedure typically have provisions similar to Federal Rule 11. See, e.g., LA. CODE CIV. PROC. ANN art. 864; OHIO CIV. R. 11; PA. R.C.P. NO. 1023.1; COL. R.C.P. RULE 11.

<sup>63</sup>No. 2011-cv-2218, 2012 WL 1932470, at \*1 (Col. Dist. Ct. Denver Cty. May 9, 2012) (involving a family alleging health problems from exposure to hydraulic fracturing and natural gas operations).

<sup>64</sup>*Id.*

*Pine* order and dismissed the case with prejudice on May 9, 2012, after ruling that the plaintiffs had not made an adequate response.<sup>65</sup>

In the other three recent decisions—two from the Middle District of Pennsylvania and one from the United States District Court for West Virginia—the courts declined to issue *Lone Pine* orders.<sup>66</sup> The courts concluded that such orders would not be appropriate under the circumstances and procedural postures of those cases.<sup>67</sup> Notably, however, each court suggested that it has authority to issue *Lone Pine* orders and that such orders would be appropriate in some circumstances.<sup>68</sup> But each decision also stated that it would be preferable to use specific provisions in the Federal Rules of Civil Procedure, rather than to rely on a *Lone Pine* order.<sup>69</sup> This suggests that parties who seek *Lone Pine* orders should cite to specific rules of procedure that would authorize the orders they seek (such as rules relating to summary judgment, discovery, and case management orders).

## VI. CONCLUSION

Contamination claims often are difficult to prove. This makes it challenging to resolve individual disputes in which individuals allege contamination, and difficult for the public and policy makers to evaluate competing assertions about the risks posed by hydraulic fracturing. States should consider adopting regulations to require that operators conduct baseline testing of groundwater before drilling for oil or gas, thereby establishing water quality data that might help resolve any future disputes regarding the impact of their drilling operations. And, when plaintiffs file suits alleging contamination, courts should consider issuing *Lone Pine* orders that require plaintiffs to produce certain evidence essential to their claims before all parties and the court invest considerable resources litigating the dispute.

---

<sup>65</sup> *Id.* at \*1–2.

<sup>66</sup> *Roth v. Cabot Oil & Gas Corp.*, 287 F.R.D. 293, 299–300 (M.D. Pa. 2012); *Kamuck v. Shell Energy Holdings GP, LLC*, No. 11-Cv-1425, 2012 WL 3864954, at \*6 (M.D. Pa. Sept. 5, 2012); *Hagy v. Equitable Prod. Co.*, No. 10-CV-01372, 2012 WL 713778, at \*4 (S.D. W.Va. Mar. 5, 2012).

<sup>67</sup> *Roth*, 287 F.R.D. at 299–300; *Kamuck*, 2012 WL 3864954, at \*1; *Hagy*, 2012 WL 713778, at \*3–4.

<sup>68</sup> *Roth*, 287 F.R.D. at 297–300; *Kamuck*, 2012 WL 3864954, at \*3–7; *Hagy*, 2012 WL 713778, at \*4.

<sup>69</sup> *Roth*, 287 F.R.D. at 299–300; *Kamuck*, 2012 WL 3864954, at \*1; *Hagy*, 2012 WL 713778, at \*3–4.