

Update on Legal and Regulatory Issues Relating to Fracking

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Hydraulic Fracturing: An update on the legal, regulatory, and technical issues of fracking

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Introduction

Hydraulic fracturing is a completion method involving the injection of water, proppant, and hydraulic fracturing fluids into underground shale formations to release natural gas.¹ The process is variously called hydro-fracturing, hydro-fracking or, as more commonly referred to and used in this paper, “fracking.” Regardless of the name used, it is a process with a longstanding history and increasing importance. First utilized in the 1940's, fracking is used across the world and is now essential to the economic production of oil and gas.²

Even though fracking is not new, it is being used in new ways.³ Previously, fracking could only be used to increase permeability in a limited zone radiating from the well bore.⁴ Engineers have now honed the process by incorporating horizontal drilling, multi-stage fracturing, slick-water, and improved equipment to allow the operator of a single well to fracture and extract resources from larger areas.

Fracking's widespread use and changing applications have given rise to controversy. Supporters herald fracking as a method to extract vast amounts of formerly inaccessible hydrocarbons.⁵ On the other hand, opponents have raised concerns most often warning of potential environmental impacts. And, “[i]n the way of our world,” various disputes stemming from fracking give rise to lawsuits.⁶

The goal of this paper is to provide a high-altitude update on current issues pertaining to fracking. First, we provide an overview of the litigation landscape for tort claims related to fracking. We also address some of the most prevalent causes of action and defenses in lawsuits

¹ See *Roth v. Cabot Oil & Gas Corp.*, 919 F. Supp. 2d 476, 482-83 (M.D. Pa. 2013).

² *Coastal Oil & Gas Corp. v. Garza Energy Trust*, 268 S.W.3d 1, 6-7 (Tex. 2008) (“First used commercially in 1949, [fracking] is now essential to economic production of oil and gas and commonly used throughout Texas, the United States, and the world.”).

³ *Tucker v. Sw. Energy Co.*, 1:11-CV-44-DPM, 2012 WL 528253, at *1 (E.D. Ark. Feb. 17, 2012) (“But using fracking in deep wells with horizontal bores is new in the natural-gas industry. See, e.g., U.S. Energy Information Administration, *Today in Energy: Technology Drives Natural Gas Production Growth from Shale Gas Formations* (12 July 2011).”).

⁴ *Ctr. for Biological Diversity v. Bureau of Land Mgmt.*, 937 F. Supp. 2d 1140, 1145 (N.D. Cal. 2013).

⁵ *Ctr. for Biological Diversity v. Bureau of Land Mgmt.*, 937 F. Supp. 2d 1140, 1145 (N.D. Cal. 2013).

⁶ *Tucker v. Sw. Energy Co.*, 1:11-CV-44-DPM, 2012 WL 528253, at *1 (E.D. Ark. Feb. 17, 2012).

seeking damages allegedly caused by fracking. This summary shows that, from a legal perspective, there is little environmental risk related to the process of fracking.

Next, the paper provides a synopsis of relevant legislation, regulations, and administrative agency publications. The paper will also address developing issues, including the relation, if any, of fracking to earthquakes.

Summary of Litigation

While there are an increasing number of cases alleging damages caused by fracking, there are a limited number of verdicts. Many cases either settle (often confidentially) or are dismissed.⁷ Existing case law, however, demonstrates the limited systemic risk associated with fracking itself. In other words, current potential liability is not based specifically on fracking, but instead on issues related to unique events at individual wells: alleged errors and omissions, the drilling and well construction process, noise pollution, and air quality. However, these risks are similar to those associated with conventional wells. While there are other causes of action associated with fracking, strict liability, negligence, trespass and nuisance are among the most common allegations.

Strict Liability

As the court in *Ely v. Cabot Oil & Gas Corporation* noted, “no court in the United States has chosen to declare that [fracking] is an ultra-hazardous activity and thus subject to strict tort liability.”⁸ Not surprisingly, the *Ely* court declined “the [p]laintiffs’ invitation to depart from the nation-wide jurisprudence on this point,” and instead determined that fracking does not legally qualify as an ultra-hazardous activity giving rise to strict liability.

In reaching this conclusion, the court examined the factors set forth in the Restatement (Second) of Torts § 520 (1977). Based on government reports and the defendants’ expert reports,

⁷ For example, a recent publication examined ninety-nine cases; there were two verdicts. Of the remaining cases, it was almost an even three-way split between cases that were dismissed, were settled, or remained pending. Blake Watson, *Hydraulic Fracturing Litigation Summary*, http://www.udayton.edu/directory/law/documents/watson/blake_watson_hydraulic_fracturing_primer.pdf. (last visited August 27, 2015).

⁸ *Ely v. Cabot Oil & Gas Corp.*, 38 F. Supp. 3d 518, 519 n.2 (M.D. Pa. 2014).

the court in *Ely* determined that, when performed properly, fracking did not pose a high degree of risk of harm or a significant likelihood of harm, and the risks could be reduced through exercise of due care. Notably, the plaintiffs did not submit substantial evidence to support their claim that natural gas drilling operations, and fracking in particular, constituted ultra-hazardous or abnormally dangerous activities. Instead, plaintiffs' expert submitted a report which simply described possible negligence and opined that fluid migration from the wells, to the extent it occurred, was likely due to a lack of care relating to faulty well design and/or construction. Plaintiffs' expert provided no testimony substantiating the assertion that proper drilling operations in the construction of natural gas wells, including the use of hydraulic fracturing, causes or is likely to cause contamination in water supplies, or other harm.⁹ On the contrary, the evidence in the record supported the defendants' position that the risks from a properly drilled, cased and hydraulically fractured gas well were minimal.

A more recent decision relied on *Ely* and reached the same conclusion.¹⁰ Such decisions are in line with prior case law regarding operation of oil and gas wells in general.¹¹ There is a caveat, however: some cases suggest in *dicta* that strict liability *could* exist in relation to fracking. In these cases, the courts denied motions to dismiss and allowed the parties to conduct discovery.¹² Those courts still recognize that whether fracking is ultra-hazardous is a question of law, but reason such a decision would be more appropriately addressed with a more developed record. For example, in *Tucker v. Sw. Energy Co.*, the court concluded that the better course was to decide the legal adequacy of the strict-liability claim on a more developed record at the summary judgment stage.¹³

⁹ *Ely v. Cabot Oil & Gas Corp.*, 38 F. Supp. 3d 518, 523 (M.D. Pa. 2014)

¹⁰ *Kamuck v. Shell Energy Holdings GP, LLC*, 4:11-CV-1425, 2015 WL 1345235, at *17 (M.D. Pa. Mar. 25, 2015).

¹¹ See, e.g., *Indiana Harbor Belt R. Co. v. Am. Cyanamid Co.*, 916 F.2d 1174, 1181 (7th Cir. 1990) ("Natural gas is both flammable and poisonous, but the operation of a natural gas well is not an ultrahazardous activity.").

¹² See *Boggs v. Landmark 4 LLC*, 1:12 CV 614, 2013 WL 944776, at *2-3 (N.D. Ohio Mar. 11, 2013) ; *Tucker v. Sw. Energy Co.*, 1:11-CV-44-DPM, 2012 WL 528253, at *3 (E.D. Ark. Feb. 17, 2012); *Fiorentino v. Cabot Oil & Gas Corp.*, 750 F.Supp.2d 506, 511-12 (M.D.Pa.2010); *Berish v. Southwestern Energy Production Co.*, 763 F.Supp.2d 702, 705 (M.D.Pa.2011).

¹³ *Tucker v. Sw. Energy Co.*, 1:11-CV-44-DPM, 2012 WL 528253, at *3 (E.D. Ark. Feb. 17, 2012).

Negligence

Plaintiffs in many fracking cases allege negligence claims. In fact, the same court that rejects a plaintiff's claims of strict liability may still allow that plaintiff to seek redress under traditional negligence principles.¹⁴

Negligence claims brought in the fracking context require the same, well-known elements as any other negligence claim: (1) a duty or obligation recognized by the law, requiring the actor to conform to a certain standard of conduct; (2) a failure to conform to the standard required; (3) a causal connection between the conduct and the resulting injury; and (4) actual loss or damage resulting to the interests of another.¹⁵

However, there are some issues unique to fracking lawsuits. For example, some states have enacted statutes that pertain specifically to gas drilling operations. In Pennsylvania, the laws and regulations establish that entities engaging in gas drilling operations must do so in a manner that would not jeopardize the health, safety, and well-being of the Commonwealth's citizens.¹⁶

Trespass

Trespass claims stem from the inherent rights of a property owner with respect to property, including the right to use and enjoy the property and excluding others if the owner so chooses.¹⁷ Plaintiffs in a fracking case often allege trespass based on claims related to groundwater; however, a trespass claim based on alleged air contamination may be available in certain states.¹⁸ In *Tucker*, the court recognized that the weight of authority from other states appeared to favor the argument that a claim based on a thing passing unwanted through the air

¹⁴ *Ely v. Cabot Oil & Gas Corp.*, 38 F. Supp. 3d 518, 534 (M.D. Pa. 2014).

¹⁵ *Roth v. Cabot Oil & Gas Corp.*, 919 F. Supp. 2d 476, 486-87 (M.D. Pa. 2013).

¹⁶ *Roth v. Cabot Oil & Gas Corp.*, 919 F. Supp. 2d 476, 486-87 (M.D. Pa. 2013) (citing 25 Pa.Code § 78.54 (requiring well operators such as the Defendants to "control and dispose of fluids ... in a manner that prevents pollution of the waters of this Commonwealth"); 25 Pa.Code § 78.86 (requiring well operator to promptly remedy any defective, insufficient, or improperly cemented casing so as to prevent pollution); see also 58 Pa. Cons.Stat. § 3217(b) (establishing casing requirements so as to "prevent migration of gas or fluids into sources of fresh groundwater"); 58 Pa. Cons.Stat. § 3218(a) (requiring well operator who pollutes public water supply to restore the affected supply with alternative potable water source)).

¹⁷ *Hill v. Sw. Energy Co.*, 4:12-CV-500-DPM, 2013 WL 5423847, at *4 (E.D. Ark. Sept. 26, 2013).

¹⁸ *Tucker v. Sw. Energy Co.*, 1:11-CV-44-DPM, 2012 WL 528253, at *3 (E.D. Ark. Feb. 17, 2012).

above a person's head was really a nuisance, and not a trespass. Nevertheless, Arkansas had not addressed the issue, and the court ruled that the trespass claim remained viable.

An example of facts sufficient to survive dismissal was presented in *Hill v. Sw. Energy Co.*¹⁹ The *Hill* plaintiffs were Arkansas landowners who, with one exception, leased their respective mineral rights to one of the three defendants. The plaintiffs alleged numerous claims, including civil RICO, Arkansas Deceptive Trade Practices Act, fraud, trespass, conversion, unjust enrichment, and contract-based claims. The defendants filed motions to dismiss, which the court granted, in part, after finding that most of the claims failed as a matter of law. One of the claims that survived was the plaintiffs' trespass claim.

The court determined that a plausible trespass claim existed: the plaintiffs alleged that the gas companies' fracking waste fluid had migrated from nearby injection wells into the subsurface strata of plaintiffs' real property. Even though the trespass claim survived, the court noted that based on the particular allegations of that case, "interesting and difficult damage issues may well arise."²⁰

The viability of trespass claims will depend on the applicable state's laws. In some states, trespass claims may not require actual injuries or damages; it may be sufficient for the plaintiff to plead and prove unauthorized entry alone.²¹

In some states and circumstances, a trespass claim may be precluded altogether. For example, in *Coastal Oil & Gas Corp. v. Garza Energy Trust*, the Texas Supreme Court held that the law of capture precludes claims of trespass when fracking a natural gas well extends into adjoining property.²² In a more recent case, the Texas Supreme Court refused to conclusively determine "whether Texas law recognizes a trespass cause of action for deep subsurface wastewater migration" because the issue was moot.²³

¹⁹ *Hill v. Sw. Energy Co.*, 4:12-CV-500-DPM, 2013 WL 5423847, at *1 (E.D. Ark. Sept. 26, 2013).

²⁰ *Hill v. Sw. Energy Co.*, 4:12-CV-500-DPM, 2013 WL 5423847, at *4 (E.D. Ark. Sept. 26, 2013).

²¹ *Hill v. Sw. Energy Co.*, 4:12-CV-500-DPM, 2013 WL 5423847, at *4 (E.D. Ark. Sept. 26, 2013).

²² *Coastal Oil & Gas Corp. v. Garza Energy Trust*, 268 S.W.3d 1, 13 (Tex. 2008).

²³ *Environmental Processing Systems, L.C. v. FPL Farming Ltd.*, 457 S.W.3d 414, 418 (Tex. 2015).

Nuisance

Nuisance claims have had some success at trial in cases alleging fracking. A nuisance claim's apparent attractiveness to plaintiffs may be due in part to causation issues associated with other claims (as well as the causation issues inherent in fracking litigation in general).²⁴ Nuisance claims can involve issues related to groundwater or air quality.²⁵

One case to reach a jury in which the plaintiff made fracking allegations is *Parr v. Aruba Petroleum*.²⁶ The *Parr* plaintiffs asserted negligence, trespass, and nuisance claims, but the only claim that survived discovery and pretrial motions was a private nuisance claim concerning air emissions and the sights and sounds of surface drilling operations such as flaring, construction activity, and truck traffic. Plaintiffs were unable to support their allegations directly related to fracking, such as underground migration of fracking fluids or water contamination. The jury found a private nuisance was intentionally created and awarded \$2.25 million in damages for pain and suffering, \$400,000 for mental anguish and emotional distress, and \$275,000 for diminution of property value. Notably, *Parr*'s lawyer was allowed, over the objections of *Aruba*'s trial counsel, to use the word "fracking" throughout trial and characterized the verdict on his website as "the first fracking verdict", which was perpetuated by media accounts.²⁷

There are a few salient issues concerning *Parr*. The first pertains to the lasting relevance of *Parr*, if any; the case is currently on appeal.²⁸ Second, *Parr* was no longer a "fracking case" at the time it was submitted to the jury.²⁹ In other words, even if the case is affirmed on appeal,

²⁴ Hilary M. Goldberg *et. al.*, *It's A Nuisance: The Future of Fracking Litigation in the Wake of Parr v. Aruba Petroleum, Inc.*, 33 Va. Env'tl. L.J. 1, 3-4 (2015) ("Due to the difficulty of proving causation, invasion, standing, and loss, however, plaintiffs have recently begun to pursue their claims as nuisance actions, enabling them to 'avoid some of the really difficult causation issues' otherwise required to 'prov[e] specific damages in fracking cases.'") (citation omitted).

²⁵ *Tucker v. Sw. Energy Co.*, 1:11-CV-44-DPM, 2012 WL 528253, at *3 (E.D. Ark. Feb. 17, 2012).

²⁶ *Parr v. Aruba Petroleum, Inc.*, No. CC-11-1650-E (Dallas Cnty. Ct. 2014).

²⁷ James Osborne, *Wise County Couple Gets \$3 Million in Fracking Suit*, <http://bizbeatblog.dallasnews.com/2014/04/wise-county-gets-3-million-in-fracking-suit.html/> (last visited September 1, 2015).

²⁸ *Aruba Petroleum, Inc. v. Parr*, No. 05-14-01285-cv (Tex. App. 5th Dist.).

²⁹ Hilary M. Goldberg *et. al.*, *It's A Nuisance: The Future of Fracking Litigation in the Wake of Parr v. Aruba Petroleum, Inc.*, 33 Va. Env'tl. L.J. 1, 11 (2015) ("Although *Parr* is generally reported as a fracking case, many in the legal and business communities take issue with this characterization, arguing that the *Parr* plaintiffs' nuisance claim, resulting in personal injury and property damages, distinguish it from many predecessor cases attacking fracking activities.").

the extent to which this case will shape the litigation landscape is unclear. Finally, given the negative connotations and misconceptions about fracking in the media, fracking allegations alone may present challenges for oil and gas operator defendants in jury trials.

Causation

Causation (or, more specifically, a lack of causation) is an important issue in many fracking lawsuits. Causation may be difficult to prove, and a plaintiff's inability to prove causation is fatal to the case. In *Magers v. Chesapeake Appalachia, L.L.C.*, the court ruled that the plaintiff's claims against one of three defendants could not proceed to trial because the plaintiffs could not demonstrate that there was more than a mere possibility that the source of gas in a water well was attributable to any particular defendant.³⁰

In another case, the court granted the defendant's motion for a more definite statement and ordered the plaintiffs to file amended complaints. The court noted "[a]s they stand, the complaints . . . are mostly a matter of 'after this, therefore because of this'—bad things happened after the fracking, and therefore because of the fracking. But this fallacy is not sound as a matter of logic or law."³¹ While the court in *Tucker* recognized that pleadings in a fracking case were not subject to the same level of specificity as a car-wreck case, the plaintiffs were still required, at a minimum, to allege more than the conclusion that "fracking fluids are dangerous, migratory animals."³² The court determined the plaintiffs had to allege specific facts linking each company's acts or omissions with the alleged harm.

Some states have enacted statutes that specifically deal with causation issues. In Pennsylvania, the law presumes "that 'a well operator is responsible for pollution of a water supply if ... (i) the water supply is within 1,000 feet of an oil or gas well; and (ii) the pollution occurred within six months after completion of drilling or alteration of the oil or gas well.'"³³ In *Roth*, the court determined the plaintiff had plead the causation element sufficiently where the

³⁰ *Magers v. Chesapeake Appalachia, L.L.C.*, 5:12CV49, 2014 WL 4352084, at *9 (N.D. W. Va. Sept. 2, 2014).

³¹ *Tucker v. Sw. Energy Co.*, 1:11-CV-44-DPM, 2012 WL 528253, at *2 (E.D. Ark. Feb. 17, 2012).

³² *Tucker v. Sw. Energy Co.*, 1:11-CV-44-DPM, 2012 WL 528253, at *2 (E.D. Ark. Feb. 17, 2012).

³³ *Roth v. Cabot Oil & Gas Corp.*, 919 F. Supp. 2d 476, 486-87 (M.D. Pa. 2013 (quoting 58 Pa. Cons.Stat. § 3218(c)(1))).

pleadings identified wells located within 1,000 feet and demonstrated that their injuries began approximately three months after drilling operations commenced.

A final issue related to causation is that many claims (lumped in with “fracking lawsuits”) actually stem from the general drilling process or well-integrity issues. Examples of gas-well-related impacts to groundwater quality have been documented where ineffective cement bonds existed behind gas-well casings, or where casing threads leaked. If those situations occur with Bradenhead pressure where sufficient formation permeability exists, then gas (primarily methane) can migrate from well bores to an aquifer.³⁴ Bradenhead pressure caused by ineffective cement bonds or casing thread leaks is a well integrity issue unrelated to hydraulic fracturing. Well integrity problems have occurred long before high volume hydraulic fracturing (HVHF) and can be identified by diagnostic well logs and mitigated through appropriate operational and engineering practices.

Summary of Recent Regulatory Challenges / Actions

Federal Actions

In March of 2015, the Bureau of Land Management (BLM) finalized its regulations affecting fracking regulations on federal and tribal lands.³⁵ Utah, Wyoming, Colorado, and South Dakota sought to enjoin the enactment of this rule, arguing that it unlawfully interfered with state regulations governing fracking, and that any federal authority to regulate these activities rested with the Environmental Protection Agency.³⁶ The states’ challenge was

³⁴ Harrison, S.S., *Contamination of Aquifers by Overpressuring the Annulus of Oil and Gas Wells*, *Groundwater*, Vol. 23, Number 3, pp. 317-324 (1985); Baldassare, F.J., *Harper Investigation Expert Report, Jefferson County, Pennsylvania*, Penn. Dept. of Environmental Protection, p. 153 (2006); Ohio Dept. of Natural Resources, Division of Mineral Resources, *Report on the Investigation of the Natural Gas Invasion of Aquifers in Bainbridge Township of Geauga County, Ohio*, p. 153 (2008); and Jackson *et al.*, *Groundwater Protection and Unconventional Gas Extraction: The Critical Need for Field-Based Hydrogeological Research*, *Groundwater*, Vol. 51, Number 4, pp. 488-510 (July /Aug. 2013).

³⁵ 43 C.F.R. § 3162.3.

³⁶ Benjamin Storrow, *Federal Judge Issues Stay on BLM Fracking Rule*, http://trib.com/business/energy/federal-judge-issues-stay-on-blm-fracking-rule/article_7e14957f-11d9-5120-b1d9-e86bf382bb1c.html (last visited August 24, 2015).

combined with a separate, industry challenge claiming that the BLM did not follow federal rule-making procedures in issuing the proposed rule.³⁷

On June 21, 2015, Judge Skavdahl of the United States District Court for the District of Wyoming issued a stay of the proposed rule pending resolution of the legal challenges lodged by states and industry.³⁸ Until the stay is lifted, hydraulically fractured wells on federal and tribal lands will proceed under current applicable regulations.

More recently, the Environmental Protection Agency (EPA) proposed draft regulations seeking to reduce methane emissions resulting from fracking at “new sources.”³⁹ The proposed suite of regulations requires reduction of methane and volatile organic compound (VOC) emissions at new, hydraulically fractured oil wells. The reach of these proposed regulations stretches further downstream, covering equipment in the transmission segment of the natural gas industry as well.

The EPA regulations are a component of the President’s Climate Action Plan, which aspires to reduce methane emissions in the oil and gas sector by 45 percent by the year 2025. The EPA attributes 30 percent of all methane emissions from human activities to oil production and the production, transmission, and distribution of natural gas. Many states already regulate emissions from the oil and gas industry and will continue to do so under the Clean Air Act.⁴⁰

State Actions

In 2012, Vermont became the first state to prohibit the use of fracking as a completion method on wells within its borders.⁴¹ New York and Maryland have since followed suit by

³⁷ *Federal Judge Issues Stay on BLM Fracking Rule*, http://trib.com/business/energy/federal-judge-issues-stay-on-blm-fracking-rule/article_7e14957f-11d9-5120-b1d9-e86bf382bb1c.html (last visited August 24, 2015).

³⁸ *Federal Judge Issues Stay on BLM Fracking Rule*, http://trib.com/business/energy/federal-judge-issues-stay-on-blm-fracking-rule/article_7e14957f-11d9-5120-b1d9-e86bf382bb1c.html (last visited August 24, 2015).

³⁹ Oil and Natural Gas Sector: Emission Standards for New and Modified Sources, http://www.epa.gov/airquality/oilandgas/pdfs/og_nsps_pr_081815.pdf (last visited August 24, 2015) (to be codified at 40 C.F.R. pt. 60).

⁴⁰ The Clean Air Act allows states to regulate emissions from sources within their boundaries, provided that the state requirements are as stringent as the federal rules.

⁴¹ *Vermont First State to Ban Fracking*, <http://www.cnn.com/2012/05/17/us/vermont-fracking/> (last visited August 24, 2015).

enacting statewide bans on fracking in 2014 and 2015, respectively.⁴² Of these states, New York, which sits on top of a portion of the Marcellus Shale (a significant, domestic source of oil and gas), consumes approximately 5 percent of the nation's gas.

Other states have not gone so far as to enact outright bans on fracking, but have a patchwork of local regulations seeking to limit the use of fracking to produce oil and gas within certain municipalities. Still, states such as Texas and Oklahoma have enacted legislation to prohibit municipal regulation of fracking, or to "ban fracking bans."⁴³

While many lawmakers cite the "environmental risks" associated with fracking as the impetus behind proposed regulations or prohibitions, studies such as the EPA's Draft Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources offer a contrasting view of such risks and may stem the tide of reactionary or piecemeal legislation.

Recent EPA Pronouncement

In 2010, in response to concerns raised about the potential effects on human health and the environment—in particular the effects on drinking water resources—Congress requested that the Environmental Protection Agency (EPA) prepare a study to identify the potential vulnerabilities of drinking water resources resulting from the fracking process. In June 2015, the EPA released its Draft Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources.⁴⁴

The EPA study followed water usage throughout the fracking process, and analyzed that process in five stages of the fracking cycle: (1) acquisition of water; (2) chemical mixing; (3) well injection; (4) flowback/produced water; and (5) wastewater treatment and waste disposal.

⁴² Jude Clemente, *Why New York's Fracking Ban for Natural Gas is Unsustainable*, <http://www.forbes.com/sites/judeclemente/2015/06/07/why-new-yorks-fracking-ban-for-natural-gas-is-unsustainable/> (last visited August 24, 2015).

⁴³ Patricia M. Rosendahl, *Oklahoma Joins Texas in Preventing Local Fracking Bans*, <http://www.natlawreview.com/article/oklahoma-joins-texas-preventing-local-fracking-bans> (last visited August 24, 2015).

⁴⁴ U.S. EPA. Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources (External Review Draft). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-15/047, 2015.

Drinking water resources were defined broadly in the report as “any body of ground water or surface water that now serves, or in the future could serve, as a source of drinking water for public or private use.”⁴⁵ This definition is more expansive and inclusive than most federal and state regulatory definitions of drinking water.

The main areas of vulnerability were identified as low water availability, spills of fracking fluids/produced water, fracking directly into formations containing both the intended product and drinking water, well integrity failures, subsurface migration and inadequately treated wastewater. Additionally, some identified vulnerabilities were not uniquely attributable to fracking and can occur in conjunction with conventional wells.

The number of identified instances in which fracking had *some* impact on drinking water resources was “small relative to the number of hydraulically fractured wells.”⁴⁶ While the EPA determined that “there are above and below ground mechanisms by which hydraulic fracturing activities *have the potential* to impact drinking water resources,” the assessment did not demonstrate that these mechanisms had resulted in “widespread, systemic impacts on drinking water resources in the United States.”⁴⁷ The Draft Assessment will be open to public comment through October of 2015, after which, the EPA will use the public comments and comments from the Science Advisory Board to publish a Final Assessment.

Other Industry Concerns / Earthquake Addendum

In addition to concerns surrounding drinking water supplies, critics have expressed concern about the relationship of the fracking process to induced seismicity.⁴⁸ However, the consensus in studies by state authorities concerning such events are that induced seismic events

⁴⁵ Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources (External Review Draft), Executive Summary, ES-3.

⁴⁶ Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources (External Review Draft), Executive Summary, ES-23.

⁴⁷ Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources (External Review Draft), Executive Summary, ES-6 (emphasis supplied).

⁴⁸ Earthquakes caused by human activity are commonly referred to as either induced or triggered seismicity.

in areas of oil and gas production in the United States may be more likely the result of the disposal of fluids in injection wells.⁴⁹

According to the United States Geological Survey, wastewater disposal wells typically operate for a longer duration than hydraulically fractured wells and inject “much more fluid than hydraulic fracturing, making them more likely to induce earthquakes.”⁵⁰ In addition to the volume of fluid and duration of use, it is relevant that “wastewater injection often occurs in never-before-touched rocks.”⁵¹

Notably, wastewater is produced at *all* wells and is not unique to the hydraulic fracturing process. In many locations, wastewater has little to do with fracking, but rather with saltwater produced as a byproduct.⁵² Non-reusable, spent hydraulic fracturing fluid is sometimes disposed of in wastewater injection wells; however, there does not appear to be a link between the content of wastewater and the likelihood of seismicity.

Most injection wells do not cause felt seismicity. Of the approximately 35,000 active wastewater injection wells, studies have associated well activity with felt seismicity at *only a few dozen* injection wells.⁵³ This rarity is likely attributed to a critical combination of factors necessary for injection to induce earthquakes including: the injection rate and total volume injected; the presence of faults that are large enough to produce earthquakes; faults that are already sufficiently stressed to produce earthquakes; and the presence of pathways for the fluid pressure to travel from the injection point to faults.⁵⁴

⁴⁹ *Myths and Facts on Wastewater Injection, Hydraulic Fracturing, Enhanced Oil Recovery, and Induced Seismicity*, Seismological Res. Letters, July/Aug. 2015, Vol. 86, Number 4, at 2.

⁵⁰ U.S. Geological Survey, *Induced Earthquakes: Myths and Misconceptions*, <http://earthquake.usgs.gov/research/induced/myths.php> (last visited Aug. 24, 2015).

⁵¹ U.S. Geological Survey, *Induced Earthquakes: Myths and Misconceptions*, <http://earthquake.usgs.gov/research/induced/myths.php> (last visited Aug. 24, 2015).

⁵² U.S. Geological Survey, *Induced Earthquakes: Myths and Misconceptions*, <http://earthquake.usgs.gov/research/induced/myths.php> (last visited Aug. 24, 2015).

⁵³ Jonny Rutqvist, Antonio P. Rinaldi, Frédéric Cappa, & George J. Moridis, *Modeling of Fault Reactivation and Induced Seismicity During Hydraulic Fracturing of Shale-Gas Reservoirs*, *Journal of Petroleum Science and Engineering*, 107 (2013): 31-44; and *Myths and Facts on Wastewater Injection, Hydraulic Fracturing, Enhanced Oil Recovery, and Induced Seismicity*, Seismological Res. Letters, July/Aug. 2015, Vol. 86, Number 4, at 2.

⁵⁴ U.S. Geological Survey, *Induced Earthquakes: Myths and Misconceptions*, <http://earthquake.usgs.gov/research/induced/myths.php> (last visited Aug. 24, 2015).

The potential hazard of future induced events can be mitigated by “detailed seismic monitoring, careful selection of injection locations, variation of injection rates and pressures in response to ongoing seismicity, and a clear management plan.”⁵⁵ Over time, the cooperation of scientists, industry, and regulators could lead to a strategic management plan to better avoid the potential for induced seismicity resulting from oil and gas activities.

Conclusion

The Hydraulic Fracturing completion method is not new, but recent improvements in fracking combined with horizontal drilling have greatly improved oil and gas recovery, allowing production from low-permeability rock formations. As indicated by the EPA Draft Assessment and other studies,⁵⁶ modern fracking in horizontal wells thousands of feet below groundwater aquifers does not appear to have led to any greater risk to the environment than exists in drilling conventional wells, such as risks associated with well integrity and waste disposal. While oil and gas drilling operations have long been regulated by state and federal agencies – including well design and operation, waste injection and disposal, air emissions, and disclosure of fracking fluid chemicals⁵⁷ – more regulations appear likely, including additional restrictions on methane emissions.

Finally, our survey of U.S. litigation indicates that plaintiffs alleging damage from fracking have either failed to show any connection between fracking and the alleged environmental impacts or injuries or have involved claims only tenuously tied to the actual fracking process, such as air emissions.

⁵⁵ *Myths and Facts on Wastewater Injection, Hydraulic Fracturing, Enhanced Oil Recovery, and Induced Seismicity*, Seismological Res. Letters, July/Aug. 2015, Vol. 86, Number 4, at 6.

⁵⁶ Ground Water Protection Council, *State Oil and Natural Gas Regulations Designed to Protect Water Resources*, p. 24 (May 2009) (“Since EPAs 2004 study found no confirmed cases of contamination from the relatively shallow hydraulic fracturing of CBM reservoirs, it is not unreasonable to conclude that the risk of fracture fluid intrusion into ground water from the hydraulic fracturing of deeper conventional and unconventional oil and gas zones could be considered very low....”).

⁵⁷ See, for example, <https://fracfocus.org/>, the national hydraulic fracturing chemical registry managed by the Ground Water Protection Council and Interstate Oil and Gas Compact Commission.