



A LexisNexis® Company

News, cases, companies:  Search

[Advanced Search](#)

- [University of Colorado](#)
  - [My Account](#)
  - [My Feeds and Alerts](#)
  - [My Briefcase](#)
  - [Newsletter Signup](#)
  - [Help](#)



[University o...](#)

News, cases, companies:

- [University of Colorado](#)
  - [My Account](#)
  - [My Feeds and Alerts](#)
  - [My Briefcase](#)
  - [Help](#)
  - [Newsletter Signup](#)

•



A LexisNexis® Company

News, cases, companies:

[Advanced Search](#)

[Close](#)

- [Law360 In-Depth](#)
- [Law360 UK](#)
- [Adv. Search & Platform Tools](#)
- [Browse all sections](#)
- [Banking](#)
- [Bankruptcy](#)
- [Class Action](#)
- [Competition](#)
- [Employment](#)
- [Energy](#)
- [Expert Analysis](#)
- [Insurance](#)
- [Intellectual Property](#)
- [Product Liability](#)
- [Securities](#)
- [Rankings](#)
- [Regional Powerhouses](#)
- [Law360's MVPs](#)

- [Glass Ceiling Report](#)
- [Global 20](#)
- [Law360 400](#)
- [Diversity Snapshot](#)
- [Practice Groups of the Year](#)
- [Rising Stars](#)
- [Titans of the Plaintiffs Bar](#)
- [Site Menu](#)
- [Join the Law360 team](#)
- [Search legal jobs](#)
- [Learn more about Law360](#)
- [Read testimonials](#)
- [Contact Law360](#)
- [Sign up for our newsletters](#)
- [Site Map](#)
- [Help](#)



Make sure you don't miss any Law360 breaking news.

[Download our plug-in for Chrome to get customizable, real-time news alerts](#)

## Expert Analysis

# Will Earthquakes Shake Up The Shale Wastewater Debate?

May 27, 2014, 6:06 PM EDT

Oil and natural gas recovery by horizontal drilling and hydraulic fracturing has changed the energy landscape, both domestically and internationally. Production has risen so rapidly that the [U.S. Energy Information Administration](#) has predicted the country has already or will soon become the world's leading producer of petroleum and natural gas combined. The U.S. is already the world's largest producer of natural gas.[1] It has also provided a considerable shot in the arm to an American economy sorely in need of one. However, fracking has also sparked controversy, with environmental advocates fearful of its potential impact on air and water quality — fracking's proponent's reason that such fears are unwarranted based on a long history of fracking activity without significant environmental effects. This latter view has been corroborated in recent research.[2]



Mark Fitzsimmons

Apart from the “more traditional” environmental concerns, there has been an increase in seismic activity in recent years in portions of the middle of the continental U.S., in some cases coinciding with the increase of oil and gas exploration and production activity. Suggestions of a connection between earthquakes and oil and gas exploration has touched a raw nerve and has been gaining prominence as an argument for those opposed to fracking.

## The Science on Induced Seismicity

Man-made or human-induced seismicity is by no means a new discovery. A variety of industrial processes can potentially induce earthquakes, such as mining, reservoir impoundment and hydrocarbon extraction. However, it is widely accepted within the scientific community that fracking itself is not a significant cause of seismicity.[3] Although there have been a handful of cases where fracking potentially induced perceptible seismic events at the land surface, such events are extremely rare compared to the more than 2.5 million fracking stimulations worldwide[4], and none were large enough to cause any damage. Current scientific discussions about potentially induced seismicity focus more on wastewater injection wells and the question of whether they might potentially induce perceivable seismic events in certain geological settings.

Although the physics of injection-induced seismicity is complex, the general concept is relatively simple. There are many natural cracks in the earth of varying sizes, all of which are under some amount of shear stress that can potentially cause rocks on either side of the crack to slip past each other. To generate slip and thus a seismic event, the shear stress must surpass a critical threshold to overcome friction. Injected fluid essentially reduces the frictional resistance and allows rocks along the crack to slip more easily. The size of a crack (i.e., a fault) that can be induced to slip is dependent on how much fluid is injected. In other words, the larger the volume, the bigger the fault segment that can potentially be induced to slip.

Starting around 2009, there has been a notable increase in seismicity in the middle of the continental U.S.[5] Some have asserted that this increase is associated with injection wells that dispose of oil and gas wastewater.[6] In addition, several studies have focused on instances of potentially induced earthquakes around individual wells. In some cases (e.g., Youngstown, Ohio)[7], researchers have concluded that seismicity was induced, whereas in others (e.g., Dallas and Fort Worth, Texas[8]) it is less clear whether the events were induced or natural.

The methods used to differentiate natural from induced events typically rely on spatial and temporal correlation (i.e., were the seismic events close to an injection well and coincident with injection activity). However, this approach is less reliable in states with many injection wells, as nearly every earthquake, whether induced or natural, is proximate to an injection well. Other techniques for diagnosing larger scale effects are in development (e.g., changes in background seismic rates or the shape of earthquake frequency-magnitude distributions[9]).

### Legal Actions: Will Policy be Made in the Courts?

Whether injection wells cause earthquakes — and what to do about it — could well be decided in the courts. A number of lawsuits have been brought alleging damage from various oil and gas activities. One recently resulted in a \$2.9 million plaintiffs' award, *Parr v. Aruba Petroleum Inc.*[10] This is the first such case to go to verdict and is likely to encourage more filings. Several cases, not including the one that went to verdict, have alleged damage from tremors induced by disposal of oil and gas wastewater. The first group of these cases was filed in federal court in Arkansas and sought class status. Consolidated into one matter, *Hearn v. [BHP Billiton Petroleum LLC](#)*, they were settled on undisclosed terms in August of 2013.[11]

Another series of cases alleging damage from disposal well operations were also filed in federal court in Arkansas, purportedly causing a swarm of earthquakes in October 2010 and February 2011. These cases did not propose class status, but they did seek an injunction against further waste disposal, damage for emotional distress, property damage and diminution in value and punitive damages. This group of cases was also recently settled, with the terms also undisclosed.[12]

Tremors in North Texas have generated still more litigation, *Finn v. [EOG Resources Inc.](#)*[13] The Finn case is a proposed class action. The complaint is short and seems deliberately vague, but asserts damages to a number of homes and general diminution in the value of property in a large geographic area. Finn also seeks an injunction on further oil and gas extraction via fracking along with punitive damages.

One of the challenges faced by plaintiffs in earthquake cases is that the alleged damages have been relatively modest. If class certification is granted in Finn or some future case, that could change the nature of these

litigations significantly. A small amount of damage to any one piece of property, multiplied over many homes or businesses, would raise the stakes. As of this writing, Finn is in discovery with no resolution imminent.

## Litigation Outlook

Perhaps it is not an accident that most of the cases alleging damage from injection-induced seismicity have settled. These cases are defensible. While dramatic, an allegation that a particular tremor or wave of tremors was associated with particular injection activity has been hard to establish. This is particularly true where a number of seismic events are alleged within a large geographic area. Moreover, separating induced from natural events is difficult and highly debatable.

As with any tort case, it is not enough that causation is a possibility. It must be shown to a reasonable degree of scientific certainty that the alleged cause brought about the specific damage. Along with proving “general causation” (i.e., that waste water disposal can cause tremors), plaintiffs must show that the specific injection well caused a particular quake. This showing of “specific causation” will be difficult, especially if a large number of injection operations were ongoing in a given area. Moreover, naturally occurring seismic activity is not uncommon, even in those regions less prone to it than others, as the residents of the Mid-Atlantic and Northeast discovered with the Virginia quake of August 2011. In those jurisdictions where *Daubert* and its state analogues are taken seriously and rigorously applied, plaintiffs will face challenges in making their case.

Importantly, a strong argument can also be made against class certification of earthquake cases. Starting with the [U.S. Supreme Court](#)'s decision in [Wal-Mart Stores Inc. v. Dukes](#)[14] and with a number of decisions interpreting and applying it, along with other important limitations placed on class actions. It is now clear that any expert testimony in support of class certification is subject to rigorous scrutiny. If there is a basis to challenge the allegations upon which class certification is based, including theories as to the source of earthquakes, then the courts are required to hear the challenge.

If an expert case can be rejected, the class can be defeated.[15] Moreover, because a class in a tremors case will be seeking money damages, there must be a commonality of allegations in support of the claim, as well as a predominance of the common allegations over individualized issues. Assessment of damages to property must be done on a property-by-property basis and, in the view of many courts, that negates the commonality requirement. Moreover, tremor cases will often be based on nuisance allegations at least in part, and courts have held that nuisance allegations involving property injury are inherently individual specific. In the only fracking case where the question of class certification was submitted to a court, it was rejected on similar grounds.[16]

However, these are not the end of the class action debate. Federal Rule 23(c)(4) and state analogues do allow for certification of only one or a limited number of issues. Some post-*Dukes* decisions have certified liability-only classes under this provision.[17] Plaintiffs seeking to certify a class action in a quake property damage case may be expected to cite this provision and seek to determine “only” that a quake was caused by the defendant's actions, reserving specific damages for individual determinations.

The argument against such issue specific classes is best exemplified by the decision in *Gates v. Rohm and Haas*. [18] The case did not allege damage from injection-induced tremors, but did assert property damage from chemical releases. In *Gates*, the plaintiff argued that if the class certification as to all issues was inappropriate, then the question of the defendant's overall liability should still be certified. The court disagreed, noting Rule 23(c)(4), but stated that single issues, including liability, should only be certified where they would materially advance the resolution of the entire case. The court went on to hold that because property damages would still have to be assessed individually, no material benefit would be gained by deciding liability only.

This dispute as to the appropriate extent of class certification remains to be finally determined. The Supreme Court recently had an opportunity to take up the issue. Cases from the Sixth and Seventh Circuits certified classes despite a lack of common injury. Certiorari was sought, but unfortunately the Supreme Court declined. [19] Thus, while the argument in the *Rohm and Haas* case is a powerful tool against certification, the legal issue remains.

## Long-Term Considerations

Vigorously defending lawsuits alleging injury from tremors is important, but may not bring about a permanent resolution of this issue. If seismic activity occurs in an area with oil and gas activities then the issue will persist. The public's views regarding these activities and the regulatory climate will also be affected. A longer term approach is needed.

Elements of a long-term strategy for industry and other stakeholders to deal with the question of induced seismicity could include the following:

- More research on the issue and, to the extent possible, a determination of how fluid injection might affect seismicity at larger scales (e.g., state or region). In addition, studies are needed to help differentiate between natural and induced events. Various stakeholders have already started investing in research on these topics, such as industry support for the Stanford Center for Induced and Triggered Seismicity.
- Development of engineering solutions and best management practices, which take a proactive approach in order to limit seismic risk. There are already widely accepted practices by the scientific community, such as avoiding injections near active faults, minimizing pressure buildup in the injection zone, installing local seismic monitoring stations, and having a plan for altering or ceasing operations if seismicity begins exceeding a conservative threshold.[20] A number of industry organizations, most notably the [American Petroleum Institute](#) and the Marcellus Shale Coalition, have developed and made publicly available a number of sound standard operating procedures for oil and gas recovery by horizontal drilling and hydraulic fracturing. It may be advantageous to deal with the question of seismicity in a similar manner on an industry wide basis.
- Careful monitoring of proposed changes to state and federal regulations to ensure that they are based on sound science. Regulations to deal with the potential seismic effects of injection activities are being developed and any continuation of seismic incidents is likely to generate new and stricter rules. Although there is likely to be considerable pressure on regulators from the environmental community, care needs to be taken to ensure that any new regulations use the best science to achieve meaningful safeguards or risk reduction, without placing unnecessary burden on the oil and gas industry.

Overall, the risk of seismicity from injection activities is extremely low, given that over 150,000 wastewater injection wells are currently operating, many of which have been for decades and over 1 million fracking stimulations have been completed in the U.S., with few notable incidents. With proper planning and preparation in regard to the technical, legal and regulatory aspects of potentially induced seismic events going forward, it is very feasible to achieve an overall reduction if not avoidance of seismic risks, allowing the continued development of this enormously important resource.

—By Mark Fitzsimmons, [Steptoe & Johnson LLP](#), Samuel A. Flewelling, Ph.D., and Matthew P. Tymchak, Gradient Corporation

[Mark Fitzsimmons](#) is a partner in Steptoe & Johnson's Washington, D.C., office.

[Samuel Flewelling](#) is a principal scientist and [Matthew Tymchak](#) is a hydrologist in Gradient Corporation's Cambridge, Massachusetts office.

*The opinions expressed are those of the author(s) and do not necessarily reflect the views of the firm, its clients,*

*or Portfolio Media Inc., or any of its or their respective affiliates. This article is for general information purposes and is not intended to be and should not be taken as legal advice.*

- [1] U.S. Energy Administration, Today in Energy, October 4, 2013. Accessible at <http://www.eia.gov/todayinenergy/detail.CFM?id=13251>; US [Central Intelligence Agency](#), The World Factbook, available at <https://www.cia.gov/library/publications/the-world-fact-book>.
- [2] See e.g., Flewelling, SA; Tymchak, MP; Warpinski, NW. 2013. Hydraulic fracture height limits and fault interactions in tight oil and gas formations. Geophysical Res. Lett. 40 : 3602-3606.
- Rutqvist, J; Rinaldi, AP; Cappa, F; Moridis, GJ. 2013. Modeling of fault reactivation and induced seismicity during hydraulic fracturing of shale-gas reservoirs. J. Petroleum Sci. Eng. doi : 10.1016/j.petrol.2013.04.023.
- Flewelling, SA; Sharma, M. 2014. Constraints on upward migration of hydraulic fracturing fluid and brine. Ground Water 52 (1) : 9-19.
- [3] National Research Council. 2013. Induced seismicity potential in energy technologies. The National Academies Press, Washington, D.C.
- [4] Montgomery, CT; Smith, MB. 2010. Hydraulic fracturing: History of an enduring technology. J. Petroleum Technol. 62 (12) :26-32.
- [5] Ellsworth, WL. 2013. Injection-induced earthquakes. Science 341 (6142) : 1225942.
- [6] Llenos, AL; Michael, AJ. 2013. Modeling earthquake rate changes in Oklahoma and Arkansas: Possible signatures of induced seismicity. Bull. Seismological Soc. Am. 103(5) : 2850-2861.
- [7] Kim, WY. 2013. Induced seismicity associated with fluid injection into a deep well in Youngstown, Ohio. J. Geophys. Res. B Solid Earth doi : 10.1002/jgrb.50247.
- [8] Frohlich, C. 2012. Two-year survey comparing earthquake activity and injection-well locations in the Barnett Shale, Texas. Proc. Natl. Acad. Sci. USA 109 (35) :13934-13938.
- [9] Shapiro, SA; Kruger, OS; Dinske, C. 2013. Probability of inducing given-magnitude earthquakes by perturbing finite volumes of rocks. J. Geophys. Res. B Solid Earth 118(7) : 3557-3575.
- [10] No. 11-1650, Dallas Co., TX.
- [11] Order of Dismissal, No. 4:11CV00474 JLH (E.D. Ark. Aug. 29, 2013).
- [12] See e.g., Order of Voluntary Dismissal, Mahan v. Chesapeake Operating, Inc., No. 4:13-CV-00184-JLH (E.D. Ark. March 20, 2014).
- [13] No. 201300343 (18th District, Johnson Co. Texas 7/30/13).
- [14] 131 Sup. Ct. 2541 (2011).
- [15] See, e.g., Cannon v. BP Products North America, Inc., 3:10-CV-00522, 2013 WL 5514284 (S. D. Tex. 2013) (Daubert motion granted against plaintiff valuation expert in a case alleging property damage from refinery emissions.).
- [16] See Ginardi v. Frontier Gas Services, No. 4:11-CV-00420-BRW, 2012 US Dist Lexis 54845 (E.D. Ark. 2012). This case alleged chemical emissions and did not specifically involve tremors, but is very relevant as to the question of whether a class would be appropriate in an earthquake case.

[17] See, e.g., McReynolds v. [Merrill Lynch](#), 672 Fed 3d 482, (7th Cir. 2002); Green v. Will, 3:09-CV-510-PPS/CAN (S. D. Ind. 2013).

[18] 655 F.3d 255 (3rd Cir. 2011).

[19] [Sears Roebuck & Co.](#) v. Butler, No. 13-430; [Whirlpool Corp.](#) v. Glazer, No. 13-431 (U.S. Supreme Court 2014).

[20] Zoback, MD. 2012. Managing the seismic risk posed by wastewater disposal. Earth 58 (4) : 38-43.

[View comments](#)

## 0 Comments

Sign In To Comment

More Expert Analysis

- [Add to Briefcase](#)
- [Printable Version](#)
- [Rights/Reprints](#)
- [Editorial Contacts](#)

## Related

### Sections

- [Class Action](#)
- [Energy](#)
- [Environmental](#)
- [Product Liability](#)
- [Texas](#)

### Law Firms

- [Steptoe & Johnson LLP](#)

### Companies

- [American Petroleum Institute Inc.](#)
- [BHP Billiton Ltd.](#)
- [BP p.l.c.](#)
- [Bank of America Corporation](#)
- [EOG Resources, Inc.](#)
- [Sears Holdings Corp.](#)
- [U.S. Energy Corp.](#)
- [Wal-Mart Stores Inc.](#)
- [Whirlpool Corporation](#)

### Government Agencies



- [Central Intelligence Agency](#)
- [Energy Information Administration](#)
- [U.S. Supreme Court](#)



Check out Law360's new podcast, Pro Say, which offers a weekly recap of both the biggest stories and hidden gems from the world of law.

[Listen To Our Latest](#)

### Most Popular

- 1 [Law360's Weekly Verdict: Legal Lions & Lambs](#)
- 2 [Escobar's FCA Test Is Mandatory, 9th Circ. Rules](#)
- 3 [ConocoPhillips Names Baker Botts Atty As New GC](#)
- 4 [Ex-Shkreli Atty Taps Williams Heavy Hitter For Appeal](#)
- 5 [FCPA Doesn't Apply To Foreigners Without US Ties: 2nd Circ.](#)

### Related Articles

## [Induced Seismicity Legal Issues Break New Ground](#)

May 15, 2015

The U.S. Geological Survey, Oklahoma Geological Survey and a recent Texas study all raise a variety of potential issues surrounding induced seismicity for the energy industry and may shape emerging regulatory trends and liability theories, say Barclay Nicholson and Emery Richards of Norton Rose Fulbright LLP.

[Read Full Article](#)

## [Quake Links Turn Up Legal, Regulatory Heat On Drillers](#)



By [Keith Goldberg](#) Apr 24, 2015

Studies released this week by federal and state geologists linking oil and gas drilling to an increase in earthquakes will provide more ammunition for plaintiffs in lawsuits over wastewater injection wells cited as the likely culprit and for regulators to impose tighter restrictions on those wells, experts say.

[Read Full Article](#)

---

## [Fracking Earthquake Claims Bank On Uncertain Science](#)

By [Sean McLernon](#) Aug 26, 2013

Landowners living near hydraulic fracturing sites have recently begun to file more lawsuits linking the drilling process to major seismic activity, taking a long-shot attempt at holding energy companies responsible for cracks in their homes and other property damage despite limited scientific findings on the topic.

[Read Full Article](#)

---

## [Fracking By EOG, Shell Caused Damaging Tremors, Suit Says](#)

By [Jeremy Heallen](#) Aug 02, 2013

EOG Resources Inc. and units of Royal Dutch Shell PLC, Sunoco Inc. and Enterprise Products Partners LP were hit with a proposed class action Tuesday in Texas state court by landowners who say hydraulic fracturing carried out by the energy companies damaged their homes.

[Read Full Article](#)

---

## [Earthquake Study Could Spark New State Fracking Regs](#)

By [Derek Hawkins](#) May 03, 2012

A new federal study linking small earthquakes to underground injections of wastewater from oil and natural gas development will likely prompt state regulators to take a fresh look at how operators dispose of those hydraulic fracturing byproducts.

[Read Full Article](#)

© 2018, Portfolio Media, Inc. [About](#) | [Contact Us](#) | [Legal Jobs](#) | [Careers at Law360](#) | [Terms](#) | [Privacy Policy](#) | [Cookie Policy](#) | [Law360 Updates](#) | [Help](#) | [Lexis Advance](#)  
**Beta Tools:** [Track docs](#) | [Track attorneys](#) | [Track judges](#)

[Visit Our Site Map](#)



Already have access? [Click here to login](#)

# Get instant access to the one-stop news source for business lawyers

[Register Now!](#)

## Sign up now for free access to this content

Enter your details below and select your area(s) of interest to stay ahead of the curve and receive Law360's daily newsletters

Email (Professional email required)

First Name

Last Name

Password (at least 6 characters required)

Confirm Password

Select at least one primary interest:

- Aerospace & Defense
- Automotive
- Benefits
- Class Action
- Construction
- Cybersecurity & Privacy
- Energy
- Florida
- Health
- Immigration
- Intellectual Property
- Law360 In Depth
- Massachusetts
- Native American
- Pennsylvania
- Project Finance
- Retail & E Commerce
- Appellate
- Banking
- California
- Commercial Contracts
- Consumer Protection
- Delaware
- Environmental
- Food & Beverage
- Hospitality
- Insurance
- International Arbitration
- Legal Ethics
- Media & Entertainment
- New Jersey
- Personal Injury & Medical Malpractice
- Public Policy
- Securities
- Asset Management
- Bankruptcy
- Capital Markets
- Competition
- Corporate
- Employment
- Financial Services Uk
- Government Contracts
- Illinois
- Insurance Uk
- International Trade
- Life Sciences
- Mergers & Acquisitions
- New York
- Private Equity
- Product Liability
- Real Estate
- Sports

- Tax
- Technology
- Telecommunications
- Texas
- Transportation
- Trials
- White Collar

[Register](#) We take your privacy seriously. As detailed in our [Privacy Policy](#), we will use your personal information to administer your account and provide the products and services that you have requested from us.

### Sign up for our Class Action newsletter

### You must correct or enter the following before you can sign up:

Please provide a professional email:

Select more newsletters to receive for free

We take your privacy seriously. As detailed in our [Privacy Policy](#), we will use your personal information to administer your account and provide the products and services that you have requested from us.

[Sign up now](#)

**Thank You!**