Hydraulic Fracturing

What You Need To Know

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Fracking in Ohio

Gasland is a divisive anti-fracking documentary released in 2010.

Gasland was filmed by Josh Fox, a Pennsylvania resident who was introduced to the issue of fracking when a gas company made an offer to lease family's land for over $100,000.

The documentary galvanized anti-fracking sentiment and was heavily criticized by gas companies, who claimed that the film contained huge factual inaccuracies. Despite these claims, the film won the Special Jury Prize at the Academy Awards.

One scene, in which a Colorado man lit his methane-filled tap water on fire directly out of the faucet, was particularly shocking—and divisive.
Who should be trusted?

The debate over hydraulic fracturing has pitted environmentalists against industry. Both sides have made sweeping claims about the safety of the process.

“Natural Gas plays a key role in our nation’s clean energy future.”
—Environmental Protection Agency (EPA) website

“We’re burning the furniture to heat the house. In shifting away from coal and toward natural gas, we’re trying for cleaner air, but we’re producing massive amounts of toxic wastewater … and it’s not clear we have a plan for properly handling the waste”
—John Quigley, former secretary of the Pennsylvania Department of Natural Resources, in The New York Times

“Making fracturing “illegal or commercially impracticable” would be a grievous and irresponsible blow to the natural gas industry and the fate of the climate alike … Environmentalists who have that as their real goal are doing the country and the planet no favors.”
—Jesse Zwick, Washington Monthly (May-June 2011)

“I saw what [fracking] does to families. These people can’t drink the water that’s coming out of their tap. Here in America.”
—Mark Ruffalo, actor and anti-fracking activist

“There may be enough recoverable natural gas to meet this country’s needs for 100 years. This has sparked a gold rush.”
—recent newsletter from the Environmental Defense Fund (EDF)

Environmental groups are not universally opposed to hydraulic fracturing, however. For instance, groups like the Environmental Defense Fund and the Natural Resources Defense Council have quietly given their approval.
There are millions of gallons of natural gas below the United States. In Ohio alone, natural gas production could lead to 200,000 jobs and $14 billion in investment by the year 2015, according to industry representatives. The problem: the gas is trapped in hard shale rock formations hundreds of feet below the surface. For years, this shale gas was undiscovered and usually thought to be unreachable. But recently, a process known as hydraulic fracturing, or “fracking” for short (also commonly spelled “fracing”), has become a popular solution for reaching this untapped supply. It has revolutionized the industry, pushed natural gas prices to record lows, and been hailed as a temporary solution to our energy problems. Meanwhile, it has also been lambasted by environmentalists as unsafe and even banned in New York state.

The Basics: How does fracking work?

- Natural gas rises through the pipe to the surface, where it is collected.
- High pressure fluid is pumped into the ground, creating cracks in the hard shale. This releases natural gas, which flows up to the surface through the well.
- Drinking water usually comes from wells that are 50-200 feet deep. Water that comes from deeper wells usually contains naturally occurring contamination.
- This, on the other hand, is non-potable water.

Hydraulic fracturing

noun
The forcing open of fissures in subterranean rocks by introducing liquid at high pressure, esp. to extract oil or gas.
The Drilling Process: a Crash Course

1. A well is drilled anywhere from 4,000 to 8,500 ft into the ground. This well is made of steel casing and is cemented in order to make it safe and secure.

2. After drilling down, the well is drilled horizontally. This technique is used by most gas companies today when hydraulic fracturing. This is much more efficient, because many more wells can be drilled in the same well pad and these wells can drill in much broader areas within the shale.

3. The well is perforated, meaning that holes are drilled in it using small explosive charges.

4. Then, the “frac fluid” is pumped into the well at high pressure. This fluid is mostly made up of sand and water. 1% of the fluid is usually made up of a variety of chemicals that help the well to function properly. Some are harmless, while others would be very dangerous if they came in contact with drinking water.

5. The pressure from the “frac fluid” causes cracks to form in the hard shale rock.

6. The sand in the “frac fluid” holds these cracks open, allowing the gas to flow into the well and up to the surface, where it is collected.
Fracking in Ohio

A Deeper Look

What is done with all of the “frac fluid” after drilling?

Once the hydraulic fracturing process is over, the “frac fluid” is pumped back up through the well and trucked off to what are called Class II injection wells. These wells are scattered throughout Ohio and are commonly used for disposing of waste. Here, the fluid is pumped deep into the ground, thousands of feet below where the fracking took place and even farther from the drinking water supplies. There are over 144,000 of these wells currently in use in the United States, and they have been used for decades.20 They are considered safe.

How does pumping all of this fluid into the ground give us natural gas?

Because the shale is porous but not permeable, the natural gas is trapped inside.

Fracing fluid is pumped through the well at high pressure, creating cracks in the shale.

This fluid includes “proppants” like sand, which “prop” the cracks open. This allows the gas to escape from the shale and into the well casing, where it flows back up to the surface and is stored.
Where is Fracking Done?

The good news: it’s all over Ohio.
The bad news: it’s all over Ohio.

Ohio lies on top of the Marcellus and Utica shale formations, which are some of the largest natural gas reserves in the world. The Marcellus alone runs through New York, Pennsylvania, and Ohio, and spans an area about the size of the nation of Greece. It could be the largest natural gas reserve in the world besides Iran’s South Pars field.18

A closer view of the Marcellus and Utica shale, the two main shale formations in the region. In Ohio, the Utica shale is most suitable for drilling. However, in places like Pennsylvania, the Marcellus shale is more suitable and has been very lucrative for drillers.
Fracking in Ohio

The Claims: Here’s what the
Why it’s risky:

Fracing fluid could contaminate drinking water, which is allegedly seen in Gasland. Or, fracing fluid could spill above ground when it is being removed from the well.
• “In order to frack, you need some fracking fluid—a mix of over 596 chemicals,” narrates Josh Fox in Gasland. Some of these chemicals are toxic or carcinogenic.
• Gas companies have often not been required to disclose which chemicals they are using in the fracking fluid, which is very worrying for the residents nearby a site where fracking has been done.
• These chemicals are being pumped into the ground in large amounts. Because millions of gallons of water are being used, 0.5% of the fracking fluid being made up of another chemical is not a trivial amount. For instance, the Akron Beacon Journal recently reported that 304 tons of hydrochloric acid were pumped into the Mangun well in Augusta township, Ohio.

Pumping wastewater from fracking into wastewater injection wells can cause earthquakes.
• Recently there have been multiple small earthquakes in northeastern Ohio that have been blamed on hydraulic fracturing. Opponents of fracking worry that there could be more.

Methane could escape from the ground causing harm to humans, causing health problems and explosions. Or, it could escape into the atmosphere and worsen our greenhouse gas problem.
• There are multiple examples in Gasland where this has supposedly occurred.

Natural gas is just a short-term solution to our energy problem. It is just a way of putting off a move to renewable, green energy.
• This is just a distraction from our ultimate goal: to develop and use renewable energy sources like wind and solar.
Fracking in Ohio

experts say. You decide.

Why it’s not risky:

The process of injecting fracking fluid into the ground is not dangerous, according to recent studies like the independent report done at the University of Texas, Austin.

- The frac fluid is injected so far below the surface that it could not migrate through thousands of feet and contaminated water supply.
- Fracking fluid does not contain 596 different chemicals—596 is an approximate number of the different varieties that they might be able to choose from. On average, the number is somewhere between 8 and 14 depending on the well, and each has a specific purpose in the fracking process.
- In many places, gas companies can no longer hide which chemicals are used in the fracking fluid. For instance, Texas has a law requiring full disclosure of chemicals used in hydraulic fracturing. Ohio has a similar law in the works.

The earthquakes that have occurred have been very minor, are preventable with proper monitoring and regulation. New technology is being developed that might entirely eliminate the need to dispose of waste in Class II injection wells.

- The earthquakes that recently occurred in northern Ohio that were attributed to disposal of hydraulic fracturing wastewater in Class II injection wells were very weak. 3.0-4.0 magnitude earthquakes usually cause very little or no damage, and often could hardly even be classified as earthquakes. After the incidents, the state of Ohio imposed new regulations for monitoring and preventing any more tremors from occurring.
- Ways of recycling the wastewater from the hydraulic fracturing process for use in other wells are currently being explored. Other new possibilities include pumping gas into the well to crack the shale (instead of water/sand/chemicals).

The release of natural gas is often natural and unrelated to fracking.

- If there is enough shale gas in a region for it to be fracked, there might also be naturally occurring natural gas in the water. This could be entirely unrelated to fracking.
- Methods of recycling the wastewater from the hydraulic fracturing process for use in other wells are currently being explored. Other new possibilities include pumping gas or other substances into the well to crack the shale (instead of water/sand/chemicals).

Natural gas could make alternative energy more viable and also has huge emissions advantages over other fuels.

- Natural gas releases about half as much carbon and pollutants as coal when used to make electricity. This could change the carbon emissions game.
- Right now, many forms of alternative energy are simply too expensive or too inefficient to be adopted. But natural gas could change all of that, because it is one of the best solutions for the inherent problems of wind and solar: what do you do on a sunless, windless day? Coal-powered generators are difficult to turn on and off, but this is not so for gas-powered generators, so natural gas could help save alternative energy—not postpone its adoption.
- Natural gas can also be used in public transportation. Many cities have transitioned to having some natural gas-driven bus fleets.
- For these reasons, some environmental groups like the Environmental Defense Fund (EDF) and the Natural Resources Defense council have embraced fracking.
The Politics of Fracking

What is the Halliburton loophole?

- In 2005, legislation was passed that essentially exempted fracking from any EPA regulation under the Safe Drinking Water Act. Thus since 2005, the EPA has had little direct control over hydraulic fracturing regulation.
- This became known as the “Halliburton Loophole” because the gas company Halliburton did a great deal of lobbying to get it passed. Dick Cheney, the head of the energy committee that dealt with the bill, is a former Halliburton executive. This has made him a scapegoat for the lack of federal regulation concerning fracking.

So how is fracking regulated?

- States have had to take on the enforcement role. In some cases, this is better: states are more attuned to the needs and have much less ground to cover.
- However, regulatory agencies in some states are stretched thin and regulations are insufficient or obsolete.

How stringent are Ohio’s regulations on fracking?

- While regulation has been comparatively lax in the past, the rules for hydraulic fracturing in Ohio have been made much more strict recently.
- New regulations are planned as part of a new Ohio energy policy bill that would require the disclosure of most chemicals used in the fracking process. A company could keep the use of some chemicals secret if they could be proven to be trade secrets, but even the names of these chemicals could be given if health hazards arose. Some Ohio Departments of Natural Resources officials have called the plan the “toughest in the nation.”

“I’m for the fracking. I think it’s an opportunity for Ohio to really get a lot of jobs. But we have to do it right. We have to really take a deep breath, make sure the public is protected, make sure our land is protected.”

—Mike DeWine, current Ohio Attorney General
A drill rig in southwestern Pennsylvania, where hydraulic fracturing has taken off.
A Landowner’s Guide

You are a landowner. A gas company has offered you more than $100,000 for the right to drill on your land. What should you know before signing away your mineral rights?

1. If at all possible, get a lawyer. This will help you negotiate the terms of your lease of mineral rights. A checklist of topics that might be worth discussing:

- You may want to have baseline data taken on the quality of air, soil, water, etc. on your land before drilling occurs. On the off chance that some sort of contamination occurs, this makes it possible to prove that the contamination was caused by hydraulic fracturing and did not exist before drilling.

- You may want to specify that the gas company periodically test for contamination.

- You may want to negotiate what areas of land will be used for drilling before signing the lease.

- You may not want to specify that the gas company not widen any roads. Hydraulic fracturing requires millions of gallons of water, and this means lots of truckloads coming in and out of your property.

- You may want to negotiate with the company about the use of a “flowback pit” where used water is stored until it can be trucked away and be disposed of. This can be ugly and damaging to the land, and some say that it is more likely to cause contamination than the hydraulic fracturing process itself. The alternative to a pit is that the company can store the “flowback water” in a tank before disposing of it.

- You may want to specify that the company not build permanent above-ground pipelines on your land to pump the gas from the well.

- You may want to specify that the company give you full access to the equipment on your property so that you can verify that the company is following laws and the terms of your contract.

2. There are a few other things to remember before you sign:

- Hydraulic fracturing requires millions of gallons of water. This means that hundreds of truckloads of water must be trucked in and out of the site throughout the process, which may require that roads be built on your property or widened.

- The process may also be noisy.

- The drill rig is not small; it may require a decent amount of land, and the rig is not pretty.

- Wells are often produce gas for many years. While the drilling of the well and hydraulic fracturing should not last more than a few months, the well probably won’t be going away anytime soon.

Legal wording can be tricky and deceptive, but contracts are serious business. This guide from the *Columbus Dispatch* is the key to deciphering the hidden meanings behind seemingly harmless wording in your hydraulic fracturing lease.

<table>
<thead>
<tr>
<th>What your contract says:</th>
<th>What it might mean:</th>
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<tbody>
<tr>
<td>“The company has rights to all gas, other hydrocarbons and non-hydrocarbons.”</td>
<td>The “non-hydrocarbons” wording could give the energy company access to a landowner’s water.</td>
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<tr>
<td>“The company has rights to conduct geophysical and other exploratory tests.”</td>
<td>The lease may give the landowner no separate payment or compensation for using the land for this.</td>
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<tr>
<td>“The company has rights to construct roads, power and phone lines, pipelines and other facilities on the landowner’s land and on neighboring lands.”</td>
<td>A landowner could have roads and pipelines crossing his or her land even though no well is drilled there.</td>
</tr>
<tr>
<td>The contract claims rights to “non-domestic” water sources free of cost.</td>
<td>The company gets free access to the landowner’s water (not from the landowner’s well).</td>
</tr>
<tr>
<td>“The company may drill ‘across, through and under the leasehold.’”</td>
<td>The landowner might get little or no compensation for gas taken from below his/her property but produced from a well on another landowner’s property.</td>
</tr>
<tr>
<td>Says that the company has the “right of first refusal” to other offers to lease mineral rights.</td>
<td>This restricts a landowner’s rights to find a better lease deal.</td>
</tr>
<tr>
<td>“No oral … representations or promises have been made or relied upon … as an inducement.”</td>
<td>Restricts a landowner’s right to legally challenge a company over false promises made by a company representative.</td>
</tr>
<tr>
<td>Includes an arbitration clause.</td>
<td>This removes the landowner’s rights to sue.</td>
</tr>
<tr>
<td>Contract attaches an “order of payment” to the lease.</td>
<td>Gives the company the ability to hold a lease for 90 to 120 days for a small payment while the company decides whether it wants to keep the lease.</td>
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All recommendations taken directly from or adapted from the infographic “Thinking about signing an oil or gas lease?” published on September 26, 2011 in the *Columbus Dispatch*. The article and graphic can be found on the *Dispatch* website at [http://www.dispatch.com/content/topic/news/2011/graphic-oil-gas-lease.html](http://www.dispatch.com/content/topic/news/2011/graphic-oil-gas-lease.html)
The Bottom Line

Commentary: Hydraulic fracturing is already here in Ohio, and it is most likely here to stay, whether you support it or not. But if hydraulic fracturing is done safely, it could be hugely beneficial both economically and environmentally.

Why you should embrace it:
- It’s simply too lucrative and promising to pass up. In a time of economic need, fracking could help jumpstart economy and create eagerly-awaited jobs. It has increased our supply of natural gas and pushed down natural gas prices substantially, lowering heating costs.
- It could help reduce our energy dependence on the middle east. At the end of 2011, the US was on track to be a net exporter of fossil fuels for the first time since 1949.

What we need to avoid:
- A future entirely without hydraulic fracturing, as many environmentalists have pushed for. They have had some success in states like New York, which created a moratorium on fracking that many politicians are now working to have removed. This would hurt Ohio and the nation as a whole both economically and environmentally.
- A future with entirely unregulated hydraulic fracturing, as industry has pushed for.

What need to be done:
Recent studies suggest that it is safe, but the jury is still out.
- Regulators are often stretched thin. More funding and staff are needed to oversee the process.
- Greater awareness and understanding of what the fracking process entails. Moderate voices need to speak up. The average citizen needs to stand up for responsible and safe use of hydraulic fracturing for the sake of the economy and the environment.

“We are headed for the worst of all possible outcomes—one in which misguided environmentalism combines with industry intransigence to create a political climate that shuts off further natural gas production. It will delay the move toward cleaner, renewable sources of energy for perhaps another generation.”
— Jesse Zwick, Washington Monthly (May-June 2011)
Learn More

The internet is rife with false or biased information on the subject of hydraulic fracturing. Below is a collection of some of the more trustworthy sources for learning more.

- **Watch** "My Water’s On Fire Tonight (The Fracking Song)", a playful video made by a group of NYU students that discusses the risks and benefits of fracking.

- **Surf** Frac Focus. The site offers a detailed explanation of the fracking process, a database of chemicals used in the fracking fluid. It can even search for the fracking sites nearest to you by zip code. The site is a project of the Ground Water Protection Council and the Interstate Oil and Gas Compact Commission.

- **Watch** Energy In Depth’s video explanation of the hydraulic fracturing process. The site has industry affiliations (it is sponsored by the Independent Petroleum Association of America), but it gives a detailed yet easy-to-understand explanation of how exactly fracking is done, from start to finish.

- **Surf** the hydraulic fracturing section on the US Environmental Protection Agency (EPA) website. Included are EPA studies, testimonies, and reports on the safety of hydraulic fracturing.

- **Read** Pro Publica’s hydraulic fracturing resource. The Pulitzer prize-winning investigative site includes a collection of relevant articles and insight into the political side of the hydraulic fracturing debate.

- **Read** the recent report given by the US Dept. of Energy’s Shale Gas Production Subcommittee which outlines the risks and best ideas for keeping hydraulic fracturing safe.