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ENVIRONMENT

A Colossal Fracking Mess

The dirty truth behind the new natural gas. *Related: A V.F. video look at a town transformed by fracking.*

By Christopher Bateman • Photographs by Jacques del Conte
WEB EXCLUSIVE June 21, 2010



A shale-gas drilling and fracking site in Dimock, Pennsylvania.

Early on a spring morning in the town of Damascus, in northeastern Pennsylvania, the fog on the Delaware River rises to form a mist that hangs above the tree-covered hills on either side. A buzzard swoops in from the northern hills to join a flock ensconced in an evergreen on the river's southern bank.

Stretching some 400 miles, the Delaware is one of the cleanest free-flowing rivers in the

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United States, home to some of the best fly-fishing in the country. More than 15 million people, including residents of New York City and Philadelphia, get their water from its pristine watershed. To regard its unspoiled beauty on a spring morning, you might be led to believe that the river is safely off limits from the destructive effects of industrialization. Unfortunately, you'd be mistaken. The Delaware is now the most endangered river in the country, according to the conservation group American Rivers.

That's because large swaths of land—private and public—in the watershed have been leased to energy companies eager to drill for natural gas here using a controversial, poorly understood technique called hydraulic fracturing. "Fracking," as it's colloquially known, involves injecting millions of gallons of water, sand, and chemicals, many of them toxic, into the earth at high pressures to break up rock formations and release natural gas trapped inside. Sixty miles west of Damascus, the town of Dimock, population 1,400, makes all too clear the dangers posed by hydraulic fracturing. You don't need to drive around Dimock long to notice how the rolling hills and farmland of this Appalachian town are scarred by barren, square-shaped clearings, jagged, newly constructed roads with 18-wheelers driving up and down them, and colorful freight containers labeled "residual waste." Although there is a moratorium on drilling new wells for the time being, you can still see the occasional active drill site, manned by figures in hazmat suits and surrounded by klieg lights, trailers, and pits of toxic wastewater, the derricks towering over barns, horses, and cows in their shadows.

The real shock that Dimock has undergone, however, is in the aquifer that residents rely on for their fresh water. Dimock is now known as the place where, over the past two years, people's water started turning brown and making them sick, one woman's water well spontaneously combusted, and horses and pets mysteriously began to lose their hair.

Craig and Julie Sautner moved to Dimock from a nearby town in March 2008. They were in the process of renovating their modest but beautifully situated home on tree-canopied Carter Road when land men from Houston-based Cabot Oil & Gas, a midsize player in the energy-exploration industry, came knocking on their door to inquire about leasing the mineral rights to their three and a half acres of land. The Sautners say the land men told them that their neighbors had already signed leases and that the drilling would have no impact whatsoever on their land. (Others in Dimock claim they were told that if they refused to sign a lease, gas would be taken out from under their land anyway, since under Pennsylvania law a well drilled on a leased piece of property can capture gas from neighboring, unleased properties.) They signed the lease, for a onetime payout of \$2,500 per acre—better than the \$250 per acre a neighbor across the street received—plus royalties on each producing well.

Drilling operations near their property commenced in August 2008. Trees were cleared and the ground leveled to make room for a four-acre drilling site less than 1,000 feet away from their land. The Sautners could feel the earth beneath their home shake whenever the well was fracked.

Within a month, their water had turned brown. It was so corrosive that it scarred dishes in their dishwasher and stained their laundry. They complained to Cabot, which eventually installed a water-filtration system in the basement of their home. It seemed to solve the problem, but when the Pennsylvania Department of Environmental Protection came to do further tests, it found that the Sautners' water still contained high levels of

VIDEO



A V.F. video look at a town transformed by fracking.

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methane. More ad hoc pumps and filtration systems were installed. While the Sautners did not drink the water at this point, they continued to use it for other purposes for a full year.

“It was so bad sometimes that my daughter would be in the shower in the morning, and she’d have to get out of the shower and lay on the floor” because of the dizzying effect the chemicals in the water had on her, recalls Craig Sautner, who has worked as a cable splicer for Frontier Communications his whole life. She didn’t speak up about it for a while, because she wondered whether she was imagining the problem. But she wasn’t the only one in the family suffering. “My son had sores up and down his legs from the water,” Craig says. Craig and Julie also experienced frequent headaches and dizziness.

By October 2009, the D.E.P. had taken all the water wells in the Sautners’ neighborhood offline. It acknowledged that a major contamination of the aquifer had occurred. In addition to methane, dangerously high levels of iron and aluminum were found in the Sautners’ water.

The Sautners now rely on water delivered to them every week by Cabot. The value of their land has been decimated. Their children no longer take showers at home. They desperately want to move but cannot afford to buy a new house on top of their current mortgage.

“Our land is worthless,” says Craig. “Who is going to buy this house?”

As drillers seek to commence fracking operations in the Delaware River basin watershed and in other key watersheds in New York State—all of which sit atop large repositories of natural gas trapped in shale rock deep underground—concerned residents, activists, and government officials are pointing to Dimock as an example of what can go wrong when this form of drilling is allowed to take place without proper regulation. Some are pointing to a wave of groundwater-contamination incidents and mysterious health problems out West, in Colorado, New Mexico, and Wyoming, where hydraulic fracturing has been going on for years as part of a massive oil-and-gas boom, and saying that fracking should not be allowed at all in delicate ecosystems like the Delaware River basin.

Damascus and Dimock are both located above a vast rock formation rich in natural gas known as the Marcellus Shale, which stretches along the Appalachians from West Virginia up to the western half of the state of New York. The gas in the Marcellus Shale has been known about for more than 100 years, but it has become accessible and attractive as a resource only in the past two decades, thanks to technological innovation, the depletion of easier-to-reach, “conventional” gas deposits, and increases in the price of natural gas. Shale-gas deposits are dispersed throughout a thin horizontal layer of loose rock (the shale), generally more than a mile below ground. Conventional vertical drilling cannot retrieve shale gas in an economical way, but when combined with hydraulic fracturing, horizontal drilling—whereby a deeply drilled well is bent at an angle to run parallel to the surface of the Earth—changes the equation.

Developed by oil-field-services provider Halliburton, which first implemented the technology commercially in 1949 (and which was famously run by Dick Cheney before he became vice president of the United States), hydraulic fracturing has been used in conventional oil and gas wells for decades to increase production when a well starts to



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run dry. But its use in unconventional types of drilling, from coal-bed methane to shale gas, is relatively new. When a well is fracked, a small earthquake is produced by the pressurized injection of fluids, fracturing the rock around the well. The gas trapped inside is released and makes its way to the surface along with about half of the “fracking fluid,” plus dirt and rock that are occasionally radioactive. From there, the gas is piped to nearby compressor stations that purify it and prepare it to be piped (and sometimes transported in liquefied form) to power plants, manufacturers, and domestic consumers. Volatile organic compounds (carbon-based gaseous substances with a variety of detrimental health effects) and other dangerous chemicals are burned off directly into the air during this on-site compression process. Meanwhile, the returned fracking fluid, now called wastewater, is either trucked off or stored in large, open-air, tarp-lined pits on site, where it is allowed to evaporate. The other portion of the fluid remains deep underground—no one really knows what happens to it.

Fracking is an energy- and resource-intensive process. Every shale-gas well that is fracked requires between three and eight million gallons of water. Fleets of trucks have to make hundreds of trips to carry the fracking fluid to and from each well site.

Due in part to spotty state laws and an absence of federal regulation, the safety record that hydraulic fracturing has amassed to date is deeply disturbing. As use of the technique has spread, it has been followed by incidents of water contamination and environmental degradation, and even devastating health problems. Thousands of complaints have been lodged with state and federal agencies by people all over the country whose lives and communities have been transformed by fracking operations.

In Dimock, where more than 60 gas wells were drilled in a nine-square-mile area, all kinds of ugly things transpired after Cabot came to town. A truck turned over and caused an 800-gallon diesel-fuel spill in April 2009. Up to 8,000 gallons of Halliburton-manufactured fracking fluid leaked from faulty supply pipes, with some seeping into wetlands and a stream, killing fish, in September 2009. Many Dimock residents were having the same problems as the Sautners. A water well belonging to a woman named Norma Fiorentino blew up while she was visiting her daughter. Reports of the havoc appeared in the local press and then gradually trickled into the national media. Reuters and ProPublica were on the story early on; later, everyone from NPR to *The New York Times* was coming to Dimock.

Over a six-month period Cabot was fined \$360,000 by the D.E.P. for contaminating Dimock’s groundwater and failing to fix the leaks that caused the problem. It was also ordered to suspend drilling in Dimock until the situation was resolved. The Sautners are one of more than a dozen Dimock families now suing the company for negligence, breach of contract, and fraudulent misrepresentation, among other charges. Other plaintiffs in the lawsuit include Ron and Jean Carter, who were evacuated after methane levels in their home reached emergency levels, and Victoria Switzer, a schoolteacher who has compiled a grim photo album of spills and leaks around Dimock, including a creek turned Kool-Aid red with diesel fuel. (In a written statement to *Vanity Fair*, Cabot declined to comment on the lawsuit but said that while it operates its facilities “in full compliance with environmental and oil and gas drilling regulations ... the accidental



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release of materials has occasionally occurred” during its operations. The company also said that it had created more than 300 full-time jobs in Susquehanna County, where Dimock is located, and that it was working with both the Pennsylvania D.E.P. and the affected families to remediate the situation.)

Keywords

Culture, Business, Web Exclusives

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all of the "clean" natural gas in the world wont be worth SQUAT if your drinking water supply is contaminated with toxic chemicals. Clean drinking water will be the new gold. Water is life.

Posted 2/14/2011 3:16:32pm by pootersmum

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Simple. You can buy up all the mineral rights in all the driling units and then just tell them you don't want to let them drill. You should not have sold them in the first place. May not have been you but somewhere back through the days somone sold the RIGHTS to the mineral property. Yes you or a prior owner put a lot of money in their pocket in exchange for rights to the oil/gas under your top soil. So just buy them back and don't let them drill.

Posted 1/13/2011 11:49:13pm by Troyd

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I think that things need to change and real quick!!! Only in America do we drill for natural gas in a nasty way and then when well water becomes contaminated we make them prove that it was caused by the drilling by thier house!!! This is America and we should take every complaint of contaminated well water due to fracking seriously and take steps to help prevent it in the future!!! Remember if we pollute all the water now what will we drink later!!!

Posted 1/7/2011 9:18:29pm by MaryBethS

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Would you protest abortion and then go home and have one yourself? Would you protest logging and then go home and cut all the trees off your land. Kind of hypocrite to protest oil and gas operations when you use hydrocarbons yourself, isn't it? After all if all you guys would just stop using them then you would not have to drill for them. Don't get me wrong I would like to see lots of green tech come into play but we are decades away from hydrocarbon independence. Until then we must "Drill and Burn" and we must not depend on foreign oil. Anyway I do wish you luck on your quest. Many of the contractors left Arkansas to go to PA and NY. So I hope you can run them back to Arkansas and get our economy booming like it was two years ago.

Posted 1/5/2011 9:33:56pm by Troyd

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Geobill?!?! Are you for real? Do you really believe what you wrote is rational? "Any development causes degradation of the natural environment...any development...roads, animals, auto dealers, houses, communes, etc. This is not bad but should be realized." You use "drunk driving" to rationalize your point? It's illegal! Fracking SHOULD be illegal. You reason the way most corrupt capitalists reason! Your minds are sick. As I drive around the countryside lately, I'm seeing more and more "Friends of NY Natural Gas" signs in more and more front yards. Has no one heard of Dimock, PA? Are they all greedy, simple-minded, brain-washed country bumpkins? Joining such a group is like saying "Friends of Flammable Tap Water," "Friends of Watching Friends and Family Fighting for Their Lives," or "I don't care about our children's future. Regardless of the consequences, I want easy money now!!!" If you are a "Friend of NY Natural Gas," you are uneducated, you lie to yourself and you're no friend of mine or my family. I swear to you, I will do whatever it takes to protect the environment in this area from the greedy who don't give a rats ass about the rest of humanity. WHATEVER IT TAKES!!! How's that for 'rational?'

Posted 12/24/2010 7:28:54pm by JohnK3

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It's going to get worse. Companies are going overseas to test out untried technologies, where American environmental regulations don't let them take the risk. When they prove that the money's there, the EPA will be powerless to introduce the technologies into the US. <http://www.saveadullam.co.il/english> describes one such project by a US-based conglomerate.

Posted 11/22/2010 9:27:45am by AmelieS

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I am for a national ban on fracking...the current politicians talk out of both sides of their mouth..we need to be careful etc etc etc and oh by the way, it could be an economic boon. Gillibrand has said this, Lifton locally etc. I am running against Gillibrand for US Senate in NY and need your help to shut this down. Scott Noren DDS Ithaca, NY Truck traffic and repairs of roads will decrease County revenues, decrease tourism dollars, and discourage business for those that depend on people and clients showing up ON TIME and not delayed by trucks and road repairs. www.norenforsenate.com to volunteer and eventually contribute when my e-donation tab goes live again in the next couple weeks. Scott Noren DDS

Posted 11/21/2010 11:13:55pm by Norenforsenate

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everyone in the US does there part to some degree to make America America...some live in an urban jungle, and some farm, and some build cars, and some produce gas and oil, and some mine and produce copper. So think about clean water and the copper piping used in your homes in NY and PA. Where did it come from? The copper pipe fairy? Now think about a few small towns in Arizona and New Mexico who host copper mines. These areas have huge pits in the ground and groundwater that is not so great and heavy metals are fairly common. But I don't see anyone in NY or PA whining about the quality of life in AZ and NM. My point is that everyone wants the benefits of the developed world but no one realizes what is involved in industry. There are sacrifices and balance in the world.

Posted 11/10/2010 12:54:10am by Geobill

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This seemed to be a fairly well researched article but it is missing the key facts and mixing and matching details to make its point. This is sloppy and deceptive. I am a former petroleum geologist from NY and now in Denver. Here are some facts to help clarify things. Fracking has been around forever and is used for gas and oil wells. Oil is filled with toxic chemicals that cause cancer and contains gasoline chemicals which are very toxic but run our cars, and pave our streets. natural gas is often found with oil. The shales that include the Marcellus Shale are the source of the oil and gas that people drill for in other zones. Fracking is generally not the problem because the chemicals used are meant for a zone or shale that already has worse chemicals in it (hydrocarbons). Also natural gas is generally not too toxic if found alone. Shales can contain some metals like arsenic etc. Whenever I hear actual cases of water contamination from oil and gas drilling I first think of bad drilling practices where the water (aquifers) that are drilled through are poorly cemented r sealed off from the generally deeper oil zones. So yes shallow water aquifers and deeper oil zones are the rule. Any development causes degradation of the natural environment...any development...roads, animals, auto dealers, houses, communes, etc. This is not bad but should be realized. Drilling does cause more chemicals to be thrown around and sometimes there are accidents usually involving human failures like driving, spilling, etc. There will be spills and accidents. There will also be drunk driving accidents from alcohol, and hunting accidents, and industrial accidents from manufacturing. Does this mean we should ban or hate all these activities of man. No! Without chemicals there is disease like cholera, diptheria (sp?), look at the third world. So I am talking balance. Is money good for people?? Who knows?? Does poverty breed human pain I think so. Isn't this what we are talking about. Regarding global warming this is pure BS and not really part of this debate. The thing is that fracking I believe is not the problem, but drilling and completion practices need to be done carefully but there will be accidents and sad stories but is it worth it. My guess is that if done right it can be a nice economic boost to the area. capitalism and companies like Cabot are not the devil. They are just trying to make money like all of us. Natural gas is cleaner than oil...period. One more thing, if gas and water from shales is not handled properly trees will die...but it doesn't mean the world has ended because mainly from salt content not some horrible hydrocarbon. I just wish real facts were used and crazy fears were minimized.






Posted 11/9/2010 9:17:04pm by Geobill

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