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Dark Side of a Natural Gas Boom

By [JAD MOUAWAD](#) and [CLIFFORD KRAUSS](#)

DIMOCK, Pa. — Victoria Switzer dreamed of a peaceful retirement in these Appalachian hills. Instead, she is coping with a big problem after a nearby [natural gas](#) well contaminated her family's drinking water with high levels of methane.

Through no design of hers, Ms. Switzer has joined a rising chorus of voices skeptical of the nation's latest energy push. "It's been 'drill, baby, drill' out here," Ms. Switzer said bitterly. "There is no stopping this train."

Across vast regions of the country, gas companies are using a technology called hydraulic fracturing to produce natural gas from previously untapped beds of shale. The push has been so successful that the country's potential gas reserves jumped by 35 percent in two years. The new supplies have driven down natural gas prices for consumers and might help the global environment by allowing more production of electricity from natural gas, which emits fewer [global warming](#) emissions than coal.

What the drilling push will do to local environments is another matter.

The drilling boom is raising concern in many parts of the country, and the reaction is creating political obstacles for the gas industry. Hazards like methane contamination of drinking water wells, long known in regions where gas production was common, are spreading to populous areas that have little history of coping with such risks, but happen to sit atop shale beds.

And a more worrisome possibility has come to light. A string of incidents in places like Wyoming and Pennsylvania in recent years has pointed to a possible link between hydraulic fracturing and pollution of groundwater supplies. In the worst case, such pollution could damage crucial supplies of water used for drinking and agriculture.

So far, the evidence of groundwater pollution is thin. Environmental groups contend that is because governments have been slow to react to the drilling boom and are not looking hard for contamination. Gas companies acknowledge the validity of some concerns, but they claim that their technology is fundamentally safe.

The debate is becoming more urgent as gas companies move closer to more populated areas, especially in the Northeast, where millions of people are likely to find themselves living near drilling operations in coming years.

"To be able to scale up our drilling, clearly we have to be in sync with people's concerns about water," said

Aubrey K. McClendon, chief executive of the [Chesapeake Energy Corporation](#), a leading gas company. “It’s our biggest challenge.”

Hydraulic fracturing consists of injecting huge volumes of water at high pressure to break shale rocks and allow natural gas to flow out more easily. The water is mixed with sand, chemicals and gels to lubricate the process and help keep the rocks open.

After refining the technique in Western states in recent years, gas companies are moving to tap the nation’s largest shale structure, the Marcellus shale, which stretches from Virginia to New York.

“It’s a very reliable, safe, American source of energy,” said John Richels, president of the [Devon Energy Corporation](#).

Environmental activists, however, say there is at least scattered evidence that fracturing operations can pose risks to groundwater sources, particularly when mistakes are made in drilling operations. They have also questioned how some companies deal with the wastewater produced by their operations, warning that liquids laced with chemicals and salt from drilling can overload public sewage treatment plants or pollute surface waters.

Deborah Goldberg, a lawyer for the nonprofit environmental group Earthjustice who is fighting to toughen Pennsylvania’s discharge rules, said the state “is facing enormous pressure from gas drillers, who are generating contaminated water faster than the state’s treatment plants can handle it.”

According to the New York State Department of Environmental Conservation, which is going through a public review of its new rules on hydraulic fracturing, gas companies use at least 260 types of chemicals, many of them toxic, like benzene. These chemicals tend to remain in the ground once the fracturing has been completed, raising fears about long-term contamination.

The most immediate hazard from the national drilling bonanza, it is clear, involves contamination of residential drinking water wells by natural gas. In Bainbridge, Ohio, an improperly drilled well contaminated groundwater in 2007, including the water source for the township’s police station, according to a complaint filed this year. After building to high pressures, gas migrated through underground faults, and blew up one house.

Here in Dimock, about 30 miles north of Scranton, Pa., 13 water wells, including that of Ms. Switzer, were contaminated by natural gas. One of the wells blew up.

Under prodding, environmental regulators are stepping up the search for groundwater contamination. In Pavilion, Wyo., for instance, the [Environmental Protection Agency](#) has begun an investigation into contamination of several drinking water wells.

Luke Chavez, an E.P.A. investigator, said that traces of methane and 2-butoxyethanol phosphate, a foaming agent, had been found in several wells near an area where the [EnCana Corporation](#), a Canadian gas company, had used hydraulic fracturing in recent years.

He said the compounds could have come from cleaning products or [oil](#) and gas production, but “it tells us

something is happening here that shouldn't be here.”

An EnCana spokesman, Doug Hock, said the company was “committed to working with E.P.A. to resolve this issue.” But he added, “At this point, no specific connection has been made between the tentatively identified compounds and oil and gas activities.”

In a 2004 study, the E.P.A. decided that hydraulic fracturing was essentially harmless. Critics said the analysis was politically motivated, but it was cited the following year when the Republican-led Congress removed hydraulic fracturing from any regulation under the Safe Drinking Water Act.

The current Democratic Congress recently enacted a law requiring the E.P.A. to review the study. Lawmakers from Colorado and New York have also introduced legislation to end the water act exemption and require gas companies to disclose all chemicals used in fracturing operations.

The agency has begun an analysis of whether hydraulic fracturing requires tighter federal regulation.

“E.P.A. is reviewing available information to determine whether hydraulic fracturing fluids have contaminated drinking water and has dedicated resources to properly studying this issue,” the agency said in a statement.

The political situation has put the gas companies on the defensive. “It’s not going to stop us, but we do have to solve the problem in a prudent manner,” said Rodney L. Waller, a senior vice president at the [Range Resources Corporation](#), a major gas producer in the Marcellus shale.

Partly in response to opposition it has encountered in New York, Chesapeake recently indicated that it would not drill in the New York City watershed, a region that supplies drinking water to nearly 10 million people. [Schlumberger](#), a service company that performs fracturing operations on behalf of gas companies, said it was working on “green” fracturing fluids, including safer substitutes for hazardous chemicals.

In the Barnett shale gas field in Texas, Devon Energy and Chesapeake are trying various treatment techniques for disposing of contaminated drilling water. Gas executives hope that wider use of such techniques will damp public opposition in some regions. Several companies are starting a joint water treatment effort in Pennsylvania in the next few weeks.

Still, around Dimock, the gas boom is viewed with mixed feelings. Many public officials support drilling. Governor [Edward G. Rendell](#) has called the surge “a great boon” to Pennsylvania. Many people have leased their land here and are collecting royalty checks from gas production.

The hills around Dimock have been bulldozed to clear the ground for dozens of drilling pads the size of football fields. Eighteen-wheelers thunder down narrow country roads, kicking up dust and fumes. Recently, a helicopter buzzed overhead while dangling heavy cables used for seismic tests.

In September, the [Cabot Oil and Gas Corporation](#), a Houston energy company, was required to suspend its fracturing operations for three weeks after causing three spills in the course of nine days. Cabot, which was fined \$56,650 by the state, said the spills consisted mainly of water, with only 0.5 percent chemicals. This month, Cabot was fined an additional \$120,000 by Pennsylvania for the contamination of homeowners’

wells. It must now submit strict drilling plans to the state.

A company spokesman, Kenneth S. Komoroski, said it was too early to blame hydraulic fracturing — the technology at the heart of the boom — for pollution of water wells. He said Cabot was still investigating the causes of last January’s contamination incidents.

“None of the issues in Dimock have anything to do with hydraulic fracturing,” he said.

The fines were little consolation to Ms. Switzer, the woman who can no longer draw drinking water from her well.

After moving here in 2005, she sold drilling rights on her property for a mere \$180 after, as she recalled it, a gas company representative convinced her only one well might be drilled. In fact, no well was drilled, but three were on surrounding properties. Her well was contaminated at the beginning of the year after gas leaked from a well drilled by Cabot.

Her family now uses bottled water supplied by Cabot every week. She fears that if she tried to sell her home, which sits in the middle of a drilling zone, no one would buy it.

“Can you imagine the ad? ‘Beautiful new home. Bring your own water,’ ” Ms. Switzer said. “We’re like a dead zone here.”

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