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## Can shale bail out Ohio?

Chesapeake Energy has spent \$2.2 billion and amassed about 800,000 acres of leases in the rich Utica shale that runs underneath eastern Ohio.

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The rich Utica shale that runs beneath eastern Ohio holds vast quantities of natural gas, gas liquids and crude oil.

The help-wanted sign is out in Canton, Ohio, for Chesapeake Energy.

The company that has led the charge in shale gas drilling is looking for truck drivers with licenses for hazardous materials, a purchasing coordinator for oil-field equipment, a pipeline technician, a field safety coordinator, administrative assistants, troubleshooting electricians, a tax analyst and more.

Chesapeake is mobilizing for a massive drilling and development campaign. The company has spent \$2.2 billion and amassed about 800,000 acres of leases in the rich Utica shale that runs underneath eastern Ohio.

It has eight rigs running and will have 20 poking holes in the ground around Election Day. It plans to install 200 miles of pipeline this year to bring its bounty to market.

"We are very excited about the Utica," Chesapeake CEO Aubrey McClendon, said in a Feb. 22 conference call.

That's welcome news in Canton, where the unemployment rate peaked at 12.3 percent in January 2010 and where it was still at 8.7 percent at the end of last year.

But shale drilling has also presented Ohioans with a dilemma.

Chesapeake Energy is using the controversial combination of hydraulic fracturing and improved horizontal drilling methods to unlock vast quantities of natural gas, gas liquids and crude oil, driving down gas prices to 10-year lows. That has raised hopes for a revival of industrial and power plant uses of the gas.

In some cases, however, companies that haven't drilled properly have contaminated water aquifers. And "fracking," which uses about 4.5 million gallons of water — about 1,300 tank trucks full — to initially stimulate a well and get it flowing, has raised concerns about the disposal of toxic drilling waste.

A Youngstown, Ohio, disposal well for fracking waste has been linked by seismologists to earthquakes. In December, the governor ordered the closure of several disposal wells in the area.

A Quinnipiac University opinion poll in January showed that 85 percent of Ohio voters believed that natural-gas drilling would create jobs, and that by a 64-to-29 percent margin they believed that the economic benefits of drilling for natural gas outweigh the environmental concerns.

At the same time, voters said by a 72-to-23 percent margin that hydraulic fracturing should be suspended until there are further studies about its impact. They said by a 43-to-16 percent margin that fracking would damage the environment.

Support for a moratorium was strong among all groups, Quinnipiac said.

"Ohio can't have it both ways," Thomas Stewart, executive vice president of the Ohio Oil and Gas Association, said in a statement after the poll was released. "A ban on hydraulic fracturing would result in increased energy costs and bring oil-and-gas-related capital investment and job growth in Ohio to a grinding halt, just as the positive effects of both are currently reviving once-struggling communities throughout the state."

"They want the jobs, but they're very risk-averse," said Peter Brown, assistant director of the Quinnipiac polling institute.

### The latest boom

Oil and gas drilling is nothing new in Ohio. In 1860, just a year after the first commercial discovery of oil in Pennsylvania, drillers found oil in Ohio near Macksburg. By 2010, there had been 275,774 wells drilled in the state, putting it in fourth place nationwide.

John D. Rockefeller established Standard Oil by cornering the Ohio refinery business and pipelines to drive down crude-oil prices and capture retail profits.

The size of Ohio's reservoirs has paled next to the giants in Texas, California and Alaska. There was an Ohio oil rush in the 1890s, and the state's production peaked in 1896.

High oil and gas prices after the 1979 price shock triggered a new drilling rush, and natural-gas production peaked in 1984, when high prices provided incentives for drillers.

Today there are 64,378 active wells, most of them "stripper" wells producing fewer than 10 barrels of oil a day or less than 60,000 cubic feet a day of natural gas.

Hydraulic fracturing combined with horizontal drilling is a new twist, however.

The horizontal drilling allows companies to snake through the shale layer rather than just tap a cross section. Water is shot into wells to crack the shale rock and release natural gas or oil, which then flows up the well.

What makes Ohio particularly alluring is that many of its shale areas are "wet," meaning they have crude oil or natural-gas liquids — currently much more valuable than gas, which is unexpectedly abundant and cheap.

Suddenly, Ohio is on the verge of an old-fashioned oil and gas rush. In certain hot spots, sums exceeding \$3,000 an acre have been paid for a five-year lease, according to the law firm Johnson & Johnson, which represents landowners.

In January, the French oil giant Total paid \$700 million for a 25 percent interest in part of Chesapeake's Ohio acreage and pledged to pay \$1.63 billion over seven years for drilling and well completion.

While big money is at stake, Ohioans fear their water is, too.

Fracking got a bad reputation in Ohio before the shale drilling boom started. Hydraulic fracturing can be used in vertical wells, too, and in 2007 Ohio Valley Energy fracked a well in Bainbridge Township.

Later, a report by the Ohio Department of Natural Resources said the company disregarded a bad cement job and went ahead with the fracturing anyway. Pressure built up in the annular space around the drill pipe, and gas migrated vertically through natural fractures in the rocks, the report said.

On Dec. 12, natural gas was detected at the local police station and two days later in homes, some of which had wells in their basements.

Then early on the morning of Dec. 15, an explosion lifted the two-story home of Richard and Thelma Payne off its foundation. The elderly couple were catapulted from their bed, according to a lawsuit filed later. The Paynes were not hurt, but 19 homes were evacuated.

Even though it was a vertical well, the issue of gas migrating from horizontal wells into aquifers through rock fractures is something that frightens many people living over shale prospects.

So far, only 35 horizontal wells have been drilled in Ohio, according to state regulators.

"I think it's a good idea to drill for natural gas, but I don't think they should drill in neighborhoods with high-density population," said Dale Markowitz, lawyer for the Paynes and their neighbors.

"If you follow the rules in place, the odds are pretty low that you'll have a problem," he says. "But you could have a drilling disaster no matter what."

### **A need for regulation**

Pennsylvania, where the Marcellus Shale has already been heavily developed, has not provided a role model for Ohioans. Among the more than 4,200 shale gas wells drilled in Pennsylvania, there have been enough problems to provide fodder for Ohio's drilling foes.

The most common problems occur on the surface. In February, for example, Pennsylvania fined Chesapeake \$565,000 for sediment that washed off both an access road and a drilling pad into a river, damaging filters at a water treatment plant.

According to the environmental group Clean Water Action, in 2010 there were 1,200 violations of environmental regulations by gas drillers in the Marcellus, a quarter of them from leaks or poor construction of waste pits for fluids that flow back to the surface after fracking.

Ohio Gov. John Kasich has moved to balance the economic and safety issues.

"You cannot degrade the environment at the same time you're producing this industry. It is not acceptable," he said in his state of the state address in February.

"And it's not a false choice. The biggest companies know that you need to have tough environmental rules. They can't be complicated. They can't be over the top, but we need to have them because we can't have some yahoo come into the state and damage this whole industry because they're irresponsible."

### **Prime regions**

Kasich spokesman Rob Nichols notes that the best drilling prospects, in the eastern and southeast regions, are in "that part of the state where people have been ignored far too long." (Portions of the Utica shale also run beneath the Marcellus and into Pennsylvania.)

Many experts say that cheap natural gas in the southeast part of the state could also lure industries that rely heavily on gas. Shell Oil has said it would build a chemical plant in the area, but hasn't decided which state.

Pennsylvania, West Virginia and Ohio are all in the running; each is vying with generous packages of tax incentives, pipeline routes and permit expediting. An announcement is due this month.

Meanwhile, the drillers are hiring. Jake Holland, a civil-engineering major who graduated from the University of Akron in 2009, served tables and tended bar at restaurants until Chesapeake Energy hired him as a field technician eight months ago.

Now he works with landowners and county engineers to figure out the best routes for trucks and locations for drilling pads. Sure of a

regular paycheck, he hopes to buy a house in the next year or so.

"We cannot let our fears outweigh the potential," Kasich said.

At the same time, Nichols says, Kasich is "looking at regulatory processes to make sure that when companies come in here they leave the place better than when they arrived."

### **More regulators**

The state proposed tighter regulations in October and Kasich has backed a tripling in the number of regulators — who now number two per county — and a tripling in their small budget.

Environmentalists say it's a step in the right direction, but not enough. A group of organizations proposed 19 pages of technical revisions. The state issued a new set of regulations that environmental groups are still reviewing.

"They've put some good things in there, but they still have a long ways to go before they're up to the highest standards," said Brianna Mordick, a geologist working for the Natural Resources Defense Council.

"This is an industrial process. You can reduce the risk of environmental problems, but you can never eliminate it," Mordick said.

She added that "you have to have really strong regulations in place and then you have to be able to enforce those regulations. When exploration and development explodes, it's really hard for these states to keep up.

"Relative to the number of wells, the number of inspectors is really small, and there's no way for them to get to the sites with enough frequency."

Meanwhile, the exploration companies are marching west from Pennsylvania.

So far, Ohio's main role in the shale gas business has been to bury Pennsylvania's waste.

Because of its geology, Pennsylvania has a limited number of waste disposal wells. So most of the state's fracking chemicals and the nasty stuff sucked back up from the shale rock gets injected into what the Environmental Protection Agency calls class 2 wells in Ohio, which has 177 of them.

The D&L Energy well in Youngstown was one. D&L Energy began drilling it in July 2010 and waste injections began in December 2010. Three months later, the first earthquakes struck.

Youngstown had never had one before.

John Armbruster, a seismologist with Columbia University's Lamont-Doherty Earth Observatory, says the well was 2.7 kilometers deep.

It was supposed to dispose of waste in sandstone, which is a couple hundred million years old, right above the basement rock, which is a billion years old.

The waste is pumped in at extremely high pressures — high enough to lift the Empire State Building, Armbruster says. It'd be like having the weight of an SUV in the palm of your hand.

The D&L well happened to be right on top of, or very close to, a fault, he adds.

"I compare it to a hydraulic jack," Armbruster said. "The pressure in the well is a thousand pounds per square inch. Put that over a piece of fault that's 1 kilometer by 1 kilometer, and you have enough pressure to move a piece of the Earth."

D&L Energy's chief executive, Ben Lupo, did not return phone calls seeking comment.

### **Unusual quake**

On Dec. 30, the state ordered the shutdown of the well and a handful of others in the Youngstown area. On Dec. 31, a quake registered 4.0 on the Richter scale, 40 times the energy of earlier ones.

How will the politics of this play out? GOP presidential candidates have supported expanded oil and gas drilling. President Obama, however, has been staking out a middle ground — more shale gas drilling, but with safeguards. While it might not please environmental groups or industry groups, it might be in line with Ohio's uncertain voters.

"Ohio's economy obviously needs jobs, and the consensus is that this will create jobs and bring tax revenue," Quinnipiac's Brown said. "So there's an inclination to want to make sure that Ohio gets those economic benefits. This is also an electorate with a sense of risk averseness on anything that involves safety and environmental questions. The challenge for a politician is to walk that line."