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CBS News

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Ohio geologists link small earthquakes to fracking



Workers change pipes at Consol Energy Horizontal Gas Drilling Rig exploring the Marcellus Shale outside the town of Waynesburg, PA on April 13, 2012. It is estimated that more than 500 trillion cubic feet of shale gas is contained in this stretch of rock that runs through parts of Pennsylvania, New York, Ohio and West Virginia. MLADEN ANTONOV/AFP/Getty Images

COLUMBUS, Ohio -- State geologists in Ohio have for the first time linked earthquakes in a geologic formation deep under the Appalachians to gas drilling, leading the state to issue new permit conditions in certain areas that are among the nation's strictest.

A state investigation of five small tremors in the Youngstown area, in the Appalachian foothills, last month has found the high-pressure injection of sand and water that accompanies hydraulic fracturing, or fracking, in the Utica Shale may have increased pressure on a small, unknown fault, said State Oil & Gas Chief Rick Simmers. He called the link "probable."

While earlier studies had linked earthquakes in the same region to deep-injection wells used for disposal of fracking wastewater, this marks the first time tremors have been tied directly to fracking, Simmers said. Five seismic events in March were all part of what was considered a single event and couldn't be easily felt by people.

The state's new permit conditions are perhaps the most cautious yet put in place in the nation, he said.

Glenda Besana-Ostman, a seismologist with the U.S. Department of the Interior's Bureau of Reclamation, confirmed the finding is the first in the region to suggest a connection between the quakes and the actual extraction of oil and gas, as opposed to wastewater disposal. A deep-injection well in the same region of Ohio was found to be the likely cause of a series of quakes in the same region of Ohio in 2012.

Under the new permit conditions, all new drilling sites in Ohio within 3 miles of a known fault or seismic activity of 2.0 magnitude or higher will be conditioned on the installation of sensitive seismic-monitoring equipment. Results will be directly available to regulators, Simmers said, so the state isn't reliant on drilling operators providing the data voluntarily.

If seismic activity of 1.0 magnitude or greater is felt, drilling will be paused for evaluation. If a link is found, the operation will be halted.

"While we can never be 100 percent sure that drilling activities are connected to a seismic event, caution dictates that we take these new steps to protect human health, safety and the environment," said James Zehringer, director of Ohio's natural resources department.



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Saturday

Scientists blame fracking for Oklahoma earthquakes

Scientists are pointing to fracking as the cause of a major uptick in earthquakes in the state of Oklahoma. Jeffrey Kluger, editor-at-large for T...

Scientists have previously pointed to fracking as the cause of a major uptick in earthquakes in the state of Oklahoma.

Ohio has also imposed an indefinite drilling moratorium at the site of the March quakes. The state is allowing oil and gas extraction to continue at five existing wells at the site.

The Utica Shale lies beneath the better-known Marcellus Shale, where energy companies have drilled thousands of unconventional gas wells in Pennsylvania, Ohio and West Virginia in recent years.

The Marcellus is considered to be one of the richest natural gas reserves in the world. Drillers have only recently begun to tap into the deeper Utica.

5 things you need to know about fracking

Brian Montopoli February 4, 2013, 5: 29 PM

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• With AFP Story by Veronique DUPONT: US-Energy-Gas-Environment A Consol Energy Horizontal Gas Drilling Rig explores the Marcellus Shale outside the town of Waynesburg, PA on April 13, 2012. It is estimated that more than 500 trillion cubic feet of shale gas is contained in this stretch of rock that runs through parts of Pennsylvania, New York, Ohio and West Virginia. Shale gas is natural gas stored deep underground in fine-grained sedimentary rocks. It can be extracted using a process known as hydraulic fracturing ? or "fracking" ? which involves drilling long horizontal wells in shale rocks more than a kilometre below the surface. Massive quantities of water, sand and chemicals are pumped into the wells at high pressure. This opens up fissures in the shale, which are held open by the sand, enabling the trapped gas to escape to the surface for collection. AFP PHOTO/MLADEN ANTONOV (Photo credit should read MLADEN ANTONOV/AFP/Getty Images)

What is it?

Fracking is short for "hydraulic fracturing," and the catch-all term used to describe the process of extracting oil and natural gas from shale rock formations deep underground. The process goes roughly like this: A company drills down more than a mile deep into the shale rock formations. Then comes what is known as "horizontal drilling" - effectively, the drilling turns 90 degrees, so that the well is exposed to more rock than it would be otherwise.

After the well is reinforced with concrete, tubes with perforating guns are sent down to set off explosions that create perforations in the rock surrounding the well. Then millions of gallons of "fracking fluid" - a mixture of water, sand and chemicals - is pumped down into the well at high pressure. The pressure builds up in the well, and the rock fractures. That frees the oil and gas that had been trapped within the rock, which flows back up through the pipe to be captured above ground. The process is repeated multiple times, with much - though not all - of the fracking fluid brought back up through the well.

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- Melvin Moran is a second generation oil man who believes the controversial fracking method of extracting oil and gas from rocks may lead to energy independence for America in just a few years. Anna Werner reports.

The history and the boom

Fracking has been going on for more than half a century, but it has exploded in the last five years. That's because of technological advances, including horizontal drilling, and the discovery that there is far more gas in shale formations like the Marcellus Shale than previously thought. In 2007, Penn State Professor Terry Engelder calculated that there were 50 trillion cubic feet of natural gas in the Marcellus Shale, which runs for about 95,000 miles underneath Pennsylvania, New York and four other states. The U.S. Geological Survey had previously estimated the shale held just 2 trillion cubic feet.

Engelder's discovery and others around the country revealed that America's shale held "the equivalent of two Saudi Arabias of oil," as the CEO of Chesapeake Energy Aubrey McClendon put it.

Fracking has transformed communities - in ways both good and bad - across the country, sometimes turning residents who sell their land rights into millionaires - or "shaleionares," as they've come to be known. For struggling towns Midwestern like Youngstown, Ohio, which saw their fortunes fall with the decline of the steel industry, fracking also represents an economic lifeline.

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In this Jan. 17, 2013, photo, the truck and trailer rig with a huge converted engine that runs a pump used in extracting gas from wells, sets outside the Cummins Bridgeway facility in Gibsonia, Pa. The unit on the front of the trailer cools the 50 liter, 16 cylinder Cummins diesel engine that occupies the center of the trailer. The pump for the fracking fluid is at the rear. Oil- and gas-field companies from Pennsylvania to Texas are experimenting with converting the huge diesel engines that operate pumps that propel millions of gallons of water, sand and chemicals down a well bore in the fracturing process to break apart rock or tight sands that trap natural gas.

The transformative potential

The realization that American had previously unknown vast oil and gas reserves has had a transformative effect on the American energy economy. It means that the United States can become less reliant on foreign energy sources, and, proponents say, potentially energy independent in the future. (By some estimates, there is enough natural gas deep underground to last for a century.) The oil and gas that is freed using fracking can be used to power cars, heat homes and provide electricity to hundreds of millions of people. And natural gas is relatively cheap and burns cleaner than coal.

As of December, there were 36,000 fracking wells in this United States, with thousands more set to open in 2013. The price of natural gas, meanwhile, has dropped by 33 percent since 2006, and the United States is beginning to export it for the first time.

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• Demonstrators associated with Occupy Wall Street march in protest of the natural gas drilling technique known as "fracking," in New York, Sunday, Sept. 16, 2012.

The risks

Environmentalists and some scientists have pointed to a whole host of environmental risks tied to fracking. They include the potential for drinking water to be contaminated if fracking fluid or the natural gas and other chemicals that had been trapped in the shale migrates up through rock and into aquifers or water wells. The Environmental Protection Agency said in a 2011 report, which has remained in draft form amid controversy, that chemicals from fracking were present in well water in Wyoming.

Other risks include those to air quality from burning off excess natural gas into the air and potentially negative impacts to wildlife and the environment from the clearing of land. There are also complications related to the disposal of the fluid that is a byproduct of the fracking process, which is believed to have caused earthquakes near Youngstown when pumped back underground and poses additional risks to drinking water.

Different states have taken different approaches when it comes to regulating fracking. Pennsylvania has been among the most willing to allow oil and gas companies to drill, while New York has had a moratorium on fracking that may be lifted in February. Last year, Vermont became the first state to ban fracking; California, meanwhile, is now poised to be the next state to see a fracking boom; lawmakers in the state, which currently does not require fracking companies to disclose the contents of their fracking fluid, are set to hold a hearing to examine fracking regulations in February.

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- New technology in Oklahoma is allowing more oil to be released and could reduce America's dependence on foreign oil.

The future

Barring a massive environmental catastrophe, the fracking industry is expected to continue growing at a rapid pace. Environmentalists have complained that Obama administration has largely allowed the industry to operate with impunity; The Republican Governors Association and the Republican Attorneys General Association complained in a letter to the president in December that the Interior Department should abandon a draft plan to require drillers on federal and Indian lands to disclose the contents of fracking fluid.

In 2014, the Environmental Protection Agency plans to release the first comprehensive national study on the possible pollution of drinking water from fracking in 2014. While we don't yet know what will be in that report, it's almost certain that the fierce battle between environmentalists and industry over allowing and regulating fracking will continue long after it is released.