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Quality of life

Canadian firm plans fracking campaign that could require 4 billion gallons of Michigan water

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by **Jeff Alexander**

Bridge Magazine contributor

KALKASKA — A Canadian firm has laid out plans to drill 500 new natural gas wells in Northern Michigan, using a technique that could consume more than 4 billion gallons of groundwater — or about as much water as Traverse City uses in two years.

The firm, Encana Corp., will rely on hydraulic fracturing or “fracking,” a technique cloaked in controversy that requires large amounts of water, mixed with chemicals and other elements, to break down rock formations and release natural gas.

Encana, for example, used 8.5 million gallons of groundwater earlier this month to frack a single gas well, the Westerman in Kalkaska County, east of Traverse City.



THIRSTY WORK: The Encana Corp.'s Westerman well in Kalkaska County recently used 8.5 million gallons of water to complete a hydraulic fracturing process. (courtesy photo)

Because most of the water used in fracking becomes contaminated and is left in geologic formations deep underground, a recent surge in drilling by Encana and other companies has raised concerns that fracking could drain water from some of the state's best rivers.

Encana recently drilled several new wells into the Collingwood shale formation, which lies about two miles underground. That's the first step in a plan to drill 500 more deep shale wells in the region using fracking, according to company records.

The company's plan to drill several new gas wells near Kalkaska will entail pumping about 300 million gallons of water out of the ground, injecting that water into several gas well bores and then leaving nearly all of the contaminated water in the ground when the fracking is completed, according to state records.

The result: A net loss of up to 300 million gallons of groundwater to the North Branch of the Manistee River, a blue-ribbon trout stream fed almost entirely by groundwater. One of Encana's drilling sites is a half-mile from the Manistee River's North Branch, according to company records.

"If the citizens of Michigan knew corporations were destroying hundreds of millions of gallons of Michigan water – water that is supposedly protected by government for use by all of us – they would be opposing this new kind of completion (fracking) technique," said Paul Brady, a fracking watchdog who lives near Kalkaska. "These deep shale, unconventional wells are using massive amounts of water without adequate testing and solid data on aquifer capacity."

Encana spokesman Doug Hock, however, is optimistic: "Can we access the (deep shale gas) and still protect the environment? Absolutely."

State's monitoring questioned, defended

Michigan's Water Withdrawal Assessment Tool, a computer-based program launched in 2006, was supposed to prevent water withdrawals that could harm streams and rivers. The tool is Michigan's first line of defense against excessive water withdrawals, but it was developed before drillers began using large quantities of water when fracking deep shale gas wells here.

Scientists, lawyers and Michigan courts have said the tool and other state estimates of stream flows are deeply flawed. If true, such a problem could result in the state inadvertently approving large water withdrawals that hurt rivers and streams.

Researchers at Michigan State University recently found several sites where the state's water tool over-estimated the volume of water in small headwater streams that feed the Manistee River.

"In some watersheds, we are seeing that the assumed flows (calculated by the state's water tool) are much higher than we measured. In one case the tool was off by a factor of three," said David Hyndman, a hydrogeologist, professor and chairman of MSU's Department of Geological Sciences.

Those findings were significant for three reasons, Hyndman said: Many of the Collingwood shale gas wells are being drilled in the ecologically fragile headwater areas of rivers; headwater streams are critically important to the health of entire river systems; and the state does little monitoring in headwater streams, where rivers originate.

Government and industry officials defended the state's water assessment tool.

State officials who developed the tool “did error analysis to make sure it was working and everywhere they tested, it worked,” said Jill VanDyke, a senior geologist with the Michigan Department of Environmental Quality.

The Water Withdrawal Assessment Tool estimates flows in Michigan's 7,000 streams and river segments using data from river gauges and other information, including geology, soil characteristics, drainage area and precipitation. But only 2 percent of all river and stream segments in Michigan, 147 sites, have gauges that measure actual stream flows. That lack of in-stream data forced the DEQ to base much of the water assessment tool on general environmental conditions and mathematical models.

Dave Hamilton, a former DEQ official who helped develop the water assessment tool, said it takes a “very conservative” approach to ensure that large water withdrawals don't cause adverse impacts.

“Ninety percent of the time there is more water in a stream than what the tool is saying,” said Hamilton, who is now a senior policy adviser for The Nature Conservancy's Michigan chapter.

Well uses 3 million gallons from village supplies

State law requires using the tool to screen water withdrawals that exceed 100,000 gallons daily. If the tool raises a red flag, state officials conduct a site visit. Those site visits usually lead to permit approvals, according to DEQ officials.

Since 2008, the DEQ has issued 52 permits for large, fracking-related water withdrawals. Another 17 permits are pending, according to state data.

Fracking critics said recent problems at the Westerman gas well in Kalkaska County — where water wells didn't produce as predicted and drillers had to truck in 3 million of gallons of water from Kalkaska and Mancelona to complete the fracking process — highlighted flaws in the water assessment tool.

Encana's Hock and DEQ officials blamed the problem on “geologic conditions” unrelated to the water assessment tool.

“Everyone wanted to jump to the conclusion that the (water assessment) tool didn't work and there wasn't adequate water,” Hock said. “The tool worked well ... it was a matter of really tougher rock than we anticipated.”



Tanker trucks were used to ship millions of gallons of water from the nearby villages of Kalkaska and Mancelona to a gas and oil well. (courtesy photo)

Industry watchdog Brady said the DEQ is trying to gloss over problems with the water assessment tool.

“Obviously the tool declared that the area had ample water and as we unfortunately found out the tool was inaccurate,” said Brady, who has written extensively about fracking on the respectmyplanet.org website.

Concerns about Michigan’s ability to accurately predict stream flows aren’t new.

In 2005, the DEQ planned to issue a permit allowing an oil company to discharge 1.15 million gallons of slightly contaminated groundwater daily into Kolke Creek, the headwaters of the Au Sable River. The DEQ claimed that the index (or average) flow in Kolke Creek was about 6,000 gallons per minute, enough to dilute the oil company’s contaminated water without harming the creek.

As part of a lawsuit challenging the DEQ permit, independent scientists proved that the state’s estimate of Kolke Creek’s index flow was up to 100 times greater than the actual flow.

A state circuit court concluded that the state’s estimate of the flow in Kolke Creek was inaccurate and blocked the proposed discharge of polluted water into creek. The DEQ appealed but the state Court of Appeals upheld the lower court’s ruling.

The prospects for natural gas drilling – and the subsequent need for water supplies for fracking – have waxed and waned in Michigan in recent years.

First came a boom of investment in drilling rights on state property as petroleum firms looked **to extend natural gas exploration from Pennsylvania and Ohio into Michigan.**

By late 2012, though, the pace of exploration in Michigan was still far below drilling rates seen in other Great Lakes states and low natural gas prices were seen **as a potential brake on activity.**

That may soon change.

Encana officials said the oil and gas industry wants to export natural gas extracted from shale formations in Michigan and other states to consumers in Asia. Demand for natural gas in China is strong and prices are double the cost of natural gas in the U.S., industry, watchdogs said.

China’s government-controlled energy company, Sinopec, has already invested \$2.5 billion in a joint venture with Oklahoma-based Devon Energy. Devon has permits to drill several Collingwood shale wells in Northern Michigan, according to state records.

And late last week, Michigan Congressman Fred Upton, R-St. Joseph and chairman of the House’s energy panel, touted fracking as an aid in making the **U.S. “energy independent” in natural gas:**

“We’re the largest natural gas producer now in the world because of the advances that we’ve done on hydraulic fracking. ... We are so rich in that resource.”

Jeff Alexander is owner of J. Alexander Communications LLC and the author of "Pandora's Locks: The Opening of the Great Lakes – St. Lawrence Seaway." A former staff writer for the Muskegon Chronicle, Alexander writes **a blog on the Great Lakes**.

29 comments from Bridge readers.

Bruce McFee

June 25, 2013 at 9:37 am

4 billion gallons is equivalent to about 6 hours of water flowing over Niagara Falls.

While that might seem like a lot of water, it would probably occur over several years. It is not the same impact as in Los Angeles where they have diverted the entire Colorado River for their water use.

The dilemma in all this is that we could continue to import energy from countries that have much less interest in protecting the environment. But this means we need a strong military presence to keep that energy supply safe. Or we just bite the bullet and become energy independent.

One piece of good news is that a break through is right around the corner making desalination of sea water more practical.

Jim Olson

June 25, 2013 at 10:42 am

Ten million gallons over 21 days will most likely harm creeks and wetlands in headwaters areas of our lakes and streams or interfere with adjacent farmer who is irrigating crops or nearby landowners who rely on water wells. What the state and industry have to do is do what every other heavy water user does — conduct a pump yield test and monitor groundwater, wetlands, streams, creeks nearby during the test. Industry will know up front whether there is enough water and DEQ and DNR and citizens will know if there is enough water, that there will be no harm or interference.

Karen Dill-Wilson

June 25, 2013 at 12:53 pm

this example is ridiculous. fracking PERMANENTLY removes that water from the consumable water table and makes it toxic. in MI the flow back water that comes up must be disposed of in class II deep injection wells and the rest stays down hole. it's an industry spin tactic: they want to say they use less water than hydro-electric or agriculture but what they DON'T tell you is that it's PERMANENTLY lost and poisoned, unlike other uses. farmers out west are now competing with gas and oil for water usage...who would you rather have water? someone who grows your food or somebody that will poison your water and leave your well dry?

Russ Klettke

September 9, 2013 at 1:23 pm

Tell us about the desalination. What is just around the corner and what will it cost — and be sure to include the costs of transport of ocean water to inland fracking wells.

Count me skeptical. Particularly when we already have alternative renewable sources of energy that are technologically developed and increasingly used. Given how solar was first used in the 1950s, we probably could have made use of that a long time ago — but the idea of self-generated energy on the rooftops of homes and businesses cede WAY too much control away from large fossil fuel companies.

Mark Knowles