



May 9, 2011

Study Finds Methane Contamination Rises Near Shale Gas Wells

By MIKE SORAGHAN of

Researchers at Duke University have issued a study showing a link between methane contamination of drinking water wells and their proximity to shale gas drilling sites.

The **study** (pdf) would suggest potential for widespread contamination of rural drinking water from drilling in the Marcellus Shale under Pennsylvania, New York and other states. It could also provide substantial backing for drilling opponents and drill-site neighbors who blame drilling for fouled drinking water.

"Some of these landowners have a legitimate complaint. It looks like there's a real problem," said Robert Jackson, an environmental chemist at Duke University who authored the paper being published in *Proceedings of the National Academy of Sciences*.

What the study did not find is evidence that hydraulic fracturing fluid or flowback waste is getting into drinking water. The contamination was methane, the principal component in natural gas, which can build up inside houses and cause them to explode. The study found average methane was 17 times higher within 3,000 feet of drilling than water farther away.

Industry groups are criticizing the study, noting that there is no "baseline" before-and-after data and no proof drilling wells caused the methane contamination.

"What you have here is a paper that draws pretty firm conclusions without much data at all to back any of them up," said Chris Tucker, spokesman for Energy In Depth, a drilling industry group.

Still, the peer-reviewed study injects some scientific rigor into a debate long characterized by shouting matches and partisan counterclaims. The report says it is the first scientific study of water contamination near shale drilling sites.

And researchers plan to go back into the field to test wells where gas was drilled since the samples were taken last year. Some of the wells they sampled far from drilling sites last year now have active production nearby.

The researchers, who also include Stephen Osborn, Nathaniel Warner and Avner Vengosh, all at Duke, have recommended more research into the medical effects of methane exposure and more

study of the disposal of fracturing fluid and the brine waste that comes back up with it.

The research team found that 85 percent of the 68 wells they tested in Pennsylvania and upstate New York had some amount of methane. That is consistent with industry contentions that lots of wells in drilling areas had methane before exploration began.

But they found that within 1 kilometer, about 3,000 feet, the concentration spikes upward sharply, and the chemical makeup more closely resembles the deep shale gas the companies are producing.

The study noted the average level found within a kilometer of drilling -- 17 times higher than non-drilling areas -- is higher than the level at which federal coal mine regulators recommend immediate action, such as ventilating the area, and possible changes to the water supply.

But John Conrad, a groundwater geologist from upstate New York, says the researchers may have "jumped the gun" to blame drilling when they have not compared the same water wells before and after drilling.

"This is possibly an interesting trend," said Conrad, who has worked with the Independent Oil & Gas Association of New York. "But with this small number of data points and no baseline data, it doesn't prove it. It might reflect the amount of gas that's always been there."

Jackson concedes that the study does not have baseline data and said he expected the criticism. But he said the correlation between drilling and contamination is strong.

"It's pretty difficult to understand for me without that being the cause," Jackson said. "There's not much difference between them except for drilling."

But America's Natural Gas Alliance (ANGA), another industry group, said in a statement that they are geologically different and said the study makes an "apples to oranges" comparison. The group also criticized the study for not including exactly where the groundwater samples were taken.

"We welcome serious, fact-based scientific inquiries into how we do our work," ANGA said. "Upon initial review, however, this study lacks key data that would be needed to validate its conclusions."

And Energy In Depth, a project of the Independent Petroleum Association of America, also criticized the researchers for including "hydraulic fracturing" in the title of the study, when they found no contamination from fracturing.

'Leaky well casings'

Fracturing, also called "fracking," or "hydrofracking," is a part of the gas production process in which chemical-laced water is injected underground at high pressure. Advances in fracturing technology are what made production of shale gas possible in Pennsylvania, New York and other

states.

Critics have long contended it could be contaminating drinking water. But industry representatives have said it cannot be, because the fluid is injected too deeply underground, a mile or so, to get back to drinking water near the surface.

The Duke researchers said the gas they found in water is not coming up through rocks from the pressure of fracturing but coming up through the wellbore.

"The study found no evidence of contamination from hydraulic fracturing fluids or saline produced waters," their report says. But it also suggests more study into whether the intense pressures used in fracturing may cause more leaks in the wellbore.

The study also found that not all water wells close to drilling operations had methane, suggesting that the methane leakage is not an inevitable side effect of drilling but improperly run drill-pipe, called casing.

"It's leaky well casings," Jackson said.

In addition to their **recommendations for more study** (pdf), the researchers offered two policy suggestions. Both relate to hydraulic fracturing, though they found no indication of contamination from the fracturing process.

Governments, they said, should require disclosure of the chemicals in fracturing fluid and Congress should order federal regulation of fracturing under the Safe Drinking Water Act (SDWA). That has been proposed by congressional Democrats for several years, with legislation called the "FRAC Act." But it has never passed.

"In our view, the inclusion of hydraulic fracturing in the SDWA, whether this is accomplished through the passage of the FRAC Act or through some other means, would strengthen public confidence in hydraulic fracturing and natural-gas extraction," they wrote.

But Jackson noted that the impact of such a move could be limited and said the best solution was for industry to find solutions.

"The Safe Drinking Water Act doesn't apply to the water we tested," he said. "For me, the default should be to self-regulate. If that doesn't work, I'd start at the state level. Federal regulation does have a place in setting the baseline."

Click here (pdf) to read the Duke study.

Click here (pdf) to read the recommendations for more research.

Copyright 2011 E&E Publishing. All Rights Reserved.

For more news on energy and the environment, visit www.greenwire.com.

Greenwire is published by Environment & Energy Publishing. [Read More »](#)