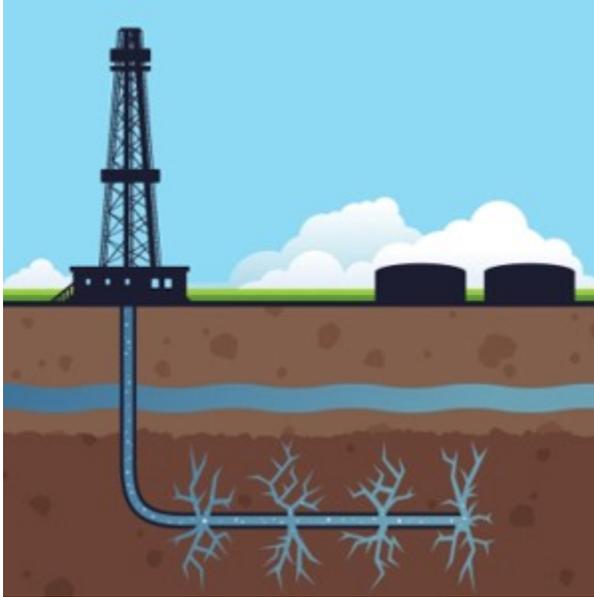


*Fracking Contamination 'Will Get Worse': Alberta Expert*  
Tighter regulations to protect groundwater needed, says U of Alberta geochemist.

By *Andrew Nikiforuk*, 19 Dec 2011, *TheTyee.ca*



Hydraulic fracturing or 'fracking' forces chemicals into the ground to pry open trapped gas deposits.

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A well-known industry expert in tracking leaking methane from oil and gas wells says a groundbreaking U.S. federal study on hydraulic fracturing highlights not only an old and growing problem, but the need for tighter regulations in the shale gas industry.

"The shale gas boom combined with hydraulic fracking will cause wellbores to leak more often than run-of-the-mill conventional wells," says Karlis Muehlenbachs, a geochemist at the University of Alberta. "The problem is going to get worse, not better."

Muehlenbachs, a leading authority on identifying the unique carbon fingerprint or isotopes of shale and conventional gases, says regulators must do better baseline groundwater testing and rigorously check wells for leakage. (Industry calls these leaks surface casing vent flow or sustained casing pressure.)

"The biggest problem is that half or more the wells drilled leak due to improper cement jobs or industry is not following best practices," adds Muehlenbachs.

Earlier this month the U.S. Environmental Protection Agency found that EnCana, the continent's second largest shale gas producer, had contaminated groundwater in Pavillion, Wyoming.

Those findings, which contradict industry assurances, didn't surprise Muehlenbachs, who has studied leaking wells in Alberta's heavy oil fields for decades.



### **EPA's breakthrough study**

The high profile EPA study has shaken up the powerful shale industry because it identified high levels of methane and toxic hydrocarbons in domestic waters and deep groundwater after extensive fracking of vertical wells less than 1,000 feet deep.

Moreover, EnCana failed to protect both surface and groundwater by not sealing its wells correctly to prevent the migration of methane from producing gas zones, says the EPA.

Concluded the detailed EPA report: "Surface casing of gas production wells do not extend below the maximum depth of domestic wells in the area of investigation." That means methane, which is lighter than air, could leak or migrate up the wellbore towards shallower domestic water wells.

"The way I read the EPA report, the surface casings were too short and that the cementing was inadequate and then they fracked at very shallow depths. It's almost negligence," says 67-year-old Muehlenbachs, who presented at a U.S. conference on *"Managing The Risks of Shale Gas"* last month in Washington D.C.

EnCana says the EPA's findings are "conjecture, not factual and only serve to trigger undue alarm."

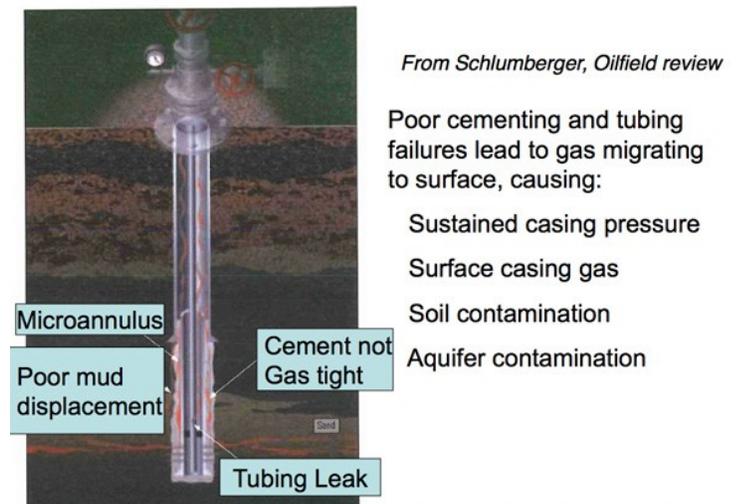
## 'What happens if the job is not done right?'

Muehlenbachs, who has been fingerprinting leaking gases since 1994, says that hydraulic fracking, which injects water, chemicals and sand into rock formations at high pressures, may create more leaks in wellbores overtime. (As industry searches for deeper and more extreme hydrocarbons, it must blast open tight rocks with more brute force over larger land bases than conventional operations.)

"They'll frack each well up to 20 times. Each time the pressure will shudder and bang the pipes in the wellbore. The cement is hard and the steel is soft. If you do it all the time you are going to break bonds and cause leaks. It's a real major issue. "

Industry spokesmen typically argue that if the drilling hole is properly cased with steel and cemented "the risk of any interaction between drinking water and fracturing fluid is significantly diminished."

But Muehlenbachs replies with another question: "Yes, but what happens if the job is not done right and how frequent are problems encountered?"



How imperfectly executed wells can leak gas and taint groundwater.

According to Schlumberger, the world's largest oilfield company, there are problems galore. In 2003, the company reported that 43 per cent of 6,692 offshore wells tested in the Gulf of Mexico by U.S. regulators were found to be leaking. In fact, by the time a well gets 15 years old, there is a 50 probability it will leak significantly and therefore contaminate other zones, wells, or groundwater.

"That's amazing. It's not Greenpeace reporting this but Schlumberger in the Oilfield Review," says Muehlenbachs. (Reliable *data on well integrity* is hard to find, but in Alberta approximately five per cent of all wells leak, while leakage rates in Norway range from 13 to 19 per cent from producing wells.)

### **Disputing claims of safety**

Although petroleum engineers now admit that companies *routinely blast fluids* and gas into other industry wells hundreds of metres away (B.C., Texas and North Dakota have all documented such cases), they still claim that "fracture communication incidents" can't happen with groundwater.

Muehlenbachs, who has documented numerous cases of groundwater contamination, calls such denials dishonest. "Such claims do more harm than good to industry. Don't they realize that social license matters to industry?"

Whenever methane leaks from one well into a neighboring wellsite, "industry says let's fix the leaks," says Muehlenbachs. "But as soon as the leaks enter groundwater, everyone abandons the same logic and technology and says it can't happen and the denials come out. In Alberta, it's almost a religious belief that gas leaks can't contaminate groundwater."

Yet it happens routinely. At a conference in Washington D.C. last month sponsored by Resources for the Future, Muehlenbachs showed evidence that shale gas drilling activity in Quebec and Pennsylvania had in several cases resulted in surface contamination.

In two cases (companies sent him gas samples to analyze), he found that deep shale methane from the Utica Shale definitely leaked up the wellbore and contaminated groundwater. In another case, gas originating along the wellbore had moved into water.

A similar example in Pennsylvania's Marcellus shale formation again found that deep shale methane rich in propane and ethane had *leaked* to the surface casing, contrary to all industry predictions. The Marcellus lies 2,300 to 6,000 feet deep, which is a little shallower than B.C.'s Montney play at 6,000 to 8,200 feet.

### **More data, greater transparency needed: EPA**

The debate about whether leaking shale methane comes from heavily fracked zones creating faults into groundwater or along poorly cemented wellbores is immaterial to landowners, says Muehlenbachs. "You don't care if it comes from fracking or a bad cement job, you suffer the consequences all the same, and lose your well water."

Given these findings and a Duke University [study](#) that found extensive methane contamination of domestic water wells in a heavily fracked area, Muehlenbachs recommends that regulators do rigorous gas and water testing.

In addition to baseline isotope testing of methane for all water wells and groundwater sources, (something EnCana didn't do in Pavillion), Muehlenbachs [says](#) regulators must also test for ethane and propane (the shale gas fingerprint) as well as gas from abandoned wells and natural seeps and gases from well casings. "The above requirements are not onerous; such isotope data is often in hand for it is used to optimize production," adds Muehlenbachs.

Like Muehlenbachs, the U.S. EPA supports "the need for collection of baseline data, greater transparency on chemical composition of hydraulic fracturing fluids, and greater emphasis on well construction and integrity requirements and testing."

Muehlenbachs suspects the shale gas boom is an energy game changer, but it may not be an economic investment due to overproduction. "But the horse has left the barn. No matter what anyone says, it will continue."

Asked if Alberta's oil patch regulator or B.C.'s Oil and Gas Commission had approached one of the world's leading experts on how to fingerprint leaking gases from gas formations, Muehlenbachs replied quickly.

"No," said Muehlenbachs. "No one pays any attention to me. The Alberta regulators are only interested in optimizing production."

Award-winning journalist Andrew Nikiforuk writes about energy for The Tyee and others. Find his previous Tyee articles [here](#).