Debbie Signer, a bed and breakfast owner near Rosebud, became worried about her water when her taps started sputtering gas.

TROUBLE IN THE FIELDS

Landowners near coalbed methane wells say government won't protect their water. So who will?

By JEREMY KLASZUS *Photographs by* COLIN SMITH

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ON AN UNUSUALLY HOT May morning, in a bed and breakfast near the southern Alberta community of Rosebud, three women sit around a kitchen table sipping coffee. Debbie Signer, the owner of the bed and breakfast, chats anxiously with neighbours Fiona Lauridsen and Jessica Ernst about the meeting they're about to have with two Alberta Environment employees.

Like many rural Alberta landowners living near coalbed methane wells, Signer is concerned about her water, which has recently started fizzing and emitting a white vapour. Ernst and Lauridsen can sympathize: both of them have so much gas in their well water that they can set it on fire. The women live atop the Horseshoe Canyon coal formation, which has been the target of frenzied drilling for the past few years as energy companies rapidly extract coalbed methane—natural gas trapped in coal.

Signer had no problems with her water after her well was drilled in 2002. But in December of last year, she observed a change. "I noticed huge amounts of gas coming through the taps in the house… That was never the case before," Signer says. Now, the single mother is worried that the water coming out of her hissing taps could be harmful to her and her teenage daughter, as well as her bed and breakfast guests.

The change in Signer's water has made her deeply distrustful not only of EnCana, the company doing most of the coalbed methane drilling around her acre of land, but also of the provincial regulators who are supposed to be monitoring gas drilling activity and protecting her water: the Energy & Utilities Board (EUB) and Alberta Environment, respectively.

Signer has been trying for over two months to get Alberta Environment to provide her with safe water, but the department has been slow to act. Signer even has a letter from Premier Ralph Klein assuring her that the government takes her concerns seriously. But months of government stonewalling have left Signer worn out and frustrated. "I basically felt ignored and overlooked," she says. "They just seem to stare and do nothing."

Nevertheless, Signer is hospitable and courteous when Kevin Pilger, a compliance investigator with Alberta Environment, arrives with his colleague, Leslie Miller. Signer offers coffee and juice to her visitors, who gladly accept. The moustached Pilger sits down at the kitchen table dressed in jeans and a dark blue short-sleeved shirt. Miller wears a light blue T-shirt and khaki pants. The mood is friendly but tense.

After some small talk and coffee-sipping, the landowners start grilling Pilger about Alberta Environment's slow response to landowners' complaints (Signer had sent several e-mails that went unanswered; Alberta Environment says they didn't get through).

"We've been fighting to get [Signer's] well tested for months," says Ernst, an environmental consultant who works in the oil and gas industry.

Most of the landowners' worries relate to the process of "fracturing." After a coalbed methane well is drilled, the steel casing of the wellbore is perforated using explosives. The coal seams are then fractured by injecting nitrogen through the perforations into each of the seams. The fractures open pathways through the coal that allow the methane to flow freely into the wellbore. Landowners are concerned that fractures at shallow depths could be contaminating their groundwater aquifers with gas and industrial chemicals. (An aquifer is an underground layer of permeable gravel, sand and rock through which groundwater flows.)

Ernst is convinced that EnCana has fractured into and ruined the aquifers near Rosebud, and she lets Pilger know as much. (EnCana acknowledges that it fractured at 132 metres into an aquifer west of Rosebud, but says the aquifer wasn't contaminated. The company says it has since improved its procedures and doesn't fracture any shallower than 200 metres in the Rosebud area.)

The three women also point out that many of the coalbed methane wells in the area are on top of coulees. Drilling distances are measured from the surface of the wells, and while EnCana says it considers topographic changes when calculating drilling depths, the women aren't convinced.

"Obviously I am not a scientist," says Signer. "But at this point in the valley—and you can get a real good visual here if you look out the window—my well is 56 metres below surface. Right on top of that hill"—she points outside the window—"is a gas well, and as the crow flies it wouldn't even be 500 metres away. Now, they're at a higher elevation than me. There's a lot of room for error there."

The landowners' frustration continues to rise to the surface, especially when Pilger tells the women that "we don't want to be Big Brother" and it's up to the gas companies to "find the answer" themselves after a landowner makes a complaint.

"Our first call after the complaint is to the company," says Pilger. "We say, 'Okay, I've got a complaint. What are you going to do about it?' We don't have the resources to be addressing all of these complaints. If you caused the problem, you find the answer."

None of the three landowners are impressed. The women insist the regulator needs to have stronger enforcement instead of asking the company to find the answers itself.

"If you've captured a bank robber in the act, does the RCMP then give him the keys to the bank and say, 'Here you go, John. Go fix the problem. Put the money back'?" asks Ernst.

"That's not a fair analogy," responds Pilger, reiterating that he can "only accept what [the companies] are telling me."

Signer walks to her kitchen sink and fills a glass. The faucet hisses and sputters the water into the cup, which Signer sets down on the table. "You look at that and you can see vapour coming off it," she says.

So it continues, with the three women telling Pilger and Miller that Alberta Environment can't keep blindly taking oil and gas companies at their word.

"All we're telling you is you've got to start questioning what you're being told," says Lauridsen. "That's your responsibility as a regulator. It's *your* responsibility. You are paid to be the regulators of this industry."

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IN 2001—the year conventional gas production peaked in Alberta—the province's first test coalbed methane wells were drilled. Commercial production started the next year, and by 2006 over 6,000 coalbed methane wells had been drilled in the province. Industry plans on drilling 3,000 more each year, despite the protests of landowners and environmentalists who aren't convinced the development is harmless.

"It's a free-for-all," says Calgary MLA and Liberal environment critic David Swann of the coalbed methane drilling frenzy. "We've drilled 6,000 wells in five years and we don't know what's going on in the groundwater? It's not acceptable."

Both the EUB and Alberta Environment say they know of no instances of gas migration into groundwater as a result of coalbed methane extraction, but the regulators tell conflicting stories about water contamination from conventional gas drilling.

Alberta Environment acknowledges that water wells have been contaminated by conventional gas activity. "We have incidents where there have been confirmed groundwater impacts from oil and gas activities," says Alberta Environment spokesperson Sherri-Dawn Arnett. The EUB, however, says it knows of no instances where industrial activity has ever impacted groundwater. According to EUB spokesperson Darin Barter, "We haven't been able to draw a link between contaminated water wells and gas development."

While government spokespeople tell differing stories to the media, scientific analysis appears to come down on Alberta Environment's side. Dr. Karlis Muehlenbachs, a geochemist at the University of Alberta who has been studying gas migration in Alberta for about 10 years, says it's "pretty obvious" that water wells have been polluted by conventional gas drilling, especially in the Lloydminster area. "There's very, very blatant and obvious pollution in some of those wells," he says.

Muehlenbachs has been analyzing gas and water samples for Alberta Environment since May, when the department made it mandatory for companies to offer to test landowners' water wells within a minimum 600-metre radius of a potential coalbed methane well before drilling. The idea behind the requirement is to monitor changes in water wells to see if any contamination is occurring, but coalbed development had been underway in Alberta for four years before the requirement came into effect.

Clockwise from top: Alberta Environment investigator Kevin Pilger collects samples from Debbie Signer's water well; a well site near Rosebud; EnCana admits it fractured into an aquifer at 05-14-27-22W4, west of Rosebud, but says water wasn't contaminated.

PHOTOS OF WATER WELL AND SIGN BY JEREMY KLASZUS

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"The fact that they've been selling coalbed methane leases and they've been developing coalbed methane for years and only now they're thinking, 'Oh, maybe we ought to be looking at whether it's doing any damage to the water'—it's the wrong way around," says Nigel Douglas, a conservation specialist with the Alberta Wilderness Association. "We shouldn't be having these developments unless we can be sure that they're not having big impacts on groundwater, and there's certainly enough evidence to suggest that they are."

From the samples Muehlenbachs has received so far, he says he doesn't have enough information to say definitively whether or not water wells are being directly contaminated by coalbed methane drilling, but he says it's a very real possibility. "Within the bounds of the numbers that I've seen, that I've measured in my lab, I think certainly in some cases there could be contamination. A large number of water wells have methane in them."

However, Muehlenbachs says it's not a black and white issue, as there are several different sources of methane in water wells. Some water wells contain methane naturally, and wells that aren't drilled and maintained properly can become contaminated with gas and bacteria, including methane-producing bacteria. "There are natural microbiological processes that add methane to groundwater, and then, as Alberta Environment often points out, there's bio-fouling—in other words, the care of the well has been poor," he says. "You can generate conditions for methane generation in your water well simply because you haven't taken care of it. So those are the issues that sort of cloud a simple black and white explanation."

Muehlenbachs has analyzed three water samples from the hamlet of Rosebud, and he says they look "suspiciously polluted." He says the samples contained methane, propane and butane. Bacteria can produce methane, but they don't produce propane or butane, heavier hydrocarbons that are components of natural gas. Muehlenbachs says the contamination is most likely from deep conventional gas wells, and he suspects the Rosebud water may have been contaminated before coalbed methane drilling even started.

Alberta Environment provided Muehlenbachs with gas samples of conventional wells in the Rosebud area, but he hasn't received any coalbed methane gas samples. Without

that information, he's not able to determine whether or not the methane is from coalbed methane drilling.

Back at the Signer residence, Pilger has a hard time convincing the women that their problems could have natural causes. In 2003, Wheatland County—which includes Rosebud and area—conducted a regional groundwater assessment of the county, and the assessment makes no mention of gas in water wells or groundwater. The women find it hard to believe that all of a sudden their water problems are occurring naturally.

"It's been well known for years that in certain parts of Alberta there's natural gas in groundwater," says Pilger.

"And where is the data?" asks Ernst.

"Most of it is anecdotal," replies Pilger.

"So EnCana and the government can use anecdotal evidence but I can't?" says Lauridsen, frustration rising in her voice. "I did not have this problem in my water before; now, I do. That's anecdotal."

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ANECDOTAL INFORMATION about coalbed methane abounds, but there is a remarkable lack of scientific research on the environmental impacts of the development. Even the government acknowledges it. A government-led multi-stakeholder advisory committee on coalbed methane found that as coalbed methane development proceeds, "there is a need for more scientific information to help understand how to protect Alberta's water resources."

The US Geological Survey (USGS) acknowledges that coalbed methane development in states like Wyoming, Colorado and New Mexico has contaminated aquifers and is an "environmental concern." Wells that haven't been abandoned properly have leaked gas into aquifers, and the USGS also acknowledges that contamination "may come from new coalbed methane wells."

Guy Boutilier, Alberta's Minister of Environment, has said that the question of whether or not coalbed methane drilling is contaminating groundwater here needs more conclusive evidence. In February, he told his fellow MLAs that "it's a very important question that we are committed to getting the answer to very quickly." Rural Albertans are still waiting, as the government has yet to launch a comprehensive study of the environmental impacts of coalbed methane drilling.

It can be a nervous wait as stories of exploding water wells circulate around the province. In May, a gas-filled water well near Spirit River exploded, hospitalizing a landowner and two Alberta Environment staff. The landowner had long suspected his well was contaminated by nearby conventional gas drilling.

Boutilier had also said his department would do "everything in our power" to get safe water to families in drilling areas where well water had changed, but Signer says she had to "jump up and down and scream" to get Alberta Environment to come to her property just to test her water. After her well was tested in May, she had to wait over a month until Alberta Environment provided her with safe drinking water by arranging for it to be trucked into her cistern.

In August, the department suddenly stopped supplying her with water, having concluded that her problems were the result of her own water well maintenance and not coalbed methane activity. Left with a boil water advisory, a business to run and an admonition from Alberta Environment to "ensure public safety and protection of the environment" by taking better care of her well, Signer fired off an angry e-mail to Premier Klein and cc'd it to local media.

"I am sick and tired that we (private citizens) are doing our utmost to ensure due diligence and the government is all willy-nilly all over the place about their responsibilities," she wrote. "Give me the respect that is deserved, follow your own rules and promises, and reinstate my water deliveries please."

The next day, Signer had a voice mail from Alberta Environment saying her water deliveries would be started up once again.

IN DECEMBER, the EUB issued a bulletin that said shallow fracturing of gas wells in Alberta had impacted nearby oil wells. The bulletin maintained the EUB's official, unchanging line—that the environment and water wells had not been affected by the incidents—but it also said fracturing companies needed to improve their practices and put "greater emphasis on protection of groundwater."

The refusal of the EUB to place any blame on industry, even as it quietly points out operational shortcomings, has earned the board plenty of scorn not only from landowners but from environmentalists as well. "The EUB is basically a facilitator for the oil and gas industry," says Douglas. "No one really takes them seriously as a regulator anymore."

A month after the fracturing bulletin was issued, the EUB put out a jargon-laden directive laying out new rules for fracturing at depths shallower than 200 metres. "Directive 027" clumsily acknowledged that "information provided by industry to date shows that there may not always be a complete understanding of fracture propagation at shallow depths and that programs are not always subject to rigorous engineering design." The directive required that companies submit an assessment to the EUB before fracturing at shallow levels. Companies must submit information on pumping rates, volumes, pressures and fluids, among other things.

The directive also says that "the EUB will conduct random or select audits of fracturing operations at depths less than 200 metres." But as of June, the EUB had not conducted one such audit.

As the landowner concerns continue to pile up, both the EUB and Alberta Environment are keeping busy with their limited resources. The EUB has about 75 field inspectors who are responsible for making sure energy companies aren't harming the environment, and Alberta Environment has 53 compliance

More than 140,000 gas and oil wells are producing energy across the province. But while production soars, regulatory enforcement is thin. The EUB has about 75 field inspectors who are responsible for ensuring that energy wells don't harm the environment.

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inspectors and 26 compliance investigators who respond to environmental problems and landowner complaints relating to groundwater. Monitoring the energy industry is a tall order for both departments, as Alberta has over 6,000 coalbed methane wells, almost 98,000 conventional gas wells and about 37,000 oil wells producing energy across the province.

Investigators and inspectors aren't the only busy people at Alberta Environment. In June the department went on a public-relations blitz, holding 13 information sessions in small towns to address concerns about groundwater. Mary Griffiths, a senior policy analyst with the Pembina Institute, expects it's only going to get busier for the approximately 800 staff at Alberta Environment as coalbed methane drilling increases.

"Alberta Environment has just got to have more resources so they can examine any problems as they arise," says Griffiths. "I'm sure the Alberta Environment staff are absolutely swamped."

While Ernst and other frustrated landowners are convinced that Alberta Environment is little more than a pawn of the oil and gas industry, both Griffiths and Douglas refuse to vilify the department. Douglas points out that Alberta Environment doesn't have a lot of clout in a government that allows its energy department to sell off oil and gas leases "with no reference to anyone else."

"It's within that context that Alberta Environment's hands are completely tied, so I'd hesitate to lay too much criticism at their door," says Douglas. "They've got such a low profile in the government, and they're sort of trying to pick up the pieces of a completely messed-up system."

Clearly, Boutilier was right when he said that more information is needed about the impacts of coalbed methane development. What is less clear is if and when the government will actively and honestly get that information. Until that happens, landowners like Debbie Signer feel they have little reason to trust a government that blames them for their water problems even as coalbed methane developers are regarded as fully blameless.

"It really feels like bully tactics," says Signer. "It all comes down to grade-school behaviour. I think our elected people can do better than that." ■

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