Welcome to a picture-perfect green valley of happy tourists, young families and corporate good will. Too bad you can't drink the water. **TADZIO RICHARDS** *documents a community's concerns over irresponsible mining practices.*

TADZIO RICHARDS

BUBBLE AND FIZZ DEPT.

BURNING WATER

IN RECENT YEARS THE ROSEBUD RIVER VALLEY—AN HOUR'S DRIVE EAST OF CALGARY—HAS BECOME KNOWN AS MORE THAN A THEATRE HOTBED: IT'S THE PLACE TO SEE WATER BURN.

Peter Lauridsen stood in his farmyard in gumboots with a garden hose in his hand, staring at a black plastic jug of water. Clear bubbles formed and popped on the water's surface.

"Holy doodle," he said. "That's the worst I've ever seen."

Local resident Jessica Ernst and I watched. "Promise me you won't fill that metal bin," she said to Lauridsen. She pointed at a barrel by the corral fence next to the big half-dome Quonset hut. "If it blew, there'd be shards of metal flying. They could cut you in the neck."

Lauridsen nodded. He dropped the hose, held a long barbecue lighter above the water in the jug and clacked the trigger. A gust of flame erupted, the bubbles sizzling and popping in blue and orange bursts. Lauridsen flipped the lid open on another plastic pail, clacked the lighter again and thump-whoosh! He leapt back, boots sloshing in the mud.

Jessica Ernst laughed, rocking back and forth in her brown and white cowboy boots. Then she looked at me.

"He's going to go back to the big city," she said, "and he's going to say there's these really strange people burning water out in Rosebud."

Nestled in a valley along the Rosebud River at the edge of the Alberta Badlands, the hamlet of Rosebud (pop. 93) is not your typical little town on the prairie. Theatre is a big deal here. In fact, you could say it saved the area. In 1972, Rosebud was more or less a ghost town. Then Rosebud Camp of the Arts was started and grew into a theatre school so successful that local citizenry pegged their fortunes to it. Today over thirty thousand tourists visit every year. They walk the Main Street, admire the old ranching and coal mining-era buildings, eat a heaping buffet meal at the restaurant, and then cross the street to the Opera House to see a musical that, according to Rosebud School of the Arts Executive Director Bob Davis, "will uplift the human spirit and touch the heart."

In recent years, however, the Rosebud River Valley—an hour's drive east of Calgary—has become known as more than a theatre hotbed: it's the place to see water burn.

At Jessica Ernst's fifty-acre property, just outside Rosebud, the well water burns blue. At the Lauridsen farm, two kilometres away, a lighter is all it takes to turn a garden hose into a flame-thrower. Poured into a container with a lid and left to sit for a few hours, the blaze is steady and orange for more than twenty seconds. Watching this is like being at a magic show, except the people doing the trick insist on explaining it. The blue flames are methane. The orange flames are possibly toluene, a hydrocarbon the oil and gas industry uses as a solvent to clean gas wells. Needless to say, it has no business lurking in drinking water.

Some locals claim the problem is natural. "Gas in water is nothing new," said old-timer George Comstock, whose father came to Rosebud in 1912. "In the old days, the entertainment was to go to someone's place and light the taps on fire."

No one disputes the anecdote, but many—including Comstock—worry that the problem is getting worse. In August 2004, silt choked several wells in Redland, just up the valley from Rosebud. Tests revealed changes in the water's chemical composition and increased levels of gas. In August 2005, smoke came out of the taps in Ernst's house. Her two dogs, Magic and Bandit, quit drinking the tap water. Similar problems hit the Lauridsen family during harvest—Fiona Lauridsen's eyes had been irritated by barley chaff, but after she rinsed them in tap water the irritation got worse. On Christmas Eve, Fiona and her children got chemical skin burns from taking showers.

High levels of methane were found in both the Ernst and Lauridsen water supplies, with a bubble-producing high of 101,000 parts per million methane at the Lauridsen farm. Ernst, an environmental consultant, is worried the reason might be the recent increase in coalbed methane wells. "We need an accurate assessment here," she said, "a regulator who's not biased to protect EnCana."

EnCana is Canada's largest natural-gas company, and it drills most of the coalbed methane and other gas wells that dot the plains and glisten on hills around Rosebud.

GEORGE WEBBER

When I asked Stacy Knull, EnCana's then-vice president of operations for the Chinook Business Unit in southern Alberta, about the gas in the water, he denied company responsibility. "If we're contaminating wells," he said, "I'd lose half my staff."

In winter 2005, the top of the Rosebud water tower blew off in an explosion. In March 2006, government tests of the hamlet's water supply found traces of toxic chemicals. Later tests were less conclusive, though traces of hydrocarbons and industrial solvents were still found.

Despite this, many in Rosebud go out of their way to reassure visitors that nothing is wrong with the hamlet's water supply. "There's not a lot to be worried about," said Debbie Anderson, the storekeeper at Little Country Blessings General Store and Collectibles. "Except for one or two extremists, most people don't want to bring it up anymore," she said. "I had patrons coming in saying the water's not fit to drink. We have to step in and say something. If the theatre goes and the restaurant goes, there goes the town."

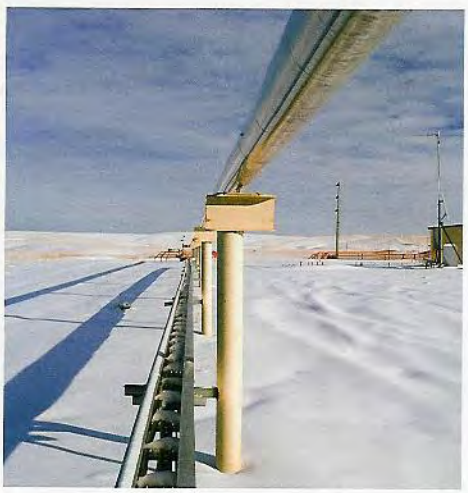
On my way out of the store, I picked up a brochure for Rosebud School of the Arts, a Christian school affiliated with the Rosebud Theatre. A line from the brochure caught my eye: "Rosebud is a place for people who seek out truth."

It's not every town that claims a higher purpose. Then again, in most places, the future doesn't depend on whose story turns out to be true.

Coalbed methane—CBM for short—is natural gas compressed into coal seams under the earth. It's known as unconventional gas, and to get it out, an energy company drills into the earth, pierces the coal seam and fractures apart the coal by blasting in large volumes of gases or chemicals. The fracturing process (known as "fracing") releases methane into the well bore.

Unlike conventional gas, where one or two wells are usually enough to drain a gas deposit, CBM wells typically produce low amounts of gas. This means that multiple wells, linked by networks of buried pipeline, are needed to get CBM to market. Under the ground, if a fracture accidentally spreads from a shallow coal seam into an aquifer, or if a cement job fails and a gas well casing leaks, then natural gas or fluids introduced during the drilling or fracing process can seep into groundwater.

In the US, where EnCana is also a big player, CBM drilling has been up and running for at least two decades. In states like Wyoming, Colorado and New Mexico, landowner complaints include unexplained skin and eye irritations, people getting sick from chemicals in water wells, and cattle drinking contaminated water then bloating and dripping blood from orifices before dying.



"I'M NOT LOOKING FOR A PROBLEM," SAYS SEAN KENNEY, "I JUST WANT TO KNOW WHAT CHEMICALS ARE IN THE WATER."

GEORGE WEBBER

Environmental consultant Jessica Ernst.

BEGINNING IN THE MORNING, THERE IS A NEAR-CONSTANT STREAM OF INQUIRIES FOR JESSICA ERNST. PHONE CALLS, EMAILS, MORE CBM-RELATED DOCUMENTS TO LOOK AT. EACH TIME I VISITED, SHE WAS BEHIND IN THE PAPERWORK FOR HER ENVIRONMENTAL CONSULTING BUSINESS. "I'VE LOST MY LIFE .... THAT'S THE ONE THING THAT REALLY ANGERS ME IN ALL THIS. I'VE LOST MY SOLITUDE."

In the recent early days of CBM in Alberta, unless a company was planning on fracing into freshwater aquifers, companies were not required to do baseline testing of nearby water wells prior to drilling for gas. And they were allowed to drill at less than two hundred metres below the surface, or above what's known as the "base of groundwater protection" line. Just beneath the surface, out of sight, where natural gas and groundwater lie in close proximity, the ground was blasted apart.

In Calgary, I talked to an engineer, Pat McLellan, who said, "Hydraulic fracturing at shallow depths of less than two hundred metres is complex, and as an industry, we are less certain about the size and orientation of the induced network of cracks."

For proprietary reasons, companies in the United States and Canada do not have to disclose the chemicals they inject into the earth to fracture the coal seams. As Dr. Mary Bachran and Dr. Theo Colborn explain in a report entitled "Chemicals Used in Natural Gas Development and Delivery," commissioned by the Endocrine Disruption Exchange in Colorado, "Typical drilling and stimulation activities use fifty thousand to three hundred and fifty thousand gallons or more of the fluid at each fracing. What chemicals constitute these liquids, and at what concentrations, is unknown."

There are over nine hundred products and chemicals that could be used in the fracing process, many of which are highly toxic carcinogens linked to reproductive problems, fetal deformities, immune-system failure, and gastrointestinal and liver damage among other adverse health effects. In the US, the natural-gas industry is "putting chemicals in water that you don't even want to take a bath in, let alone drink," said Dr. Colborn.

Despite all this, industry analysts often refer to CBM as the next big thing for Canada's natural-gas industry. Beginning in the late 1990s, exploratory wells were drilled in the Horseshoe Canyon formation running beneath agricultural land between Calgary and Edmonton and through the Rosebud River Valley. By 2006, there were more than seven thousand CBM wells in the province.

By most accounts, that's just a first step in the CBM gas rush. Some analysts project there will eventually be as many as fifty thousand CBM wells in the Horseshoe Canyon area alone—a growing spiderweb of wells and pipelines pumping gas for up to fifty years. Other CBM beds such as the Mannville and Ardley coal formations are currently the focus of exploratory drilling, and CBM exploration is ramping up in British Columbia and the Yukon as well.

Horseshoe Canyon is the beachhead for CBM in Canada, and both industry and government claim there's little to worry about: the coal seams are "dry" meaning little or no water has to be pumped from the coal before the gas can flow ("wet" coal generates large volumes of water that needs to be stored in surface containment ponds or diverted back underground). As well, the Alberta Energy and Utilities Board (EUB) claims that Alberta's "regulatory environment is arguably the most stringent in the world."

"This is a better place to drill," said Knull, who has given over two hundred presentations on CBM. I went to visit him at one of EnCana's corporate offices in downtown Calgary. With $7.4 billion to spend, the company has hired an architect from England to design and build a "signature building" on "one or two" city blocks in Calgary. Until it's built, EnCana employees work in six different buildings in the downtown core. Getting out of the elevator on the eighteenth floor of the one I visited, I noticed the walls were grey, or creamy beige, and sparsely adorned with softly coloured landscapes and abstract paintings. There is very little smell, and the place has the scrubbed, rootless feel of an airport hotel.

Knull has chubby cheeks and a trim moustache, and wears a blue button-up shirt. He is personable and direct. The water problems around Rosebud, he said, were "not caused by us." Naturally occurring bacteria can contaminate water wells. A farmer himself, Knull explained that "it is necessary to shock-chlorinate [the] wells twice a year." In the Rosebud area, he said, water wells are often sunk into coal seams, and methane gas has always been in the water.

As for fracing in the Horseshoe Canyon, says Knull, "we just use nitrogen." He grabbed the air with his hand as if to tear the element from oxygen and bring it into view. "Nitrogen is in the air we breathe," he said. In support of initiatives like hockey arenas and theatres, EnCana gives "one percent of profits to communities," he said. "Everyone needs energy. If you're anti–oil and gas, you've got to support coalbed methane."

If there was an earthquake," said Sean Kenney, pointing at a map of his farm laid out on his kitchen table, "this would be the place to be." He put his finger on a square section of map so thick with lines it looked like a blueprint for a steel bunker. "It's pretty solid in there," he said.

COLIN SMITH

GEORGE WEBBER

HE THAT CAN DOUBT SO FAR [THE EXISTENCE OF WHAT HE SEES OR FEELS] WILL NEVER HAVE ANY CONTROVERSY WITH ME;

SINCE HE C

An unassuming man of medium height and weight with short, dirty-blond hair, Kenney works with his three brothers on the family's eight-thousand-acre cattle-and-grain operation in the community of Redland, just up the valley from Rosebud. The map showed all the pipelines and gas wells on the fourth-generation farm—the deep gas wells from the 1960s, the shallow gas wells that came in the 1990s and the CBM wells drilled in the last few years.

"When they're going to drill a new one," says Kenney, "the construction supervisor will just call me up. We have a good relationship."

As we talked, Kenney's wife Jacqueline watched their three small children and packed for a weekend trip—golf with friends in the Rockies. The TV in the newly built farmhouse was tuned in to a golf tournament. Life in the house seemed like the normal routine of a successful Alberta farmer, except for one thing: "We're drinking bottled water," said Kenney. In August 2004, the family came back from a vacation and found silt in their bath and laundry water. A local well driller named Chris Gerritsen believed there was a break in the casing of the Kenney's water well. He drilled them a new one. It, too, was full of silt. And after pumping for several days, the new well didn't clean out—an extremely rare occurrence. A mug of water poured from a tap had thick foam on top. "Like beer head," he said, "you could spoon it."

Kenney put his finger on the map, pointing to one of EnCana's CBM sources known as the 05-14 Gas Well. "This is the well they cemented over," he said. "It's right next to my house."

He looked over at his children in the kitchen, rosy-cheeked children, the youngest with curly blond hair. "They fraced five feet of coal that I'm getting water from," he said. "When the water went, my wife was eight-and-a-half months pregnant. We hauled laundry to Rockyford for three months."

"I'm not looking for a problem," he said. "I just want to know what chemicals are in the water."

Storms in central Alberta are something to behold. Advance winds blow branches from trees, then stronger winds bring bustling dark clouds over the plains. Crackling spears of lightning shoot through the electric air, and bloated low clouds pelt rain, sometimes all night. Dirt roads turn into treacherous, potholed slicks. Roadside grasses and pink wild roses glisten with rain. As the storm rages ungovernable and moves on across the big sky, orange fences gleam around gas wells in waterlogged fields, and the next dark thunderhead is already rising in the distance like a fist.

I drove out to meet Gerritsen, the Kenneys' water-well driller, during one such downpour. A second-generation driller, Gerritsen is a stocky man with a round, friendly face. Strands of hair stick up from his head as if charged with static electricity, and he speaks quickly, intently, with an eye-to-eye gaze. When I showed up at his warehouse, his assistants were fixing a water pump on the shop floor, the clatter of rain on the roof mixing with the clang and thump of metal on metal. We went up the stairs to his office.

"If I were working for EnCana right now, I could not talk to you about this," said Gerritsen. "So I quit."

In 2004, Gerritsen was under contract to EnCana when the water problems began at Kenney's farm. During his contract, a consulting firm, Hydrogeological Consultants Ltd. (HCL), was hired by EnCana to investigate the Kenney water problems and write a report.

"At Sean's, we drilled a new well and they used that for testing," he said. "The foam coming out of Sean's well—the foam he said looked exactly like beer in a mug—they threw it out. There was one test they did that they threw out because the nitrogen level was 30 percent. They said it was contaminated from the air."

More complaints came in, and Gerritsen realized that something unusual was happening to the water in the area. He counted off the contaminated water wells he had investigated: "Don Glazebrook, Dale and Linda Dahm—Olive Kenney was a real hot one too," he said. "I just asked myself, what's going on in Redland? Like, one thing after another, stuff I've never seen before—and I've done this for a long time."

"The silt is very common in Redland, and chemistry changes in the water," he continued. "The common denominator was more gas."

In January 2005, the consulting firm concluded that the silt in Kenney's new water well was related to "inappropriate design." The high levels of nitrogen found in the water "did not appear to be a result of the stimulation of the 05-14 Gas Well." Or in plain language: The nitrogen is a freak occurrence, and the dirty water is the water-well driller's fault. The report dismissed the possibility that nitrogen used in the shallow gas-well fractures had migrated into the groundwater, along with anything else that might have been in the gas well.

Fiona and Peter Lauridsen in their kitchen.

"I was quite upset about this," said Gerritsen. "I had a meeting with EnCana and I said I'm done, I don't want you to call me. I said I knew what they did up in the hills."

What's clear, even from the report, is that something went wrong with the gas well. In the hills by the Kenney house, the 05-14 Gas Well was producing water—5.6 litres a minute according to the report, which amounts to about 8,000 litres a day—from the same depths as the aquifer that supplies a number of water wells in the area, including Kenney's. In July 2004, after a number of shutdowns

GEORGE WEBBER

COLIN SMITH

because of the water, cement squeezes or seals were applied to the gas well at depths as shallow as 125.5 metres. The Horseshoe Canyon is supposed to be dry and not produce much water in gas wells, and cement squeezes are usually done only if there's a problem. In August, the Kenney water well went bad. In October, the gas well was fully cemented off and shut down.

Six months before the report was printed, EnCana's testing of the 05-14 Gas Well revealed nitrogen levels as high as almost 30 percent. While this information was available, it's not in the HCL report. Instead of comparing the high nitrogen levels in the Kenney well to that in the 05-14 Gas Well, the report compares Kenney's water with other gas wells up to twenty-seven kilometres away with low levels of nitrogen. The report found the nitrogen in the Kenney water couldn't have come from a gas well because gas in the general area doesn't have high levels of nitrogen.

Gerritsen leaned over the table. "The concern now is chemicals possibly in the water," he said. "Certain things at Redland—I thought, why didn't they check for this? Why didn't they check for methane levels right away? Nitrogen levels? But they didn't check for hydrocarbons at any time. I thought, wouldn't you want to check for that, just to see?"

"We've always had gas," he said. "But now the question is, how much and in what concentration? When you test other wells that haven't been affected, they're low. A coal seam will give off a certain amount of methane, but now, how much more do we have? We weren't testing for it before because it wasn't a problem."

He shook his head. "They got the answer they needed," he said. "They'll never admit the damage."

Have some crackers," said Jessica Ernst. I stood in her kitchen, staring out the window at goldfinches pecking in a bird feeder at the edge of the deck. Ernst stood at the counter eating cheese and crackers. I grabbed some, too, and ate standing up like she did. The kitchen table was stacked with papers: letters, articles, studies, technical data on drilling and fracing, lists of chemicals, data sheets on CBM wells and records of rural water tests. The piles spilled over the ends of the table, pushing her laptop to the edge.

"I'm so tired," she said, leaning back against the fridge. "It's a non-stop battle."

I munched on crackers and nodded. I'd been to her house at the edge of Rosebud several times. Though born and raised in Montreal, Ernst has over twenty-five years of experience working with oil and gas companies in Alberta. A tall woman with high cheekbones and long, silvery-blond hair, she is a wealth of knowledge about technical and regulatory issues. Beginning in the morning, from eight o'clock on, there is a near-constant stream of inquiries: phone calls from concerned landowners, emails from journalists with deadlines, more CBM-related documents to look at, yet another evening meeting to prepare for. Each time I visited, she was behind in the paperwork for her environmental consulting business.

"I've lost my life," she said. "That's the one thing that really angers me in all this. I've lost my solitude."

And her tap water. Earlier we'd filled five-gallon jugs with water from her garden hose. The water bubbled and fizzed in the jug. I put my hands around the top of the jug to make a seal and the gas coming off the water pushed at my palms and whistled through tightly squeezed fingers. In the Quonset hut, we'd sparked a lighter at the opening at the top of the jug. A burst of blue flame ripped upward in the darkness of the barn.

"Till 2004, I had the best water in the valley," said Ernst. "Then all these gases were blowing in my home, coming out the taps. I was breathing this stuff. From 2005, my skin was getting irritated really bad from baths and showers, and my eyes were burning."

In March 2006, an investigation had begun to look into the water problems at Ernst's place. A similar investigation was already under way at the Lauridsen farm on the other side of Rosebud. Under order from Alberta Environment, for the duration of the investigation, EnCana now provides the Lauridsen's with clean water. Ernst also receives regular water deliveries. To hold the government accountable, she requested that Alberta Environment pay for the deliveries.

"Now I have tanks in the house with safe water delivered," said Ernst. "My eyesight's coming back. My eyesight was really going downhill."

She looked out the window at the Quonset hut by the fence and the green hills of the valley beyond. When Ernst bought the property in 1998, the yard was full of broken-down, rusting farming equipment. Now it's cleaned up. A pileated woodpecker knocked on a telephone pole. A deer nibbled on the Saskatoon bushes on the back hill.

"This place is the environmental project of my career. I put pretty much everything I had into cleaning it up," she said. "Now the only safe way to do testing on my place would be to have police, firemen and paramedics on site."

She finished another cracker with cheese and sat back down in front of her laptop. In a newspaper article in the piles of documents on the table, Mike Dawson, president of the Canadian Society for Unconventional Gas, is quoted as saying, "Water tests done by Alberta Environment have found no connection whatsoever between gassy water wells and natural gas from coal exploration and development." For industry and government, CBM is still considered safe.

Ernst is out to prove them wrong. Among the mounting evidence: Husky Oil found that 46 percent of its tested conventional-gas wells in Alberta and Saskatchewan leaked gas into groundwater or soil. The Canadian Association of Petroleum Producers bluntly titled one study, "Migration of Methane into Groundwater from Leaking Production Wells Near Lloydminster." A study of drilling in the US concluded that "man-made migration pathways probably introduced most near-surface gas to the study area."

She gestured at a pile of letters sent to rural Alberta landowners by lending agencies refusing loans. "To consider this property for mortgage security, we will require confirmation that the above property has been reclaimed and is free and clear from any environmental contamination of any kind whatsoever," said one letter. "We are reluctant to take this land as security due to the oil spill," said another.

COLIN SMITH

THE WATER BUBBLED AND FIZZED IN THE JUG. I PUT MY HANDS AROUND THE TOP OF THE JUG TO MAKE A SEAL AND THE GAS COMING OFF THE WATER PUSHED AT MY PALMS AND WHISTLED THROUGH TIGHTLY-SQUEEZED FINGERS. IN THE QUONSET HUT, WE'D SPARKED A LIGHTER AT THE OPENING AT THE TOP OF THE JUG. A BURST OF BLUE FLAME RIPPED UPWARD IN THE DARKNESS OF THE BARN.

COLIN SMITH

This past year, new regulations were drafted, banning shallow fracing above two hundred metres in depth without a full first assessment of potential impacts. As well, companies must now ask landowners with water wells within six hundred metres of a CBM gas well if they want their water tested prior to drilling (eight hundred metres if there's no closer well). Ernst noted that this was too little, too late for the Horseshoe Canyon, where thousands of CBM wells already exist. And besides, the baseline testing would just identify the presence of gas in water. Increases of gas levels in water would not be tested for. Though the technology exists to do it, there is no mandated effort to trace methane in water back to a contaminating gas well.

"I'm shocked that we've allowed industry to barrel over us like it has," she said.

I asked her what keeps her going. She looked up from her laptop. "It's a war," she said. "And the big thing is that I can't be bought."

From Ernst's house I walked five minutes down a dirt road—past the grain elevators by the railway tracks, the antique tractors by the Opera House, and along the hamlet's Main Street—into Rosebud, to meet Bob Davis of the Rosebud Theatre. Tour buses rolled into town. Tourists walked in and out of the stores and took pictures of the old buildings.

"Our hamlet water is safe," said the youthful-looking Davis. "The challenge is [in] creating a separation between the hamlet and private landowners."

I asked him how the CBM controversy would end if it were a play done by his theatre company. "If this story was a Rosebud Theatre story," said Davis, "then whatever problems people have would be resolved. It would end with corporate Canada standing alongside rural Albertans on a bedrock of understanding where we could meet and greet without barriers. It would have a happy ending."

He encouraged me to buy a ticket for the buffet meal and a play at the Opera House. *Joseph and the Amazing Technicolor Dreamcoat* was on, the story of a man who is sold out by his brothers for material gain. I bought a ticket. At the restaurant, I looked at the plans for a new Rosebud Centre (a 10,000-square-foot multi-use space). EnCana had contributed $150,000 for its expansion.

In the Opera House, nearly every seat was taken, filled by groups of elderly people and families with young children. I settled in a seat right at the front. The theatre went dark. The stage lit up. A woman danced and sang while child actors sat up in onstage beds, wide-eyed and listening to the early lines of the play.

"Are those stories true?" she asked, and then replied theatrically to her own question: "The ones that are true last a really long time."