

MERRITT COAL

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BLA Gold

Coal bed methane is the oil industry's next big play

US → Merritt Coal by Robert Simpson

In an open field, eight km south of Corbett Creek, Alberta, a cluster of gas wells is pumping coal bed methane, the oil industry's next moneymaker—or so it hopes. Though extracting coal bed methane (CBM) is a relatively new idea in Canada, a 20-year history of success in the United States has firms lining up to take the chance here. How much of a chance is still anyone's guess. Canada is the world's 12th largest coal producer and has huge coal reserves in British Columbia, Alberta and Nova Scotia. But nobody knows the resource's true potential, or even how much gas is recoverable from coal deposits.

"The resource estimates and the gas recoverability rates are all over the place," says Rob Woronuk, senior analyst, Canadian Gas Potential Committee. According to the Canadian Gas Potential Committee, estimates of the CBM gas resource nationwide could range anywhere between 187 trillion cubic feet (tcf) to about 460 tcf. The British Columbia Energy Ministry estimates the

province's resource at 90 to 250 tcf. and the Alberta Energy and Utilities Board estimates Alberta's reserves at 135 tcf to 410 tcf. Only 20 tcf of CBM will supply US gas needs for a year.

"The real question is not how large the resources are but how much can be recovered and we just haven't had enough experience to determine that yet," says Woronuk.

According to the British Columbia Ministry of Energy and Mines, recoverability is estimated at 20% and an estimate for recoverable reserves in the Western Canada would be 100 tcf. In a public statement Richard Neufeld, B.C.'s Minister of Energy and Mines, said the province's 90 tcf to 150 tcf could conceivably fulfill the province's gas need for between 25 and 75 years.

Neufeld might be getting ahead of himself. A more conservative study conducted by FirstEnergy Capital in 2002 claims estimates of only 19.5 tcf recoverable coal bed methane for the entire country.

Coal bed methane makes up 7% of U.S. gas production

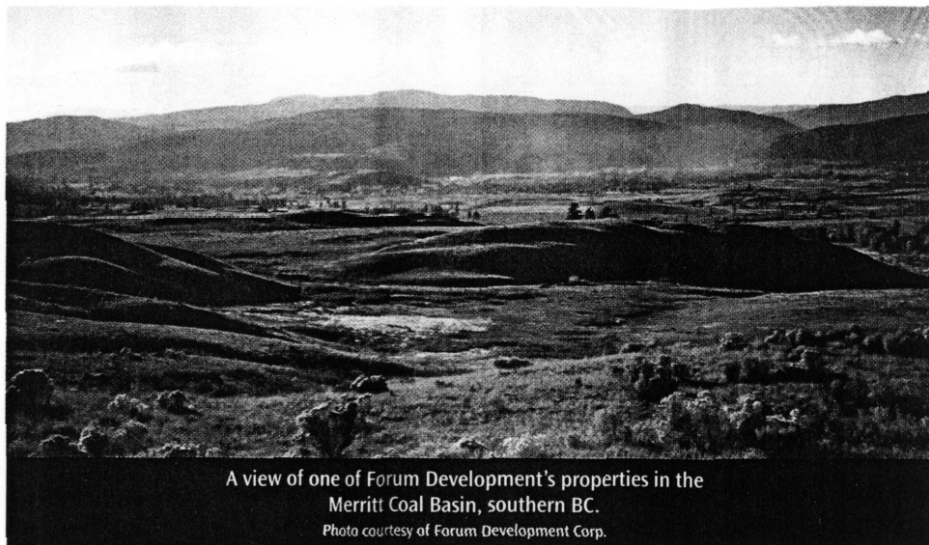


On the lower left can be seen the corner of one of Forum Development's properties (to the left of the road) with the City of Merritt, BC in the centre of the picture. Another Forum property can be seen in the left centre area of the photo and a third in the upper-central area. Photo courtesy Forum Development Corp.

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TO WATCH



A view of one of Forum Development's properties in the Merritt Coal Basin, southern BC.

Photo courtesy of Forum Development Corp.

RECOVERABLE RESOURCES UNKNOWN

There are several uncertainties when trying to determine the amount of recoverable methane gas. Every CBM project is unique, and while some of the technology from the U.S. experience is helpful, the Canadian coal beds are typically less gassy and less porous, making it harder for the methane to flow to a well bore.

"Extracting CBM has some formidable technical challenges," says Tim Jeffery, director of investor relations for Nexen Inc. [NXY-TSX].

Coal bed methane is a natural gas found in most coal deposits and created over the millions of years it takes to convert plant material into coal. The methane in a coal seam is not stored as a compressed gas but absorbed chemically into the coal and held in place by the overlying rock and water pressure.

While CBM can be extracted using conventional natural gas technology, the similarity ends there. Methane can't be extracted until the water that permeates coal beds and literally traps the gas in the coal is pumped off. This dewatering lowers coalbed pressure and, like taking the cork out of a bottle of champagne, the bubbles (methane) come to the top. Dewatering often means dumping 12 to 15 gallons of water a minute from each well—a process that must continue for a year on average before maximum methane production kicks in.

REGULATORY AND ENVIRONMENTAL

Regulatory and environmental issues associated with dewatering have many in the CBM industry concerned. "The question is what to do with the water,"

says Woronuk. Here a lesson could be taken from the U.S. experience. Ask any rancher in the coal bed methane-rich Powder River Basin of Wyoming and they will tell you the biggest problem is the water. The state's CBM industry now produces enough water to supply thousands of people per day, but instead much of the water, which ranges from fresh to brackish, is simply spilled on the ground.

Not surprisingly, the State is awash with lawsuits and land disputes and according to the Wyoming Wildlife Association, the massive development of coal bed resources is jeopardizing thousands of square miles of aquifers that feed the headwaters of the regions rivers and streams. At risk, say association spokesmen, are water resources that could be damaged for 200 to 1000 years.

In Canada there is a stronger regulatory framework to build on, including established rules for water disposal, but the rules are still decidedly sketchy when it comes to CBM and differ in each provincial jurisdiction. In Alberta, disposal of any kind of oilfield water back into the ground is governed by the Energy and Utilities Board, while surface water handling—unless it is stored in tanks—falls under the jurisdiction of the Department of Environment.

Under the status quo, CBM developments would require a combination of permits from both authorities to proceed. But special circumstances unique to CBM production also require outright rule changes.

Alberta tightened environmental laws in 1999 to make surface discharge an unacceptable practice, despite exemptions granted to the coal industry for tailings ponds. Likewise, oil and gas operators

are not allowed to have evaporation ponds under an interpretation of the current rules. More serious than the issue of dispersing dirty water is the issue of what to do with fresh water produced from coal seams—dewatering non-saline aquifers is against the Alberta Environmental Protection Act. Any other type of groundwater use requires diversion permits.

In September 2001, the Alberta Department of Energy delivered a report of CBM that recommended establishing subcommittees to look at specific sections where changes might be made, including environmental rules. But the report itself doesn't represent government policy and the lack of regulatory clarity adds another level of uncertainty.

TECHNICAL CHALLENGES

Although the exploration risk for finding coal beds is minimal, that's where the risks end. The geological and technical risks are huge and make CBM production a capital-intensive proposition on par with Alberta's mega-project oil sands developments. For starters, each CBM play is unique, requiring different techniques for drilling, completing and stimulating wells. If the coal bed is too shallow pressures are not high enough to absorb the methane on the coal surface and if it's too deep the pressure is shut off and collapses the fracture, making it impossible to retrieve the methane gas. Ideal conditions in Canada are between 400 and 1,000 metres (1,200-3,000 feet) below the surface.

The San Juan Basin in Colorado holds its methane in 30 to 60-foot thick coal beds that lie 1,600 to 3,300 feet underground. The gas in the Powder River Basin lies in more permeable seams at a depth of 600 feet.

Production can be tricky and potential players need a large land base, as the wells produce at very low rates and it can take up to two years to reach peak levels. But once in production, the CBM well's production continues for several years—some U.S. wells are still producing after 20 years.

The initial capital investments are huge and success is not guaranteed because the amount of gas that can be produced depends not only on the correct depth, but on the thickness and lateral continuity of the coal, the level of permeability that is controlled by the amount of fracturing or cleats and other barriers such as impermeable layers and

faults or folds that keep the gas trapped within the coal seam.

"The key to coal bed methane production is a large land position, as it requires a large coal seam to make the play economic," says Jeffery. CBM extraction also requires twice as many wells as a natural gas play. Instead of one hole per 640 acres, CBM demands as many as one well every 80 acres, costing between \$100,000 to 400,000 per well.

But before companies tackle the environmental, exploration and financial obstacles there still remains the question of who holds the rights to the resources. Coal companies, **Fording Inc.** [FDG-TSX], **Sheritt International Corp.** [S-TSX] and **Teck Cominco Ltd.** [TEK-TSX] are freehold lease owners of some of Alberta and

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British Columbia's coal, and they typically argue that CBM is part of the package. "It isn't clear who owns the methane gas right now," says Jim Popowich, Calgary-based chairman of the Canadian Coal Association.

Neil Swift, president of **Priority Ventures Ltd.** [PVS-TSX Venture], currently developing a CBM project in the Comox Valley on Vancouver Island, says the question of resource ownership is a major hurdle. In 1886, the federal government granted to the E&N railway a large land package on the Island that included coal, coal oil, fire clay and minerals. "Our interpretation was that E&N did not reserve petroleum and natural gas for themselves, so this reverts back to the original land owners. But the B.C. Government believes the rights originally owned by E&N were forfeited back to the Crown after the provincial government passed the Mineral Tax Act, and the Crown believes they own the petroleum and natural gas rights," says Swift.

CANADIAN COMPANIES

But the uncertainty and complications of extracting CBM hasn't stopped majors including **Nexen Inc.**, **Talisman Energy Inc.** [TLM-TSX], **Penn West Petroleum Ltd.** [PWT-TSX], **Suncor Energy, Inc.** [SU-NY] and **EnCana Corp.** [ECA-TSX] from investing more than \$100 million in exploratory well projects in the past two years.

The most extensive investigations and only Canadian production to date in Canada has resulted from a joint venture between **EnCana Corp.** and **Quicksilver Resources, Inc.** [KYK-NY], a Texas firm that specializes in unconventional gas plays in Michigan's Antrim Shale Fields. The joint venture has drilled 175 wells on the million-acre Palliser Block east of Calgary over the past two years, and reported its first production in February 2003.

So far **MGV Energy**, the Canadian subsidiary of **Quicksilver Resources**, likes what it has found in Alberta; the company doubled its CBM investment to \$30 million last year and in January 2003, reached an Asset Rationalization Agreement with **EnCana Corp.** to divide land and natural gas assets that were previously included in the CBM joint venture between the two companies. Going forward, **Quicksilver** holds an interest or an option to drill and earn in approximately 667,000 acres of Alberta land where it is conducting a variety of CBM projects. These lands contain a mix of target coals with the initial commercial development currently delivering gas to sales.

"Our Canadian CBM work has been a great success, contributing to Canada's first commercial CBM production. By pursuing an independent strategy we can streamline our operations and better control our pace in developing these assets. **Quicksilver** is going to be very busy in Canada for the foreseeable future," says **Glenn Darden**, **Quicksilver's** president.

The first **Quicksilver** CBM development project, in the Gayford area of the West Palliser block, is producing 2.7 million cubic feet per day (Mmcf) into sales lines from 18 net wells with five more wells to be added in February 2003. The company will book an estimated 35 billion cubic feet of proved reserves from this area with the release of its year-end 2002 reserve report.

In addition to the Gayford area, **Quicksilver** has interests in lands and wells in the Beiseker area of West Palliser and in the **ConocoPhillips**, **NCE Petrofund Corp.**, and **Murphy Exploration** joint ventures. The company also holds substantial acreage

on acquired Crown lands and continues to build its acreage position through joint ventures and lease acquisitions. **Quicksilver** has a \$35 million capital budget for development and exploration in Canadian CBM for 2003 with a target year-end production rate of 15 Mmcf. **Quicksilver** plans to complete over 175 wells in all areas during 2003.

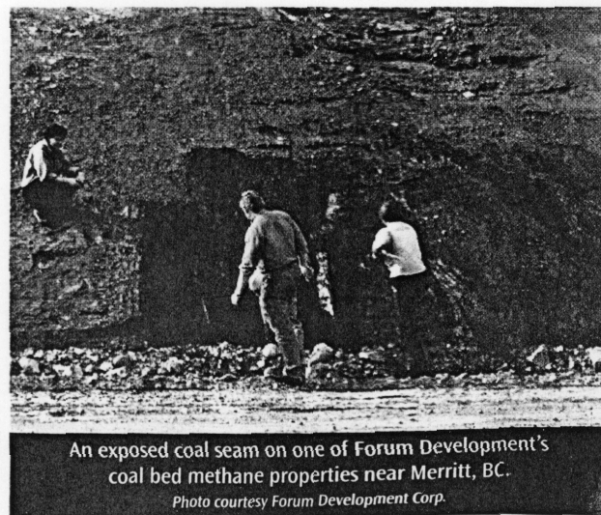
EnCana is also evaluating projects in central Alberta, B.C. and Nova Scotia. The most advanced is in the Elk Valley in East Kootenays, where 10 wells have been de-watering coal since 2001. **Encana** says a decision on whether to move to commercial production will come at the end of the year.

While bringing a full CBM field into production is capital intensive, many juniors are finding their places in early stage exploration identifying large-scale potential then vending them to senior companies.

According to **Gary Zak**, president of **Forum Development Corp.** [FDC-TSX], junior companies have been quick to organize and establish land positions on some of the most prospective properties. **Forum's** Merritt CBM project is a classic example.

When the British Columbia government opened the coal beds in 2001 claims that sat stagnant for many years, **Forum**, like many juniors were quick to react and acquire previously identified coal resources. "When the government changes occurred, everyone jumped on the bandwagon and headed to Victoria to review the archives," says **Zak** who acquired 4,950 acres of coal-bearing property near Merritt, British Columbia. "Like most junior exploration companies,

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An exposed coal seam on one of **Forum Development's** coal bed methane properties near Merritt, B.C.

Photo courtesy **Forum Development Corp.**