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# Energy Evolution

*The Rise of Unconventional Gas in Canada*

**GUIDEBOOK AND DIRECTORY**







# Money and Brains

*Stealth Ventures and Canyon Technical Services partner to answer unconventional fracturing challenges*

Unconventional gas, by definition, is difficult-to-produce gas that requires some sort of artificial stimulation to flow at commercial rates. Because of this, there has been much research and field experimentation on fracturing technologies that will work on the thinner, often complex unconventional gas zones of western Canada.

In the Horseshoe Canyon, producers quickly discovered a high-pressure nitrogen fracture could make gas flow at commercial rates. With that technique well entrenched, efforts are now turning to the shallow, immature shales covering much of the Western Canadian Sedimentary Basin and to the more challenging Mannville coals where, unlike the Horseshoe Canyon, water is present in most potential producing zones. Many of these efforts involve partnerships between operators who have the land base and capital to develop resources and service providers with novel technology and the unconventional brainpower to turn the resource into flowing reserves. One example of this is the partnership between emerging producer Stealth Ventures and Canyon Technical Services that is targeting shallow shale gas. The shales of the Cretaceous Colorado Group, covering all of central and southern Alberta and a large swath of central and southern Saskatchewan, hold a potential 300 trillion cubic feet (Tcf) of gas in place. Over 50,000 wells have been drilled through this shale formation, but until recently few companies in the industry have produced from it. In fact, 10,000 wells will likely be drilled through the formation this year alone as producers bypass it chasing conventional plays.

"Everyone knows the gas is there, the question has always been where is the sweet spot that will allow you to drain the gas commercially," explains Derek Krivak, COO for junior producer Stealth.

Stealth began assembling lands to target the Colorado shales 18 months ago. It now controls 1.1 million acres, with its Saskatchewan holdings in a 50/50 partnership with PanTerra Resource Corp. Reserves in place are estimated in the trillion cubic foot-plus range. Krivak says that after drilling over 40 wells, Stealth is well on its way to cracking the challenges of economically producing the massive shale resource. And, he adds, much of the credit in making this happen goes to the service partnership Stealth has formed with Canyon Technical Services.

"My personal relationship with Canyon goes back to the days when I worked for the Gas Technology Institute," says Krivak. "From its inception, the company had a mandate to provide what everyone else was not offering by focusing on tough reservoirs."

The Canyon Services Group was formed in 2004 with the idea that customized fit-for-purpose fracturing spreads and highly specialized technical people would be needed to access the more complex unconventional reservoirs that would increasingly become important to North American gas supply. Early on, the company focused on coalbed methane resources, building nitrogen fracturing spreads to meet operator demands in the Horseshoe Canyon. In the three years since its inception, Canyon has grown from an idea to significant service provider with 12 fracturing spreads in the field. Krivak describes the company's Saskatchewan effort as a shallow, biogenic tight-shale play. The depth of the play ranges from 300 to 700 m. Biogenic gas is methane produced by bacteria feeding on the organic matter contained in the shale.

The plus side of targeting shallow biogenic shale gas rather than the deeper shales that are often more prolific reservoirs, is the shallower resource has lower drilling



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costs. Some experts also believe because there is less compaction at shallower depths there may be better permeability. But the shallow play also has its challenges. Krivak explains, "There are a pile of clays—and they are susceptible to water imbibition and swelling—that can cause serious reservoir problems." Another concern is the gas-bearing rock may be too immature to preserve fractures well.

Krivak says there is one particular piece of Canyon equipment that has proven to be a key in developing the plains shale play. "They have a piece of equipment unlike any other piece of pump equipment I know of—it's called the Grand Canyon," he explains. "It can propagate fractures using pure gas under high pressure while adding proppants."

The Grand Canyon Process is patent pending, but the company confides that it is based on nitrogen fracturing and the use of a light weight proppant developed by the company. The actual Grand Canyon unit is a high-pressure vessel that meters the light weight proppant into a 100 per cent nitrogen stream. Using nitrogen rather than a liquid produces a fracture with no gel damage, no fluid retention,

and no cleanup issues. Large diameter coiled tubing (2-7/8" or 3-1/4") is used to isolate perforations so that multiple productive zones can be fractured sequentially.

Krivak says that partnering with a service provider is about more than just finding a company with the right technology and bringing it to bear on the resource. Because the two companies are breaking new ground, they must work together to continuously improve the technology's effectiveness. He adds that this is an area where Canyon has really shone. "One of the real pleasant surprises has been how frequently this company has sat down with our technical staff and asked how they could improve their product," he explains. "Because of this, they've implemented significant changes that have made us more successful. Our successes have driven off each other." While Stealth Venture's exploitation of the Colorado shales is in its early stages, results so far have been significant. In initial production testing, wells flowed at three times the rate of typical coalbed methane wells. And this has Krivak believing Stealth and Canyon's partnership will be long term.

"I'm hopeful we'll drill thousands of wells together." ■

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