

NEW DRILLING TECHNOLOGY COULD FINALLY MAKE CBM VERY ECONOMIC

Technology Promises Drop in Gas Extraction Costs

Summary: We talked by telephone with Nathan Mitchell, managing director of Mitchell Drilling in Brisbane, Australia, about his company's proprietary Dymaxion® drilling technology. Over the past seven years, his company pioneered this new drilling technology. He reports coalbed methane (CBM) gas extraction costs can drop well below \$2/mcf, possibly as low as \$1.10/mcf. Having drilled more than 250 wells across Australia, and making gas economic, where many believed it would not be, Mitchell Drilling has now expanded its operations into India, Kansas (United States) and China. The Dymaxion® technology could help spur a worldwide boom in the CBM sector.



Mitchell Drilling's Managing Director, Nathan Mitchell is smiling because he has the CBM drilling technology to get the gas out cheaper, for a lot less cost than many CBM companies now pay to get their gas.

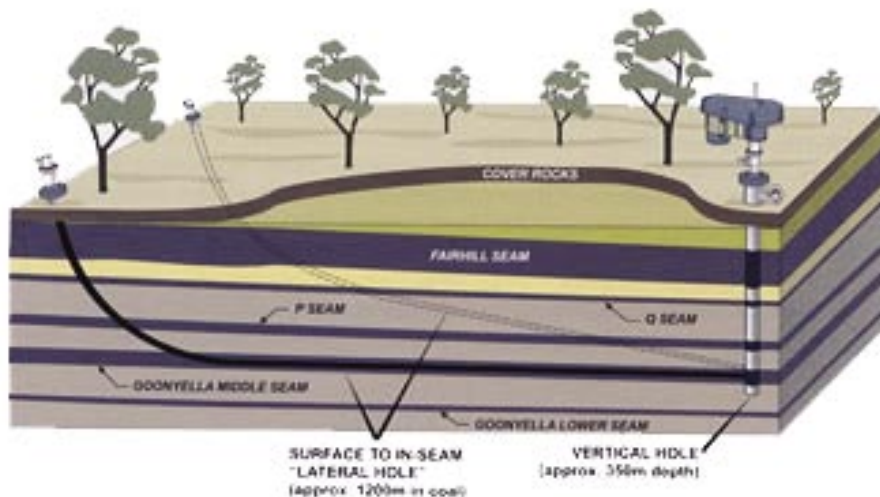
By James Finch

In a previous interview about coalbed methane (CBM), [Sprott Asset Management CBM analyst Eric Nuttall](#) he would remain, "quite excited about the prospects for companies with coal bed methane assets so long as natural gas prices remain above \$6 per Mcf (thousand cubic feet). The economics would be very skinny under \$6." That's because CBM exploration and development can get pricey. What if there was a drilling firm regularly bringing gas out of the ground for under \$1.50/mcf? There is and they've proven it with more than 250 wells in Australia. They've moved into India, where they drilled another 30 to 50 wells and another 70 wells to come. Mitchell has taken acreage in southern Kansas, where the company just finished its first CBM well. And the company formed a joint venture with Pacific Asia China Energy (TSX: PCE) to bring its Dymaxion® technology to China later this year.

You don't get to be Australia's largest privately owned drilling company without timing your markets right. The Mitchell family's great timing ability began in 1969, when company founder Peter Mitchell bought his first drilling rig at a repossession sale for \$11,500. Parts of Queensland, Australia were in the grips of a drought. Mitchell put his rig to good use as he began drilling water wells for farmers in the surrounding rural counties. Just as the drought had ended, Mitchell caught the boom in coal. His growing company began drilling in the oil shale and coal fields around Moranbah, then a remote part of Queensland. They then caught the drilling boom in mineral resources through the 1980s. By then, the company was drilling oil, gas, uranium and coal reserves throughout Australia. In the 1990s, Mitchell Drilling got the first whiff of Coalbed Methane (CBM) exploration entering Australia. That is when the major U.S. oil companies, such as Amoco, Conoco and others, came to the country searching for new CBM fields.



One of more than 20 drill rigs owned by Mitchell Drilling in Australia. The company is also drilling in Kansas, India and China.



The area degassed by a Dymaxion SIS hole is far greater than with conventional vertical production wells.

But, the major U.S. oil companies abandoned CBM in Australia because they soon discovered Australia's shallow coal fields were too expensive for their big oil rigs. "The economics just didn't work," Nathan Mitchell told StockInterview. "They needed high gas flow, but the fracking technique just didn't give them what they needed." Still they persisted and asked Mitchell Drilling to run his smaller water well rigs. "That was the start of it," Mitchell recalled. "We made CBM work with the water well rigs from an economics point of view, but they still weren't making enough gas." Still, the economics of the smaller rig made it work to a degree.

Enter the politicians. "The Queensland government made a law that said five percent of all coal-fired power stations had to be run by gas," explained Mitchell. "That spawned the industry and CBM really took off." Mitchell continued with the vertical rigs, but it was the economics of the smaller rig that made CBM work.

Getting Blood Out of a Stone

It was during the CBM boom when Mitchell developed the better mousetrap. Coal miners didn't see the gas resource beneath their feet. "They just saw them as coal fields," said Mitchell who knew there was "nuisance gas" there. "There was never even a thought there was enough gas there to make it viable." With natural gas selling for \$2/mcf in Australia, the economics didn't make sense. Australian coal seams are found at shallower levels where greater pressures have to be created to liberate gas from the extended horizontal seams. The Australian one-two punch of shallow coal seams and low gas prices drove Mitchell to become innovative.

"We'd seen in the coal business the underground in-seam drilling of horizontal holes and degasification," Mitchell explained. "But, there was usually a lot of water involved and no way to get the water out." Because of the company's decades

of experience in drilling water wells, Mitchell combined the vertical well with the horizontal well. Mitchell described the process, "The vertical well became the conduit for the coal mine, the gas and the water, and gave us a huge surface area. Suddenly, in areas where there wasn't a resource, we could produce something like a million or up to 2 million a day from these Dymaxion® wells."

The technology was put to the test in central Queensland, Australia. An Australian newspaper reported in June 2004, "In an industry where tradition plays a strong role, innovative drillers Mitchell Drilling have chalked up the 100th example of their revolutionary Dymaxion surface to in-seam (SIS) methane gas drainage hole for gas producer [CH4 Limited](#) at their Moranbah gas project." CH4's website spoke highly of this gas project, "The Moranbah Gas Project will utilise innovative drilling and gas extraction techniques, allowing increased potential gas yields while leaving the coal resource undamaged."

How does this impact the industry? "We see this as revolutionary," Mitchell cheerily remarked. "It has changed the face of CBM. It works in areas where people didn't think it would work." For example, the Dymaxion® drilling works in high permeability with low gas. "We can get such high gas from low gas content reservoirs, where people didn't previously think there were reservoirs."

It has worked in Australia, where every penny counts. "Our price may cost around \$1.25 or \$1.10 (US\$) per mcf so they are still making reasonable profits at around 50 percent." How will it play outside of Australia? Mitchell shot back, "If you can imagine costs at \$1.25 and you're selling it for \$6/mcf, that's some pretty good bloody profits." Drilling at reasonable profits for \$2 gas, Mitchell said, "We are keen to take this technology around the world. Even if we were to double our costs, our clients would still be extremely happy."



Dymaxion drilling involves both a vertical and horizontal well.

Using Both Vertical and Horizontal Wells

When discussing the Dymaxion® technology with an oil and gas man, his puzzled response was, “Did I hear you right? You are using both a vertical and horizontal wells to get the gas?” There are the skeptics. “Contractors from the larger oil and gas companies came over to have a look,” Mitchell said. “Some people thought we were sliding by or sort of skimming costs.” He explained the procedure, “We have to intercept (the vertical) because we actually line up every one of our lateral wells with a slotted liner, a perforated liner. It is stacked into the vertical well, by the arrangement we’ve developed, so we know we’ve intercepted it.”

Mitchell said the key is the ability to flush and know that the finds are coming out. “We can have a number of wells lined, going from one point to another,” he explained, “and we’ve got continuity of connection and flow between one well which is 1000 to 2000 meters away and the vertical well. We can flush between both.” He gave an example, “We can have three horizontals going into one vertical and two of the horizontals can be closed. Number one can be opened and flushed; then number two can be open, flushed and closed. So you have this over the 10 to 20 year life of the well.”

How does the SIS hole de-gas a greater area than a regular horizontal? “When we put two wells into a chevron pattern, you start to get absorption between the V at the start of the well,” Mitchell said, describing the Dymaxion process. “Once you get the wells done, in a V with each other, you start to get better flows, a bit more gas and greater increasing gas in a slow decline.”

Mitchell’s website does admit the old technologies may be suitable for deeper drilling, “In the case of very deep deposits, up to 3000 meters underground, a vertical well may be adequate to create sufficient water table pressure to liberate and bring to the surface large quantities of methane gas.” Because of the greater surface area draining the underground

gas in the coal seams, the same website is quick to point out, “SIS drilling also provides valuable exploration data on seam rolls and faults, allowing greater certainty in mine planning and development.”

The SIS process begins by using modified, multipurpose mineral drill rigs with specially designed bottom hole assemblies. In the SIS technique, a hole is drilled at 60 to 90 degrees from the surface. It is then steered through a medium radius bend to horizontally enter the target coal seam. The 96 millimeter hole is steered in the seam toward a previously drilled vertical production well. A homing device is lowered down the vertical well to the target seam, which helps the horizontal hole intersect the production well. The vertical well dewateres the seam. Once the hydrostatic head has sufficiently been lowered, gas flows to the surface.

Mitchell’s Worldwide Expansion

Developing the Dymaxion® technology in the late 1990s, the first test took place in Australia in the year 2000. Now, going on nearly seven years later, the company has drilled more than 250 wells in Australia, another 30 to 50 wells in India with another 70 more to drill, and has moved on to both Kansas and China. Mitchell talked about Kansas, “We finished our first well, but we don’t really want to be a contractor in the United States. We don’t see a lot of benefit to handing over our technology, but we would be interested in doing some sort of equity deal or partnership with clients.” He believes that in the right areas, what Mitchell has got is “exceptionally good.”

So where did Mitchell first make an equity deal? “The two big powerhouses of the world for the future are going to be China and India,” he noted. “Both of them will have energy problems in the future. Mitchell’s first equity deal came about with Pacific Asia China Energy. “We just astounded them with what was happening in Australia,” Mitchell laughed, “to see this small compact rig drilling 2000 meter holes of a well and making it work at \$2 gas.” He explained that although rigs were cheaper in China, the logistics, the costs of roads and access for trucks and pumps, gear and equipment, costs start to go up. “It like a U.S. aircraft carrier,” Mitchell compared with a drilling operation, “you have 40 planes on deck but it takes 70 people to run it.” Even in China, costs can go up when running these logistics. The deal with Pacific Asia China Energy involves reduced drilling costs and a 50/50 arrangement for income produced through the use of the Dymaxion® technology in China. The joint venture company has exclusive use to this technology in the world’s largest coal producing country, China.

How does Mitchell see business growing in China? “Exponentially,” he quickly replied. “In China, there is a push to degasify their mines. There are some several thousand large mines, many with over one hundred million tons in reserves, and a lot of mines are being shut down because of degasifica-



Many Chinese coal mines are forced to stop production for safety checks.

Websites and Trading Symbols of companies mentioned in this report:		
Pacific Asia China Energy	www.pace-energy.com	TSX:STM

About...

Nathan Mitchell
Managing Director, Mitchell Drilling

People often talk about having an industry in their blood so close are they to the essence of the business, but in Mitchell Group Managing Director Nathan Mitchell’s case, there is no other way to describe his lifelong involvement with the drilling and resource exploration industry.

His 17 years in the industry has spanned every role, starting as drillers offsider. This hands on approach has stayed with Nathan as he tackles the latest challenges in the worldwide CBM industry. He is currently a Director of Purus Energy, a member of the Australian Coal Seam Gas Council, Director of Global CBM, and a member of the Advisory Board for PACE – Pacific Asia China Energy, a Chinese based CBM corporation. That is in addition to his main role of Managing Director of all the companies in the Mitchell Drilling group.

Nathan’s active role with PACE enables that organisation is able to draw on his immense knowledge base and solid reputation. This is another indication of Nathan’s personal commitment to the CBM industry around the world, and is why Mitchell Drilling and associated companies are poised to stay at the forefront of the technological growth and economic opportunities being experienced today.

tion problems.” In an earlier interview with the Tunaye Sai, president of Pacific Asia China Energy, he reported that every single coal company at a recent symposium approached both Mitchell and himself about the Dymaxion technology for China. Was that true? “Very much so,” Mitchell confirmed. “Mine safety is now at the forefront of China and international observation. They’re looking forward to international help and technology to come to China and fix these problems. They’re looking at it from they want to sell coal, but they also want to sell gas. It worked well in Queensland and will apply to in China. That’s why we see such a growth for Mitchell.”

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