

BUSINESS WITHOUT BORDERS

ENERGY

Old World oil, New World techniques

Calgary-based Vermilion Energy among the Canadian firms to see tremendous potential in the shale rock of France's Paris Basin

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Nestled between a field of freshly sprouted winter wheat and an oak and poplar forest, oil well Numbers 5 and 29 represent what could be the future of the farm country that stretches east from Paris to the famous Champagne and Chablis wine-growing regions.

Originally drilled in 1985 by oil giant Exxon Mobil Corp., the wells pumped conventional light crude before running dry several years ago. Now, Calgary-based Vermilion Energy Inc. is betting they will lead to a much bigger prize – as much as 75 billion barrels of oil thought to be trapped in shale rock in the geological formation known as the Paris Basin.

Vermilion reactivated the wells last year, using horizontal drilling and fracturing techniques that have revolutionized the gas industry in North America, and became the first company in the region to tap into the shale rock. Vermilion's vice-president of European operations, Peter Sider, says the results were "encouraging. We now know we can produce oil from the shales because we are doing it every day," he said.

Vermilion is one of 10 companies competing for the right to explore the 140,000-square-kilometre Paris Basin and, if all goes well, to extract billions of barrels of oil that was previously unrecoverable.

"We are seeing an incredible amount of interest. Trying to sort this out is like dealing with kids in the school yard," said Charles Lamiroux, head of oil exploration for the French Energy Ministry. "I think if they are fighting this hard, it's because they think there is an important future there."

The eastern section of the Paris Basin, famous for its Brie cheese and home to thousands of hectares of rolling farmland dotted with villages of yellow-stone houses, has produced small amounts of oil since the late 1950s. Production peaked in 1988, but dropped to its current level of about 18,000 barrels a day as oil prices declined. Interest in the region picked up again about two years ago as oil companies adapted new technologies developed to extract gas from shale rock in the United States.

The structure of the Paris Basin closely resembles that of the Bakken shale in the Williston Basin, which stretches across North Dakota into southern Saskatchewan. Companies there have used new horizontal drilling and fracturing techniques to ramp up production to 300,000 barrels a day over the past two years.

Canadian companies such as Vermilion and White Rock, B.C.-based Realm Energy Interna-



Vermilion uses horizontal drilling and fracturing techniques to extract oil from shale formations. VERMILION ENERGY

tional Corp. hope to see similar results in the Paris region.

Vermilion, already the biggest producer of oil from conventional fields in France, has exploration rights on 200,000 acres (80,000 hectares) of existing concessions and has applied for permits for 600,000 acres more. It plans to spend \$160-million on research and development over the next five years. Realm Energy has applied for permits to explore 1.65 million acres.

Realm Energy chairman Craig Steinke says the similarities with Bakken shale make its Paris Basin bid "one of our highest opportunity plays." He adds it should be economically feasible as long as oil stays above \$80 (U.S.) a barrel. But he says there are still years of work to be done before anyone knows whether techniques that have succeeded in the United States will work here.

Geologists believe up to 100 billion barrels of light oil is held in a layer of shale between two rock formations that contain conventional oil. The Institut Français du Pétrole estimates that 5 per cent to 10 per cent may be recovered, at most. Mr. Steinke says it could be even less than that.

"What we don't know is how these shales are going to give up the oil and we won't know that until we get down and do it," he said.

Companies also face major challenges working on a continent that is not all that accustomed to oil production and has virtually no infrastructure to support it.

Mr. Sider, Vermilion's vice-president, says exploration and drilling costs will be up to three times higher than for similar wells in North America, because companies will have to import drilling rigs and most other equipment.

Concerns about the environmental impact of drilling shale on some of France's richest agricultural land could also become a major factor. Horizontal fracturing uses large amounts of water, pumped into the ground at high pressure to break up shale rock and release oil, and requires dozens more wells to extract the same amount as from more conventional sources.

Marie-Paul Duflo, president of one of the largest environmental groups in the Seine and Marne region, said she is concerned that large-scale oil development in the area would "transform

our countryside into a field of derricks. We don't want that." She said she is also worried about possible pollution and potential water shortages, since water use in the region is already restricted in the summer.

Mr. Lamiroux said protecting the environment is a major concern for the French government.

"In France, I think this is unavoidable because the French are very sensitive to the protection of their environment. It is a problem of social acceptance," he said.

"The government is committed to energy self-sufficiency so if the oil is there, we're going to go look for it, but it won't be at any price."

That may mean that shale oil development proceeds at a slower pace than it has in North America and may even reduce the amount of oil that can be extracted. But as long as oil prices continue to rise, Canadian companies expect the project will pay off.

"This is a big pie," said Paul Beique, Vermilion's vice-president of capital markets. "If the pie is big enough, even one piece is okay."

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THE PARIS BASIN

The Paris Basin currently produces about 10,000 barrels of oil a day, down from a peak of 40,000 barrels in the late 1980s.

Calgary-based Vermilion Energy produced about 8,500 barrels of oil a day in the Paris Basin in 2010.

Vermilion plans to invest \$160-million to explore and develop shale oil reserves in the Paris Basin over the next five years. Each well costs about \$10-million to drill, two to three times more than it costs in North America.

Estimates of the amount of oil trapped in shale rock in the Paris Basin vary from 50 billion barrels to 200 billion barrels. However, Vermilion estimates that only 0.5 per cent to 1 per cent, a maximum of 800 million barrels, will be recoverable.

Shale oil is currently produced only in the United States. The largest known reserve is the Bakken formation in the Williston Basin in North Dakota and southern Saskatchewan. The U.S. Geological Survey estimates the Bakken formation holds four billion barrels of recoverable oil.

Shale-oil production in the Williston Basin has risen from 80,000 barrels a day in January, 2004, to 300,000 barrels a day in May, 2010.

Companies in the United States produce 500,000 barrels a day of shale oil from three formations, in North Dakota, Texas and California, compared with seven million barrels a day from conventional oil production.

World oil production is 86 million barrels a day.

Source: Vermilion Energy, Institut Français du Pétrole, and the U.S. Geological Survey

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