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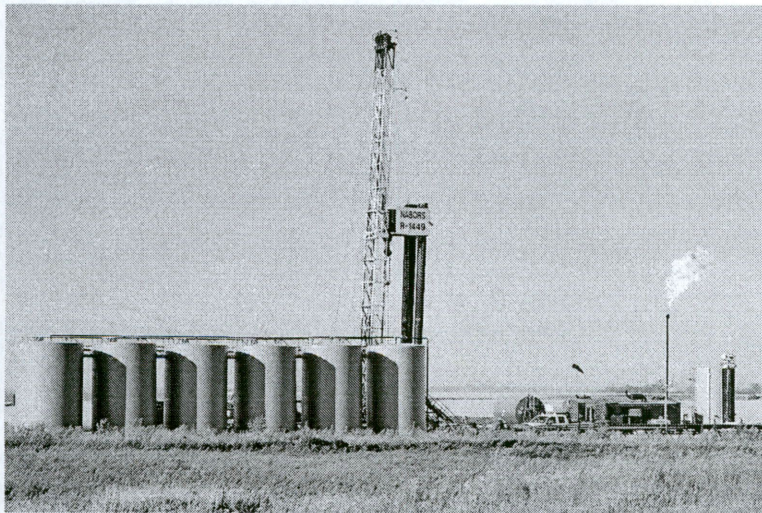
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What the Future of Oil Drilling Will Look Like

Liberty Resources' oil 'factory' focuses on lower costs, more flexibility and better community relations



Much development in the Bakken Shale has been chaotic. Liberty is aiming for a more methodical approach.

PHOTO: KAREN BLEIER/AFP/GETTY IMAGES

By RUSSELL GOLD

May 5, 2015 11:04 p.m. ET

TIOGA, N.D.—The future of the U.S. oil industry may well be taking shape north of this town on 15 square miles of windswept prairie above the Bakken Shale. It's about as far from the industry's wildcatting heritage as is thinkable.

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Joel Vagts

“Our idea was to build the world’s greatest oil factory,” says Chris Wright, the chief executive of Liberty Resources LLC. And if the U.S. oil industry is going to overcome several significant challenges, it may have to follow the lead of this small Denver-based company.

The U.S. oil industry boomed when crude oil prices were high, but has entered a world where low oil prices may be the norm for a while. Saudi Arabia says it won’t cut production to reduce supply, leaving U.S. companies vulnerable. After years of pell-mell development, these producers also face rising pressure from communities and regulators to be better neighbors.

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“The correct focus in a price downturn is to focus on efficiency and cost mitigation, but it is much easier said than done,” says Cody Rice, a Houston-based senior research analyst for energy consultant Wood Mackenzie. “There are so many moving pieces that it is very difficult to do these things well.”

Mr. Wright’s oil factory is well-suited for this new world. It is focused on cutting operating costs and boosting output. And it is flexible, allowing oil output to be started and stopped—something that could be a big plus as volatile global crude prices require U.S. companies to adjust production levels.

Reducing truck traffic

On a frigid February evening, the project was beginning to take shape. The first three operational wells were flowing into a giant battery of storage tanks that will separate the oil from water. Nearby, a small drilling rig was putting the final touches on a \$3.7 million saltwater disposal well, where wastewater will be piped for injection underground. A large earthmover was preparing the ground for a new pad where more than a dozen wells were to be drilled.

Notably absent were tanker trucks. Liberty Resources has spent \$16.2 million building pipelines to deliver fresh water and send out natural gas and oil, greatly reducing the need for trucks. Another pipeline sends gas from its wells to drilling rigs and other machinery, cutting diesel consumption in half and reducing the number of fuel trucks required.

“Getting trucks off the road is one of the main drivers in controlling the costs,” says Chris Clark, the production manager. Trucking water for disposal, for example, can cost \$1.75 a barrel, about 50 cents more than shipping water via pipeline, he says. Overall, pipeline usage helps Liberty make an additional \$3 a barrel for oil, mostly from reduced costs but also because the company can more easily get its oil to locations where it brings in higher prices, he says. “We are spending more to make more,” Mr. Clark says.

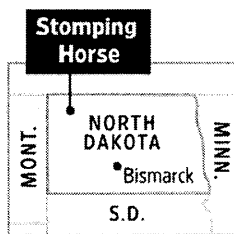
Reducing truck traffic is about more than just cutting costs, however. It also helps with community relations. “The No. 1 objection to industry’s presence is always trucks,” says George King, a consultant at Houston-based oil and natural-gas producer Apache Corp.

Liberty Resources, backed by private-equity firm Riverstone Holdings LLC, calls the project Stomping Horse. It is developing the nearly 10,000 acres as a unified project, rather than a collection of individual wells. When it’s done, the project likely will have cost more than \$800 million and there will be 96 wells.

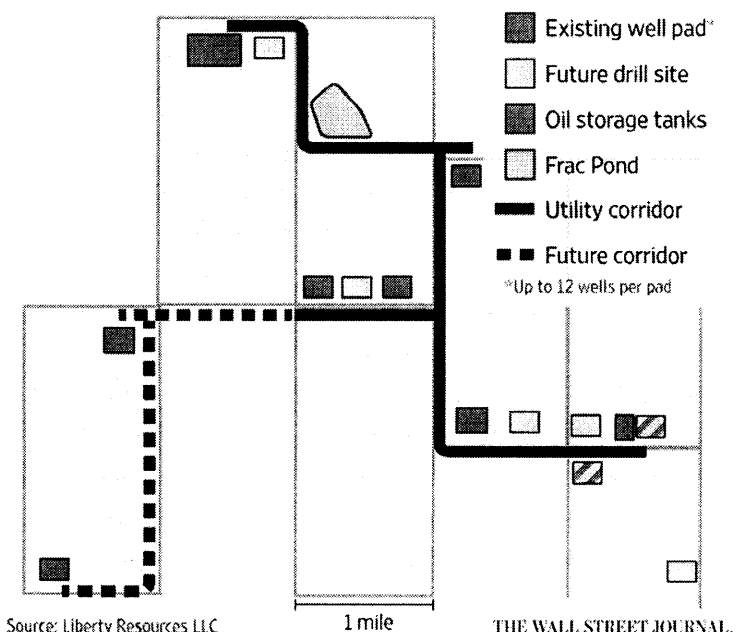
Building centralized infrastructure—pipelines, a disposal well, a tank battery—is expected to drive down operating expenses, Mr. Clark says. Because fewer workers are needed to operate the wells, field-personnel costs are down 34% this year, he says. “We’ll still make money at \$50 a barrel,” he says. Even so, the company plans to take a break from producing oil until August, when it hopes prices will have rebounded and costs from oil-field-services companies will have fallen.

Building an Oil Factory

Instead of drilling wells on an ad hoc basis, Liberty Resources is developing a 96-well North Dakota development called Stomping Horse in a methodical manner to reduce costs. The company has built a "utility corridor" that connects and services the well pads, reducing the need for heavy truck traffic and long runs of pipeline to isolated units.



- ◆ **A network** of 16-inch pipe will collect the natural gas for sale; a 6.5-inch oil pipeline will gather the oil.
- ◆ **Natural gas** will also be captured and piped around the project to power drilling rigs and other equipment.
- ◆ **Water for hydraulic-fracturing** operations in the 96 wells will come from a single "frac pond" connected by pipeline to the well pads.
- ◆ **A saltwater disposal** well will take wastewater via pipeline from oil-extraction operations.



More-productive wells

To understand what is so unusual about Stomping Horse, it is necessary to understand the rapid rise of the Bakken Shale. In 2008, North Dakota generated a little more than 100,000 barrels of oil a day. That has risen tenfold. With oil prices high, speed was prized over efficiency.

Development was chaotic and unplanned: Drill some wells, build some supporting infrastructure, use trucks to get water in and oil out, and often flare off gas.

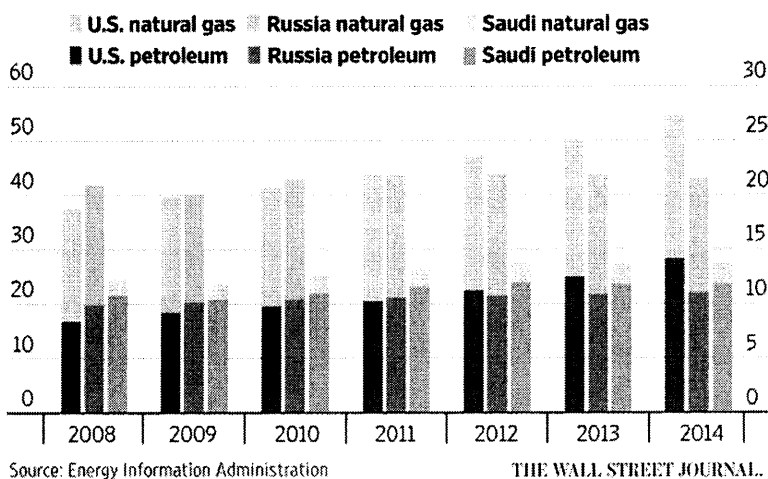
A couple of years ago, "people were racing around to secure acreage," says John Harju, associate director

of the Energy and Environmental Research Center at the University of North Dakota. That's because the oil boom set off a land-leasing boom, and companies needed to drill and start producing oil or lose leases they spent hundreds of millions to acquire.

Today, companies "are going about this in a much more methodical way," he says. He compares it to the difference between modern farming that cultivates thousands of acres with GPS-controlled John Deere machines and homesteading of a century ago.

Fueled Up

The U.S. has been the world's largest producer of oil and natural gas for the past three years. Figures are quadrillion British thermal units (left scale) and million barrels a day of oil equivalent (right scale).



While Liberty Resources has taken the concept furthest, others are also attempting to make their operations more factory-like. Continental Resources Inc., a large Oklahoma City-based oil and gas producer, has used centralized facilities for the past few years, though on a smaller scale. The company said in an email that it “will continue using it to boost operational efficiencies

and reduce environmental impact.”

Joseph Kiesecker, the lead scientist for the Nature Conservancy, a New York-based environmental group, applauds the trend toward centralized infrastructure. “It makes both practical sense for the industry because it reduces their cost and it makes good environmental sense because it reduces the footprint for development,” he says. “Nobody is saying we shouldn’t develop these resources. We all turn the lights on. It is about just being smarter.”

There is another way that Stomping Horse is cutting-edge. Liberty intends to drill and frack all the wells for each 1,280-acre rectangle consecutively. The idea is to leave no square foot untouched by fractures, thus avoiding pressure imbalances that can make wells less productive.

Liberty’s Mr. Wright says this approach is producing considerably better-than-average wells. The downside is that the company needs to drill and frack 10 wells before it produces oil.

“It’s a lot of capital out before anything comes back,” he says. “But I think this is what people will do eventually.”

Either way, he says, the industry will get better at producing more oil, more cheaply. “In the fall, everyone believed that once we got below \$80 or \$70 that all of America’s tight oil would shut down,” he says. “It may shut down a lot of players, but there are tons of players that are very good at what they do and have much lower costs of production.”

Mr. Gold is a reporter for The Wall Street Journal in Texas. Email: russell.gold@wsj.com.

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