THE AMERICAN OIL & GAS REPORTER

FEBRUARY 2011

The "Better Business" Publication Serving the Exploration / Drilling / Production Industry

Oil Boom Creates Infrastructure Needs

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WILLISTON, N.D.–Before 2007, traffic jams were almost a foreign concept in a state in which the largest city has fewer than 100,000 inhabitants. But then North Dakota has never seen anything like the Bakken Shale play.

North Dakota is the 19th largest state in the union in terms of land area, but it has the fourth smallest population spread across its 69,000 square miles. So for the locals in rural farming communities throughout northwestern North Dakota, seeing a constant stream of vehicles traveling what until a few years ago were lonesome county roadways is something of a novelty.

A soaring rig count and exponential crude oil production growth has North Dakota poised to reap the dividends of an unprecedented oil boom. Economic times are unquestionably good with bountiful tax revenues, an influx of new people and businesses, and the creation of high-paying jobs. Along with all the hustle and bustle, however, come some near-term headaches. Within the industry, services and supplies have never been tighter. In the small towns that dot the Williston Basin prairie, there are increased traffic, long lines at restaurants and coffee shops, and picked-over shelves at retail stores. Housing is also at a premium, with officials estimating the need to build new homes for 23,000 new permanent residents in the northwestern part of the Peace Garden State.

That is not to suggest, however, that the Bakken Shale play is not a huge blessing for residents, businesses, and local and state economies alike, insists Tom Rolfstad, executive director of Williston Economic Development in Williston, N.D., located in the heart of the activity. "This is a once-in-a-lifetime opportunity," he says. "I am sure we are going to break all kinds of records next year, and may break them again the following year. It is hard to say where it will stop. It is amazing."

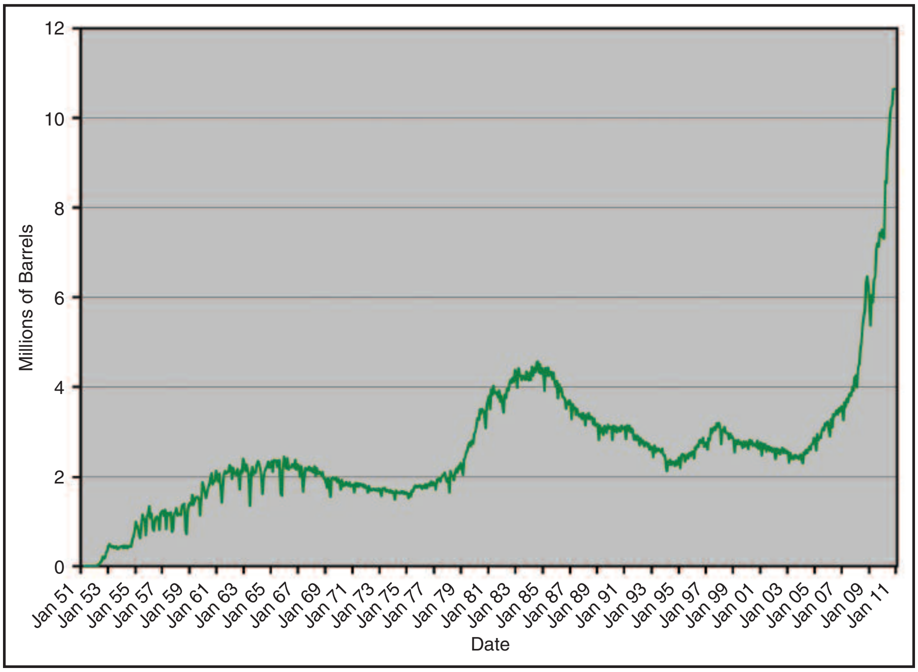
A record 166 rigs were drilling into the Bakken and Sanish/Three Forks formations in northwestern North Dakota in mid-December, according to the state's Department of Mineral Resources. Thanks to the giant unconventional resource play, the oil production trend line is charting almost straight up (Figure 1), putting North Dakota on track to soon eclipse Alaska in total statewide production. Not surprisingly, the activity has the industry–especially service companies and crude oil transporters–as well as municipalities scrambling to solve infrastructure constraints to accommodate the historic surge in economic development that is flowing from all the Bakken exploration and drilling activity.

"It is a challenge for everyone involved to keep up," Rolfstad observes. "It is a challenge for the industry, it is a challenge for us as communities, and it is a challenge for the state. Hopefully, there is a lot we can learn here that will make it easier for the next place that experiences this."

North Dakota oil production now exceeds

FIGURE 1

North Dakota Historical Monthly Oil Production (1951-2011)



Source: **North Dakota Department of Mineral Resources**

TABLE 1

North Dakota Oil Production Growth

Month	Oil bbl/month	Oil bbl/d	Wells producing	Oil bbl/d per well
Nov 2000	2,628,503	87,617	3,110	28
Nov 2001	2,562,143	85,405	3,228	26
Nov 2002	2,534,865	84,496	3,215	26
Nov 2003	2,399,051	79,968	3,143	25
Nov 2004	2,735,349	91,178	3,189	29
Nov 2005	3,154,763	105,159	3,253	32
Nov 2006	3,461,101	115,370	3,415	34
Nov 2007	3,923,037	130,768	3,623	36
Nov 2008	6,469,117	215,637	4,067	53
Nov 2009	7,37,4604	245,820	4,407	56
Nov 2010	10,651,146	355,038	5,091	70

Source: North Dakota Department of Mineral Resources

355,000 barrels a day (Table 1) and 400,000 bbl/d basinwide, and Williston Basin production could eclipse 800,000 bbl/d by 2015-17, according to projections from the North Dakota Pipeline Authority. If the most optimistic industry assumptions prove correct, Williston oil output could soar to as much as 1.2 million bbl/d within the next decade. Tight take-away capacity is giving railroads, terminal and hub operators the opportunity to offer operators flexible marketing and attractive net backs for the region's light sweet crude, and pipelines are undertaking major multimillion dollar expansions.

Spectacular Impact

For their part, municipalities are investing in significant residential and utility expansion projects to meet the demand. Williston already accommodates some 250 service companies, including Halliburton's largest operation in North America. Household income has surged from $29,688 in 2000 to $55,000 in 2010, according to the latest figures from the U.S. Census Bureau. "The economic impact over the past three years on the city of Williston has been nothing short of spectacular," Rolfstad says.

Williston's population has swelled by 40 percent, from 12,500 in 2000 to 17,500 in the 2010 Census count. But the Census estimates that more than 23,000 people have moved into the region over the past decade and only counts those who consider Williston home, Rolfstad points out. More than 6,000 residents are classified as temporary oil field workers, according to state estimates. "We are pretty confident that Williston's population is going to reach 25,000 over the next five years," Rolfstad states. "If anything, that estimate could prove to be very conservative."

Traffic on the city's streets has suddenly become a way of life and store shelves are often bare, he notes. "The local Williston Wal-Mart had the highest increase in year-to-year sales of any Wal-Mart store in the country. If you go there, you will find shelves empty because they cannot find enough workers to stock the shelves," Rolfstad says. "Everyone is working high-paying jobs in the oil field."

Housing demand also continues to outpace supply. Last year, 1,200 homes were built in Williston, but Rolfstad estimates that at least 2,000 were needed. Contrast those numbers to 2004-08, when he says the city averaged only about 10 housing starts annually (a time when many parts of the nation were experiencing a residential building boom).

Studies by the North Dakota Housing Finance Agency for an eight-county region in the basin estimate 9,000 new single- or multiple-family homes will be needed. That projection covers 20 years based on demand created from 21,000 total wells in the region, but Rolfstad notes that the estimated number of wells drilled over the next two decades ranges as high as 40,000.

"Most of the residential housing development will need to take place over the next five to eight years. There are no vacant lots in town now, and we are to the point where we have to build major water and sewer extensions in order to bring in new land to the community and be able to subdivide," he continues. "And we need to increase capacity for our sewer treatment plant, water treatment plant, and city schools."

Estimates have yet to be done on the potential cost of overall infrastructure needs regionwide, but Rolfstad points to a new study that reveals a need for $70 million to increase capacity for Williston's schools alone–a funding task that could be made easier by North Dakota's budget surplus, thanks to increased revenues from Bakken Shale oil development.

Water and sewer system work already is well under way, Rolfstad reports. A newly formed $150 million regional water system will treat water principally from the Missouri River and deliver it to Williston and other communities, he notes. Depots under construction also will make more freshwater available for service crews.

Area governments also are looking for the state's help in maintaining and improving roads subject to the traffic of what the Williston Economic Development estimates are 1,000 truck trips in and 1,000 out of each location during drilling and fracture stimulation operations. Although drilling could subside somewhat after operators meet initial requirements to hold leases, Rolfstad says activity is expected to maintain a healthy pace with plenty of development drilling in the years ahead. And no let up is yet in sight; a quick look

TABLE 2

North Dakota 2010 Monthly Statistical Update

Month	Monthly Oil Prod.	Wells Producing	Average Daily Prod.	Average Permits	Rig Spuds	Count
Jan	7,321,468	4,638	236,176	100	82	83
Feb	7,314,243	4,668	261,223	91	94	94
Mar	8,601,079	4,754	277,454	115	110	103
Apr	8,534,767	4,824	284,492	104	124	107
May	9,246,771	4,909	298,283	99	114	115
Jun	9,440,875	4,985	314,696	127	136	125
Jul	9,956,052	5,062	321,163	142	153	135
Aug	10,195,378	5,152	328,883	131	155	140
Sep	10,241,555	5,199	341,385	165	145	143
2008 AVG	5,231,343	3,755	171,989	79	60	75
2009 AVG	6,644,705	4,421	218,456	52	52	53

Source: North Dakota Department of Mineral Resources at statistics from the North Dakota Department of Mineral Resources' Oil & Gas Division shows that activity only gained more steam through the first nine months of 2010 (Table 2).

Labor And Housing

In the meantime, all segments of the local economy will continue to compete for the scarcest commodity of all: labor. "The challenge is there even with construction crews brought in to build houses," Rolfstad says. "You have to house them while they do the work. That is where temporary 'man camp' housing comes in."

Limited permanent housing (including a shortage of rental apartments) and hotel space has created an acute need for temporary housing, says Brian Lash, chief executive officer of Boston-based Target Logistics, whose company is investing $50 million to build six man camps with a total of 1,700 bedrooms by the end of the summer.

"Infrastructure is not just about pipe and rigs, but also about human beings," Lash relates. "How do you house, feed and transport all these people?"

In Williston, the company's Muddy River Lodge, a three-story, extreme weather complex constructed from rail containers, houses 300 Halliburton employees. Before moving the facility to North Dakota, the complex was used for security and operations personnel at the 2010 Winter Olympics in Vancouver and was originally built to house employees for a mining company in Canada's frigid Northwest Territories, Lash details.

Worker access is by magnetic card. Each bedroom has a flat screen television, DVD player, and wardrobes. Bathrooms are down the hall. Common areas include a large kitchen run by a French chef and a dining room, gym, game room and Internet access area. Nightly buffets offer three menu choices, a dessert bar and a salad bar every night, as well as a sundae bar with ice cream and toppings. On Saturday nights, the facility has smoked meats such as ribs, pork butt and brisket, and Monday is steak night, with steaks prepared over an open fire, Lash says.

"In addition to great and unlimited food at our camps, we furnish the men and women with great bedding, including excellent mattresses, soft sheets, extra pillows, thick comforters and oversize towels. After all, a high-quality man camp has to have great food and great bedding," Lash adds.

The company's Williston Lodge, an open camp used by several companies, has 251 bedrooms. "We are sold out at the camp, but we are adding 600 rooms this spring to meet demand," reports Lash.

Target Logistics also is adding 69 two-bedroom cabins with full kitchens and baths. Cabins often are used by companies that do not offer meal plans because employees are constantly on the go, he says.

The Tioga Lodge about 30 miles away is a 250-bedroom facility initially built for Hess Corp. and subcontractors constructing a gas plant. Target Logistics also operates a lodge in Stanley, N.D., and is building facilities in both Minot and Dickinson.

By contracting housing, operators and service companies forgo millions in investments, Lash points out. "We finance it and companies sign lease contracts on a per diem rate," he says. "Chief financial officers with oil and gas companies and service companies do not want to tie up $15 million in nonperforming assets. Their stakeholders want to see them own more oil wells or frac trucks and drilling rigs. These housing units get a lot of wear and tear, and they are not the kind of core investment they want to be involved in."

In addition to financing the buildings and operating the camps, Lash adds that Target Logistics offers transportation services to shuttle workers to and from well sites.

With a scarcity of housing and hotel space, one solution is temporary units designed to provide comfortable accommodations for oil field workers. Shown here is the Muddy River Lodge, a three-story, extreme weather complex constructed from rail containers that houses 300 Halliburton employees.

Railroad Services

Increased transportation capacity has reduced Bakken crude oil's discount to the West Texas Intermediate benchmark price, but exponential gains in oil production continue to outpace anticipated growth in pipeline take-away capacity, giving railroads the opportunity to step up for operators looking for market flexibility, says Trevin Hogg, Union Pacific's business manager of petroleum marketing.

According to the North Dakota Pipeline Authority, pipeline capacity is not expected to keep pace with production until early 2013, leaving incremental volumes to find alternative transportation methods, primarily rail, which was capable of hauling 115,000 bbl/d day last year. Railroads are projected to accommodate 222,000 bbl/d by 2013, according to the NDPA.

While Union Pacific does not directly access North Dakota, the nation's largest railroad offers operators access to alternative markets by linking with Burlington Northern Santa Fe Railway, Canadian Pacific and short lines directly serving the region, Hogg notes.

"From a railroad perspective, we can provide producers with a 'pipeline on wheels' or a more flexible pipeline in the form of an 80-100 car unit train to competitive destination markets that will allow the customer a better net back to the wellhead. Often, we can make the arrangement happen in as little as three months," he offers.

For operators, crude not committed to pipelines can be shipped to new markets previously unavailable, Hogg says. "Typically, producers will ask what markets are available," he observes. "We ask them where they want to go. We can ship to St. James, La., elsewhere on the Gulf Coast, or even to California if that is where they want their product to go. We are not oil guys, but we are trying to find ways to offer alternatives to oil and gas companies so they do not feel key-holed into one market.

"We not only see that in North Dakota, but also in Union Pacific's turf in the Niobrara Shale in Wyoming as well as the Eagle Ford Shale in South Texas," Hogg goes on.

Recent crude oil rail shipments from North Dakota to St. James have averaged about five days. "We understand producers' priorities, which include the urgency to get product to the various marketplaces, so we try to make sure we are providing fast and efficient service to competitive destination markets of their choosing," Hogg says. "Often times we will provide them a list of rail served refineries and/or injection terminals and ask that they contact the refineries or injection terminals, and we will in turn build a transportation plan to meet their needs."

Destination Terminal

U.S. Development Group LLC, a transportation logistics company, opened a new crude oil destination terminal in October in St. James served by Union Pacific, according to Bill Swan, director of business development.

With 65,000 bbl/d in initial capacity, the St. James Rail Terminal is the first in a planned nationwide network of rail terminals to handle crude oil, Swan says. The terminal is connected by pipeline to an adjacent crude/condensate storage terminal operated by Plains All American Pipeline LP.

From 2004-08, Williston, N.D., averaged only about 10 housing starts annually. But with the Bakken booming and the city's population swelling, housing demand continues to outpace supply. Last year, 1,200 new homes were built in Williston, but at least 2,000 were needed, according to estimates by city planners. Shown here is the Granite Peaks residential development.

"It is designed to simultaneously give producers access to a key trading hub and refiners access to a steady supply of high-quality crude," Swan explains "We offer producers and marketers access to premium markets that pay more for crude oil."

Operators are getting into the game, as well. EOG Resources' 65,000 bbl/d rail loading facility began service to Cushing, Ok., a year ago, and Hess has announced plans for a new $48 million, 60,000 bbl/d rail facility in Tioga that is expected to be operational in early 2012, according to a summary of transportation projects from the North Dakota Pipeline Authority.

In August 2010, Dakota Transport Solutions began shipping crude oil from New Town to St. James. The facility has the capacity to transport 20,000 bbl/d, according to the NDPA. Since 2008, smaller rail facilities in North Dakota have continued to operate with an estimated combined capacity of 30,000 bbl/d, and include locations in Minot, Dore, Donnybrook and Stampede.

With North Dakota oil production outpacing pipeline take-away capacity additions, railroad shipment is giving operators the flexibility to access their destination markets of choice using rolling 'pipelines on wheels.'

Crude Oil Hub

Sugarland, Tx.-based Rangeland Energy LLC plans to provide producers with an open-access crude oil marketing hub in North Dakota, says Chief Executive Officer Christopher Keene. The company's planned COLT Hub in Williams County and the COLT Connector line are expected to be in service by December 2011, he says.

"We felt that an open-access marketing hub did not really exist in North Dakota to the extent that it does in other crude oil-producing areas," Keene explains. "Crude oil supplies eventually revolve around terminals that are hubs and provide industry players with options, which is key."

The COLT Hub will collect oil from Williams and neighboring counties through trucks and gathering systems, provide handling and on-site tank storage, and provide access to multiple downstream markets through the COLT Connector and railcar loading facilities, Keene details. Served by BNSF Railway, the COLT Hub will load both unit-train and manifest shipments of crude oil to markets throughout North America, including oil receiving terminals along the Gulf Coast.

More than 90 percent of Bakken crude is trucked from leases, giving Rangeland and others opportunities to capitalize on demand for gathering systems to terminals, Keene goes on. "We will build this hub, aggregate supply, provide market access, and expand our footprint upstream by building gathering lines and expanding pipeline and rail access on the downstream side to grow the hub," he delineates, pointing out that initial capacity is 100,000 bb/d, including 40,000 bbl/d by pipeline and 60,000 bbl/d shipped by rail.

EnCap Investments is providing initial development funding, and Keene says that the overall price tag for all gathering systems, the COLT Hub and the COLT Connector could eventually exceed $100 million.

In late January, Savage Companies announced plans to construct a 270-acre multiuser rail terminal in Trenton, N.D. The Trenton Railport will be served by BNSF Railway and is designed to bring large-scale rail service for shipping tubulars, frac sand and other supplies into the Bakken, as well as shipping crude oil out of the play, the company reports.

Pipeline capacity is among the critical long-term needs in the Williston Basin with rapidly growing oil production. Several significant pipeline construction and expansion projects are under way, and the North Dakota Pipeline Authority expects the state's total pipeline take-away capacity to more than double by 2013 to 738,000 bbl/d.

Pipeline Expansions

Perry Schuldhaus, vice president of business development at Calgary-based Enbridge Pipelines Inc., says pipeline take-away capacity is a critical long-term need in the Williston Basin. At the end of 2010, the NDPA estimates that North Dakota pipeline capacity stood at 337,500 bbl/d, but with significant new projects on the drawing board, it expects capacity to reach 738,000 bbl/d by 2013.

"It takes time to build pipeline infrastructure," Schuldhaus says. "As we see it right now, production is outpacing take-away capacity, so railroads provide an opportunity to serve the market needs for near-term capacity while pipelines are being brought on stream to service long-term crude oil transportation requirements."

Enbridge and its related entities plan to increase pipeline capacity from North Dakota by 145,000 bbl/d over the next three years, Schuldhaus reports. The project (with an estimated cost of $370 million in the United States and an additional $190 million for portions of the project in Canada) includes reactivating and reversing its Portal Link Pipeline to carry 25,000 bbl/d from North Dakota to Saskatchewan for transportation to the company's main line in Cromer, Manitoba, where he says the oil can access refineries in Canada as well as the U.S. Midwest and Gulf Coast.

"The project, which also will carry crude from Montana and Saskatchewan, is designed so capacity ultimately can be expanded to 325,000 bbl/d," Schuldhaus offers.

True Companies Pipeline has announced its Baker 30 project to increase take-away at its Baker, Mt., hub from 118,000 to 300,000 bbl/d by 2013 through incremental expansions. Quintana Capital Group Pipeline also plans to connect major producing regions of the Williston Basin with TransCanada's Keystone XL Pipeline in eastern Montana as part of a $250 million project with initial capacity of 100,000 bbl/d.

Schuldhaus stresses that one of the challenges for pipelines is to add enough capacity to meet anticipated future production without overbuilding, which he says could result in higher tolls being charged on main lines. "Production is coming on more quickly than expected and the forecast continues to get more bullish all the time," he says. "With production ramping so fast, it is hard for pipeline capacity to keep pace. Because pipeline construction takes time and has complicated regulatory and permitting processes, adding capacity in a timely manner is a challenge."

Developments also are proceeding to expand gas processing capacity in North Dakota to handle increased natural gas and gas liquids production associated with crude oil development in the Bakken Shale. For example, in September, the North Dakota Public Service Commission approved Amerada Hess Corp.'s $500 million expansion of a gas processing plant in the northwestern part of the state. Originally built in the 1950s, the plant's capacity is being increased from 120 million to 250 million cubic feet a day.

In October, ONEOK Partners LP announced plans to invest $300 million-$355 million by the end of 2012 in the Bakken Shale play, including constructing the new 100 MMcf/d Stateline I gas processing plant and related NGL infrastructure in western Williams County, N.D. Another processing plant, Stateline II, is being evaluated and could add another 100 MMcf/d of capacity if additional gas volumes become available for processing, according to ONEOK Partners.

Project Financing

As far as financing is concerned, the outlook is going to get better for operators, service companies, midstream operators, developers and others looking to supply the Williston Basin, suggests Todd Holleman, a partner in Charlotte, N.C., at the King & Spalding law firm, which pairs equity investors with companies.

Absent an overall figure for total financial needs in all areas throughout the region, the cycle of providing financing for projects is still in the early stages, he says. "You will see the use of private equity, pure venture equity, and nontraditional financing sources such as financing from companies that already are active participants in this arena," Holleman assures. "As those start to get replaced with debt structures such as first-lien, second-lien and mezzanine debt, we will start seeing traditional finance companies come in, and then possibly high-yield and private placements as well."

Other than pure equity, capital needs currently are being fulfilled through debt financing backed by companies' non-Bakken assets and through mezzanine financing with requirements for higher returns, but that resemble equity on the balance sheet, he says. "Mezzanine financing can be expensive, so it is a bit of a Catch-22 for developers," Holleman says. "Certainly I have heard a lot of interest from lenders in getting involved in the Bakken on the pure exploration, drilling and production side, but until there are proven reserves by a developer, it is hard to place that debt in the marketplace."

Management track records and proven reserves in the ground are key to lenders determining their risk tolerance for operators, he notes. "Service companies have the same demands that producers have," he relates. "In conversations with bankers over the past six to 12 months, they required straight-down-the-fairway collateral packages in order to get things done. Prior to that, we saw structures like first-lien and second-lien credit facilities."

But robust oil prices and accelerating activity are influencing institutional lenders to become more willing to finance more first- and second-lien debt for service companies, Holleman adds. "Financing is absolutely necessary to build the infrastructure to take advantage of what we all know is there," he comments. "But a lot of lenders are not going to want to finance the infrastructure until the proven reserves or other assets can be used to back a loan. I see equity, first- and second-lien structures and mezzanine debt as the ways to bridge the gap until we can get more traditional straight senior financing." ❐