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Dakota – Bakken Crude Gathering Systems in Tough Times

Oil Production Sliding As New Networks Come Online



- The COVID-related collapse in crude oil demand and prices is leading producers in the Bakken and other U.S. shale plays to cut their planned 2020 capital spending, slash their rig counts and shut in production.
- The Bakken had been on a roll the past three-plus years, with production increasing by more than 50% from its late-2016 low.
- Production gains spurred the development of new crude gathering systems in the Bakken, as well as the expansion of existing systems, all with the primary aim of reducing the cost of delivering oil from the lease to takeaway pipelines and crude-by-rail terminals.
- Most of the new crude gathering capacity was built in four western North Dakota counties that have been the epicenter of drilling activity.
- Still to be determined is the degree to which flows through these systems will decline during the current downturn.

1. Introduction

The collapse of both crude oil demand and prices sent shock waves through the oil patch, the likes of which U.S. producers have only seen two or three times in the 21st century. COVID-related stay-at-home directives in most states — and much of the industrialized world — resulted in sharply lower consumption of motor gasoline and jet fuel, and the sudden end of the OPEC+ supply-management alliance in early March spurred a short-lived price war, including threats by both Saudi Arabia and Russia to increase their crude oil production precisely when refinery demand for crude was cratering. Cooler heads prevailed, and by mid-April a new, nearly global agreement to reduce production was reached. But the cuts were too little, too late, amounting as they do to less than half — and maybe only one-third — of the devastatingly large demand destruction at refineries.

With the spot and futures prices of WTI at Cushing still at low levels and crude storage capacity becoming scarcer by the day, crude-focused producers in the U.S. are slashing their 2020 capital spending plans and rig counts and deciding which of their wells would be the most logical to shut in first, all in an effort to reduce their crude output as quickly as possible. As was the case when

oil prices crashed in 2014-15, the magnitude of the cuts this time around will vary widely by shale basin. Which brings us to the Bakken.

It seems like eons ago, but the Bakken shale play in western North Dakota was one of the first to demonstrate the promise and potential of horizontal drilling and hydraulic fracturing in the production of crude oil. As shown in Figure 1, between the beginning of 2010 and the end of 2014, Bakken crude production rocketed from ~250 Mb/d to ~1.26 MMb/d, a gain of 400%, according to the Energy Information Administration (EIA). But the mid-decade collapse in oil prices hit the Bakken hard. By December 2016, crude production there had bottomed out at less than 960 Mb/d (blue area), and the number of active rigs in the play had plummeted to 32, from 182 rigs two years earlier (orange line).

Things soon turned around, though. Crude oil prices rebounded, producers significantly reduced their drilling-and-completion costs and increased their wells' productivity, and — especially important for the Bakken, which remained chronically short of pipeline takeaway capacity through its initial 2010-14 growth spurt — the Dakota Access Pipeline (DAPL) to Patoka, IL, came online in June 2017. DAPL, which started out with a capacity of 470 Mb/d and has since been expanded to 570 Mb/d, freed many Bakken producers and shippers from their reliance on crude-by-rail and slashed the cost of delivering the play's light crude to market.

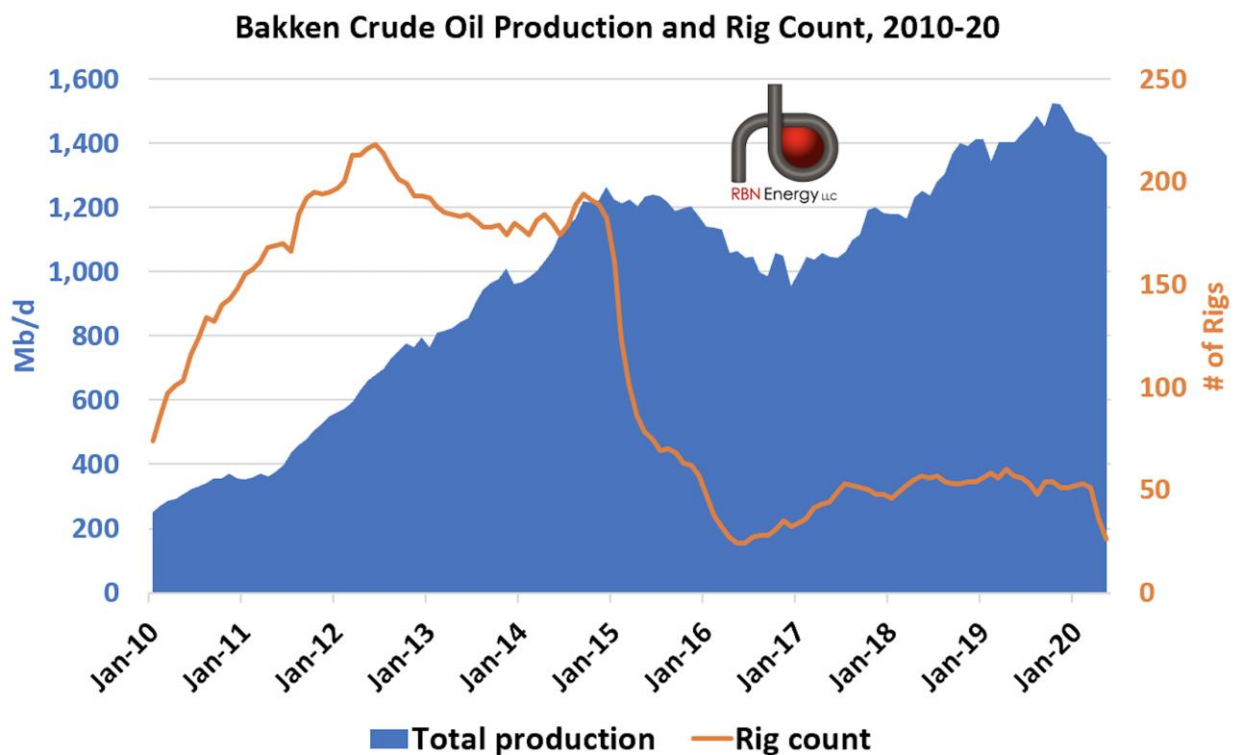


Figure 1 – Bakken Crude Oil Production and Rig Count, 2010-20. Sources: Energy Information Administration and Baker Hughes

Bakken crude production rose steadily through the 2017-19 period, exceeding its previous December 2014 peak of ~1.26 MMb/d in July 2018, then topping 1.4 MMb/d in October of that year and 1.5 MMb/d in October 2019. There have been challenges to that growth, however. For one, the run-up in crude output filled DAPL and the other, smaller oil pipelines out of the Bakken to near-capacity, spurring plans to expand capacity on existing pipelines and build new ones, including Phillips 66 Partners and Bridger Pipeline's now-deferred Liberty Pipeline from the

Bakken to Cushing, OK. Also, associated gas production from the play's gassy wells put a squeeze on the Bakken's gas processing capacity — midstreamers had to scramble to add new processing capacity to help hold down the need for flaring, and ONEOK built the new Elk Creek NGL pipeline from the Bakken to their fractionators at the hub in Conway, KS, to deal with the mixed NGLs the processing plants produce.

But the frenzied build-out of new pipelines and other infrastructure to accommodate production growth in the Bakken appears to be over, at least for now. In fact, there already are clear signs that production in western North Dakota is on its way down and that the pace of cuts may accelerate through the rest of this spring. Between late February and May 1, the rig count in the region fell by half, from 53 to 26, according to Baker Hughes. And in a mid-April presentation, the North Dakota Oil & Gas Commission (O&GC) said oilfield services companies have indicated that they see the rig count dropping to the high teens by June. Similarly, the number of frac crews in the Bakken is expected to drop from nine or 10 in mid-April to five or six by June. The O&GC also said there were more than 16,000 active wells in North Dakota at the start of March, but 4,600 wells were “shut in” in March and the first two weeks of April, a number the commission said equates to about 260 Mb/d of production. That suggests that Bakken production, which stood at just under 1.4 MMb/d in March, had declined to less than 1.2 MMb/d by early May and may be headed even lower.

According to published reports, Continental Resources and Oasis Petroleum are among the Bakken producers that started shutting in wells there in the past several weeks. Hess Corp., another Bakken producer, in mid-March announced an \$800 million cut in 2020 capital spending to be achieved primarily by shifting from a six-rig program in the Bakken to a one-rig plan. Hess said that it expected to complete the shift by the end of May.

The sharp decline in Bakken crude production in the spring of 2020 comes on the heels of what has been a significant build-out of crude gathering systems. Crude gathering pipelines play a critically important — but often overlooked — role in the midstream sector. Generally speaking, these systems consist of multiple small-diameter pipes that reliably and cost-effectively transport crude from production wells to larger-bore trunk or shuttle lines that transport oil to regional crude hubs and takeaway pipelines. In the Bakken, it is not uncommon for gathering systems to also connect to one or more of the region's many crude-by-rail loading terminals, some of which are owned by the same companies that installed the gathering pipes. Until gathering systems are in place, the delivery of crude oil from the lease to takeaway pipelines or rail terminals is typically handled by tanker trucks, a slower and more costly transportation process — and a particularly challenging one during western North Dakota's long, snowy winters.

The new crude gathering systems that have come online in the past two or three years are concentrated in a relatively small area, in this case four western North Dakota counties — McKenzie, Dunn, Williams and Mountrail — that together account for nearly 90% of the play's total crude production. The systems were developed by producers, midstream affiliates of producers and independent midstreamers in anticipation of continued growth in Bakken crude production in 2020 and beyond — growth that now seems highly unlikely to occur in the near- to mid-term. The question now is, what will that mean for the volumes flowing through the crude gathering pipes?

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The Table of Contents for “Dakota – Bakken Crude Gathering Systems in Tough Times” is included below.

Table of Contents

1. Introduction	- 1 -
2. Crude Gathering Systems in the Bakken.....	- 5 -
2.1 Hess Midstream.....	- 5 -
2.2 Enable Midstream Partners.....	- 7 -
2.3 Crestwood Equity Partners	- 8 -
2.4 Oasis Midstream Partners.....	- 10 -
2.5 Paradigm Midstream.....	- 11 -
3. Conclusions.....	- 13 -