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40 Miles from Denver – Crude Gathering in the D-J Basin

Production Gains Lead to New and Expanded Systems



- Favorable production economics continue to drive crude oil-focused production growth in the Denver-Julesburg Basin, where crude output has increased by 45% in the past two years to about 620 Mb/d.
- Production gains have spurred the development of new crude gathering systems in the D-J, 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.
- Most of the new crude gathering capacity is being built in Weld County, CO, which has been the epicenter of drilling activity, though new lines also are being added in a number of neighboring counties.
- Crude quality — in this case the ability to segregate lower-API, higher-value oil — is a key aim for producers and midstreamers as they build out their D-J crude gathering systems.

1. Introduction

Crude oil production in the Denver-Julesburg Basin in northeastern Colorado and southeastern Wyoming has nearly doubled over the past four years and increased by 45% over the past two years, making the D-J Basin the second-fastest-growing major production area in the U.S. — only the Permian Basin has been growing faster.

The D-J Basin is the more prolific of the two main production areas in the Rockies' Niobrara Shale, the other being the Powder River Basin in northeastern Wyoming. The “sweet spots” in the D-J offer just about everything that producers want, including an unusually intense concentration of hydrocarbons within four geologic layers, or “benches,” only a few thousand feet below the surface, as well as low per-well drilling costs and direct pipeline access to the crude hub in Cushing, OK.

Crude oil is the focus of drilling-and-completion work in the basin, though the D-J's wells also produce large volumes of associated gas — a rich mix of natural gas and natural gas liquids — that only augment the wells' crude-related revenue. Most of the oil produced in the D-J comes from the Niobrara B, Niobrara C and Codell benches, with smaller volumes coming from the Niobrara A layer. In Weld County, CO, the epicenter of drilling activity in the D-J, these benches

lie only 5,000 to 8,000 feet below the surface, which helps keep drilling costs relatively low: less than \$5 million per well, on average. In contrast, per-well costs in the Bakken average around \$7 million, and in the Permian they average close to \$8 million.

Production growth in the D-J to its current level of about 620 Mb/d (stacked blue and yellow areas in Figure 1) has spurred a rapid build-out of crude oil gathering systems and other infrastructure, especially in Weld County, which is located a short drive northeast of Denver. 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 lines downstream. These trunk lines then run to regional crude hubs and interconnections with takeaway pipelines that move even larger volumes of oil to major hubs — Cushing, in the D-J’s case. Until gathering systems are in place, the delivery of crude oil from the lease to takeaway pipelines is typically handled by tanker trucks, a slower and more costly process.

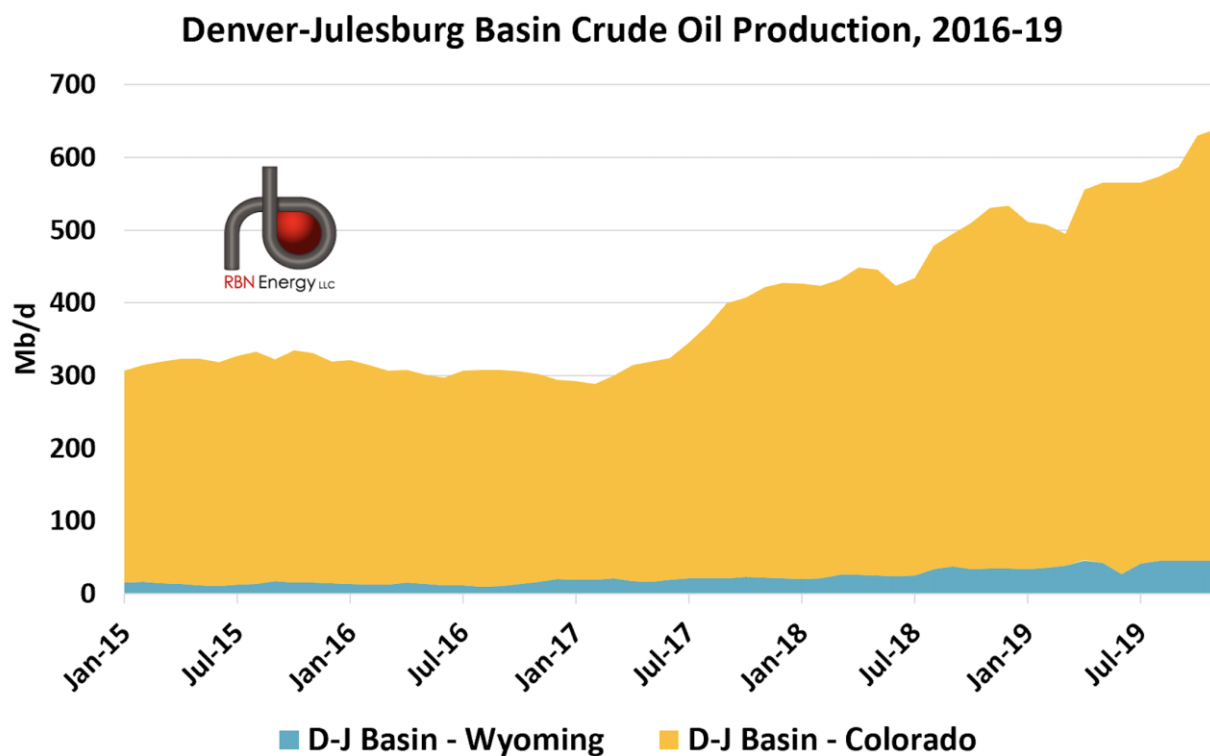


Figure 1 – D-J Basin Crude Oil Production, 2016-19; Source: IHS Markit

Fortunately for D-J producers, midstream companies in the middle years of the 2010s went on a takeaway-pipeline building spree that resulted in an excess of crude oil capacity to Cushing. Thanks to all that work, the region has experienced few, if any, oil pipeline constraints, something that made the D-J even more attractive to producers. However, with continued production growth and the 2019 conversion of one of the two crude-carrying pipes on the White Cliffs Pipeline to NGL service, the gap between needed and available takeaway capacity has narrowed, necessitating plans for more capacity to be added. Currently, the 340-Mb/d Grand Mesa/Saddlehorn Pipeline is in the midst of a planned 100-Mb/d expansion to be completed late this year, and new 400-Mb/d Liberty Pipeline from the Bakken to Cushing via the D-J is scheduled to come online in the first half of 2021. Also, to facilitate the delivery of crude oil from newer D-J production areas in, Tallgrass Energy has been lengthening its Northeast Colorado Lateral —

itself an extension of the company's 420-Mb/d Pony Express Pipeline — farther into Weld County, and is planning yet another extension into neighboring Laramie County, WY.

Taken as a whole, the new crude gathering capacity being added and the new takeaway pipeline capacity being built should be sufficient to support continued growth in D-J Basin oil production, assuming that crude prices remain high enough to justify continued drilling-and-completion activity.

Also, it is important to note that a number of the new gathering systems in the D-J are being designed to enable producers and marketers to benefit from the higher values associated with lower-API crude oil such as “Niobrara spec,” which has an API gravity of less than 42 degrees and which sells at a premium to higher-API “D-J Common.” Lower-API crude is desired by a number of refineries in Kansas and Oklahoma, as well as by other end-users further downstream. Several gathering systems allow for the segregation of lower- and higher-API barrels through pipeline “batching” and separate and distinct tankage at crude hubs within the D-J.

In this Drill Down Report, we discuss a large sampling of existing and planned crude gathering systems in the D-J Basin, including, where possible, each system's mileage, throughput capacity, related storage facilities and connections to takeaway pipelines, as well as the acreage that producers have committed to the system. We also examine the increasing significance of crude quality in the development and design of gathering systems.

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