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With a Permian Well, They Cried More, More, More

Capacity Constraints Loom Large for Permian Crude Oil, Natural Gas and NGLs

- **Over the past four years, pipeline takeaway projects have added 1.2 MMb/d of crude oil capacity out of the Permian, as well as 3.2 Bcf/d of natural gas takeaway capacity and 660 Mb/d of NGL capacity.**
- **Responding to attractive producer economics and robust drilling programs, Permian production for all three commodity groups is growing rapidly, renewing the possibility of takeaway constraints and wide negative differentials for local commodity prices.**
- **Several pipeline projects are being developed to relieve pending capacity constraints; the questions are whether they will be enough and if they will be completed in time.**
- **In the crude oil sector, projects could add 1.8 to 2.0 MMb/d; they include BridgeTex Expansion, Cactus Expansion, Permian Express II Expansion, Enterprise Midland-to-Sealy Pipeline, Basin Expansion, EPIC and South Texas Gateway -- likely more than enough to provide adequate takeaway capacity for the next five years.**
- **The quandary for individual producers is whether to make firm — and expensive — commitments to projects such as these, or leave that to other producers, then sit back and benefit from the constraint-clearing and de minimis price differentials that will come with the incremental takeaway capacity that other producers go out on a limb to commit to.**

1. Introduction

The Permian is back, bigger and badder than ever. Producer economics are the best in the U.S. Half of all rigs drilling for crude oil in the U.S. are in the Permian. It is the fastest growing basin from an output perspective and already contributes 2.2 MMb/d to the nation's oil production, or about 25% of Lower 48 crude volumes. It is not just crude oil. Natural gas production in the Permian is up 35% over the past three years, with most of that production classified as *associated gas* that comes along with crude oil. It is a similar story for natural gas liquids — NGLs — with the Permian now churning out about 750 Mb/d of NGLs from gas processing, or more than 20% of the nation's total.

But there are potential problems looming on the Permian horizon. There is simply not enough midstream infrastructure to accommodate this astronomical growth. Even though almost 100 years of oil and gas production have supported the development of thousands of miles of crude, gas and NGL pipelines that crisscross the region, midstream developers are having a hard time keeping up with today's incredible rate of production increases.

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It's not for lack of trying. Over the past four years, pipeline takeaway projects have added 1.2 MMb/d of crude oil capacity out of the Permian, as well as 3.2 Bcf/d of natural gas takeaway capacity — much of it in the first four months of 2017 — and 660 Mb/d of NGL capacity. In fact, there is more than enough takeaway capacity for all three hydrocarbon product groups today. But not for long. Crude oil could run into pipeline capacity constraints early next year, depending on the pace of production growth. Fortunately, several new pipeline projects are coming online, including planned expansions of the BridgeTex and Cactus pipelines and a likely expansion of Permian Express II, plus Enterprise Products Partners' big new Midland-to-Sealy project. But if Permian crude production continues to ramp up toward 3.7 MMb/d in 2022, as predicted by RBN's Growth Scenario production forecast, crude takeaway capacity will be maxed out again by mid-2020 unless additional projects are developed. There are a number of other projects on the drawing boards, such as a possible expansion of the Plains Basin pipeline system and proposed greenfield projects like the EPIC Pipeline and the South Texas Gateway Pipeline, but final investment decisions are still pending and the timing of the projects remains uncertain.

Similar problems could hit the market even sooner for natural gas. Like crude, there is enough takeaway capacity today, but production is growing rapidly. Currently, Permian dry gas production is about 6.1 Bcf/d and there is almost 8.0 Bcf/d of pipeline takeaway capacity, including ONEOK Partners' Roadrunner Pipeline to Mexico that was expanded to 570 MMcf/d in October 2016. RBN's Growth Scenario forecast has Permian production hitting that 8.0 Bcf/d of capacity next year, which could be an issue unless two other new Energy Transfer Partners pipelines to Mexico that have just come online take up the slack: the 1.4-Bcf/d Trans-Pecos pipe from Waha to Presidio and the 1.1-Bcf/d Comanche Trail pipe from Waha to San Elizario (near El Paso). That should be more than enough capacity to take care of the Permian natural gas takeaway problem — *if* the capacity gets used. But that is far from a certainty. Almost all of the incremental capacity into Mexico is targeting new gas-fired power generation demand south of the border, much of which has been delayed or is highly uncertain, at least in the near to medium term. If all that new pipeline capacity to Mexico does not get used, it will not do the market much good. In other words, the effect of a demand constraint is no different from a transportation capacity constraint. The incremental Permian production growth would have to find another home. Fortunately, midstream companies have been stepping up to the plate to address that possibility. NAmerico Partners, for example, is planning the 1.85-Bcf/d Pecos Trail Pipeline from the Permian's Delaware and Midland basins to the Agua Dulce gas hub near Corpus Christi. Kinder Morgan is planning the ~1.7-Bcf/d Gulf Coast Express along a similar route, and Enterprise is eyeing another Permian-to-Corpus project. The remaining concern is that the capacity from these projects will not be online until 2019. So there is the distinct possibility that the market could experience a period of constrained takeaway capacity.

The natural gas liquids market is facing similar issues, although the timeframe for capacity constraints is likely further out. Over the next five years, RBN's Growth Scenario indicates that Permian NGL production will double, from 750 Mb/d to almost 1,500 Mb/d by 2012. At that growth rate, overall Permian pipeline capacity constraints would hit in late 2020 or early 2021. However, for any specific geographic part of the Permian (such as Reeves County in the epicenter of Delaware Basin production) the problem could come much sooner. In April 2017, Enterprise announced plans for the 571-mile, 24-inch-diameter Shin Oak Pipeline, which initially will move up to 250 Mb/d from the Permian to Enterprise's NGL storage and fractionation complex in Mont Belvieu, TX, when it comes online in the second quarter of 2019, and which later could be expanded to transport up to 600 Mb/d.

One consequence of unrelieved takeaway capacity constraints is the same, regardless of the hydrocarbon market: *downward pressure for local prices*. Producers without access to pipeline capacity are forced to discount their hydrocarbons to the point that holders of pipeline capacity

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will purchase their product locally and move it to markets outside the constrained area. But if the constraint is severe enough, the problem can be much worse, forcing transportation by more expensive means — rail and truck — to move crude and NGLs to market. Natural gas constraints can result in the ultimate penalty: the need to curtail drilling or even shut in production if there is no pipeline to move that gas to market, resulting in production cuts not only for the natural gas, but also for the crude and NGLs that are produced along with that gas. That is a scenario that producers will invest a lot of their budget dollars to avoid.

How bad could Permian takeaway capacity constraints become over the next few years? Will projects that have been announced take care of the problems before they happen? What happens if crude oil prices increase to levels that stimulate even more drilling and consequently result in even faster production growth?

To fully answer these questions for each of the three energy commodity groups — crude oil, natural gas and NGLs — it is important to develop a comprehensive understanding of the infrastructure that is in place today, the current utilization rates of that infrastructure, the expected rate of production growth and the potential impact of proposed new takeaway capacity projects in the region. This RBN Drill Down Report is the first in a series of Permian assessments. We start with crude oil pipeline capacity and utilization. In it, we examine each of the nine pipelines currently providing crude oil pipeline takeaway out of the Permian: Basin, Centurion, West Texas Gulf, Amdel, Longhorn, BridgeTex, Cactus, Permian Express II and PELA. Our analysis includes a dossier on the owner, origin, destination, capacity, tariff rate and other details about each system; a map of each pipeline; our assessment of current pipeline capacity utilization; and our projection of future capacity utilization of each pipe.

With this analysis as a foundation, we then review potential capacity additions from seven expansion and greenfield projects: BridgeTex Expansion, Cactus Expansion, Permian Express II Expansion, Midland-to-Sealy, Basin Expansion, EPIC and South Texas Gateway. As with existing pipes, we provide details on each project and a map of the project's route.

Based on our analysis, there is the distinct possibility of a brief period of crude oil pipeline takeaway capacity constraints during the latter months of 2017 into early 2018. During this period, much depends on the ramp-up pace for the 450-Mb/d Midland-to-Sealy pipeline, which is expected to enter service in the fourth quarter of 2017, then increase throughput volumes through early 2018. If initial volumes come on strong, the market will most likely avoid a significant widening of the Cushing-Midland basis. However, if the pipeline is delayed or comes on slowly, widening of the basis can be expected.

Either way, new capacity will resolve these near-term constraints in relatively short order. However, over the longer term it is likely that significant capacity constraints will develop if several new pipeline projects are not built.

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