
You Send Me - Vaquero's Integrated Plan For Moving And Processing Rich Gas From The Permian

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The surge in crude oil, natural gas and natural gas liquids (NGL) production in the Permian is driving a massive buildout of midstream infrastructure designed to move the hydrocarbons to end-use markets. On the gas processing front, there are literally dozens of projects announced or in the planning phase that are scheduled to start up over the next two years. Some are small projects aimed at a few producers, while others are set to significantly expand processing capacity and affect large areas of the basin's gas gathering and transmission network. Today, we discuss Vaquero Midstream's ambitious Delaware Basin gathering and processing projects.

We last looked at Permian gas gathering and processing infrastructure in [Part 3](#) of our Waha Hub blog series, "It Was Good Living With You, (W)aha." In that blog, we reviewed the Agua Blanca pipeline and how it fits in with the development of more than 5 Bcf/d of natural gas processing capacity in the basin. Keeping up with the myriad of infrastructure changes taking place in Permian midstream is a challenge, so we never miss a chance to dive deeper into the key projects underway in the basin. Today, we look at another intra-basin pipeline built to aggregate large quantities of gas to Waha: Vaquero's Lariat pipeline and the associated Caymus processing facility.

Vaquero (from the Spanish for cowboy and horse training where building willing partners is paramount) is a private-equity funded midstream company formed to develop natural gas gathering and processing assets in the Permian. Its first project is located within the central and southern Delaware Basin, and it's a big one. The company's midstream assets span 100 miles in Texas's Reeves, Loving, Ward and Pecos counties and include all the essential pieces needed to gather and process a portion of the rich natural gas being produced in the Delaware Basin as a byproduct of oil-directed drilling. The Vaquero system is shown in Figure 1 and consists of the following infrastructure:

- Rich gas gathering pipelines and the 24- and 30-inch-diameter Lariat gathering pipeline (long brown line), capable of transporting 1.0 Bcf/d and expandable with future compression;
- Caymus I, a 200-MMcf/d cryogenic processing plant (green square) at Waha (northwestern Pecos County) that came online in 2016;
- Caymus II, a 200-MMcf/d cryogenic processing plant (green square) scheduled for completion in the first quarter of 2018;
- Enough acreage at Waha to expand processing capacity to over 1 Bcf/d;
- The 16-inch-diameter Riata natural gas residue pipeline (blue line to lower right) that connects Caymus to multiple gas pipelines at the Waha Hub; and
- The 12-inch-diameter Pistolero NGL pipeline (short orange line to lower right) from the Caymus facility that connects to Enterprise Products Partners' Chaparral Pipeline and Energy Transfer Partners' Lone Star NGL pipelines (Lone Star Express and Lone Star West Texas Gateway).

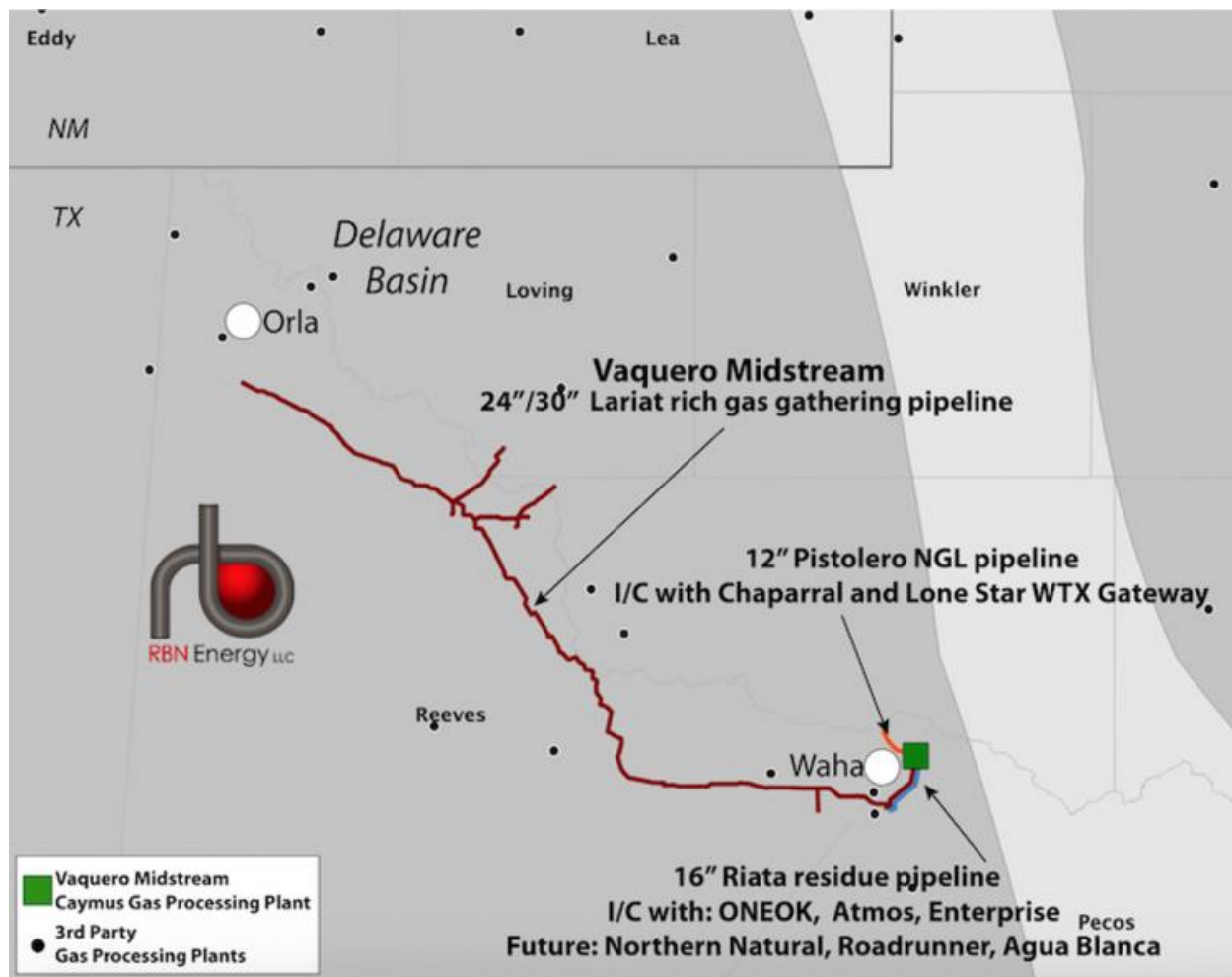


Figure 1. Vaquero's Permian Midstream Infrastructure, Sources: Vaquero, RBN Energy

Let's break apart Vaquero's expansive system to better understand the various components. First, Vaquero's Lariat pipeline is a rich gas system, meaning it carries gas from the wellhead that hasn't yet been processed. The pipeline starts about 100 miles northwest of Waha in the northern Delaware Basin near the town of Orla in northern Reeves County. At its starting point, the pipeline is 24 inches in diameter. It ties into various operators' gathering systems and then makes its way southeast, roughly tracing the route of the Pecos River. Vaquero has built two laterals that cross the river and is in process of building additional laterals that connect to more production from Reeves, Loving and Ward counties. Downstream of these laterals, the Lariat pipeline becomes a 30-inch-diameter line for about 25 miles as it approaches the Waha area. The general purpose of the Lariat pipeline is similar to WhiteWater Midstream's Agua Blanca pipeline and Energy Transfer's recently announced Red Bluff Pipeline in that all of these projects are aimed at moving Delaware Basin natural gas south to Waha. However, Lariat carries rich gas, while Agua Blanca and Red Bluff are residue pipelines carrying dry natural gas that has already been through a processing plant. Vaquero's Lariat system crosses a very active drilling area, with approximately 80 rigs drilling within 10 miles of the pipeline. Operators in that area are targeting a number of horizons, including the Avalon and Bone Springs, but are mostly focused on the Wolfcamp in some of the higher gas/oil ratio (GOR) production areas within the region. The Wolfcamp in particular is prized by processors because it produces rich gas with a liquids content of around 6 gallons per thousand cubic feet of natural gas (GPM), with low concentrations of carbon dioxide and almost no hydrogen sulfide.

One of the drivers behind Vaquero's decision to build a rich- gas pipeline was location, as the company found the best spot to build its processing plants at Waha. As Vaquero sees it, this location has a number of advantages. First, the site chosen for the Caymus plants has enough acreage to accommodate at least 1 Bcf/d of processing capacity — at least 600 MMcf/d beyond the 400 MMcf/d

already in operation or under construction. Second, Waha is relatively less remote than other possible plant sites in the basin, providing advantages for sourcing labor and supplies. Finally, the Waha location allows Caymus to connect to multiple NGL and natural gas takeaway pipelines and avoid the need to transport residue gas through constrained intra-basin pipelines to access the Waha market. After the Lariat pipeline delivers wet gas to the Caymus plant, liquids are removed and sent to the 12-inch-diameter Pistolero NGL pipeline. This pipeline connects to Enterprise's Chaparral Pipeline and Energy Transfer's Lone Star NGL pipelines, which then move the NGLs to the NGL storage and fractionation hub in Mont Belvieu, TX (near Houston). For more on current and planned Permian NGL infrastructure, see our recent blog series, [Different for NGLs](#).

Residue gas, the natural gas left after removing NGLs, then moves through the 16-inch-diameter Riata pipeline to the header shown in Figure 2. Caymus currently has three direct options for flowing residue gas: Enterprise's Texas intrastate system, the Atmos Texas Pipeline and ONEOK's WesTex Pipeline. More interconnects are under construction or planned, including tie-ins to the Northern Natural Gas, Roadrunner and Agua Blanca pipelines. The pipelines that tie into Vaquero's natural gas residue header, their capacity and completion status are as follows and shown in Figure 2 below:

- ONEOK's WesTex system; 60 MMcf/d; complete;
- Atmos Texas Pipeline; 180 MMcf/d; complete;
- Enterprise's Texas Intrastate Pipeline; 180 MMcf/d; complete;
- Berkshire Hathaway Energy's Northern Natural Gas Pipeline; 180 MMcf/d; scheduled completion, October 2017;
- ONEOK's Roadrunner Gas Transmission Pipeline; 200 MMcf/d; scheduled completion, fourth quarter of 2017; and
- WhiteWater's Agua Blanca pipeline; 200 MMcf/d; completion date to be determined.

Vaquero Residue Header

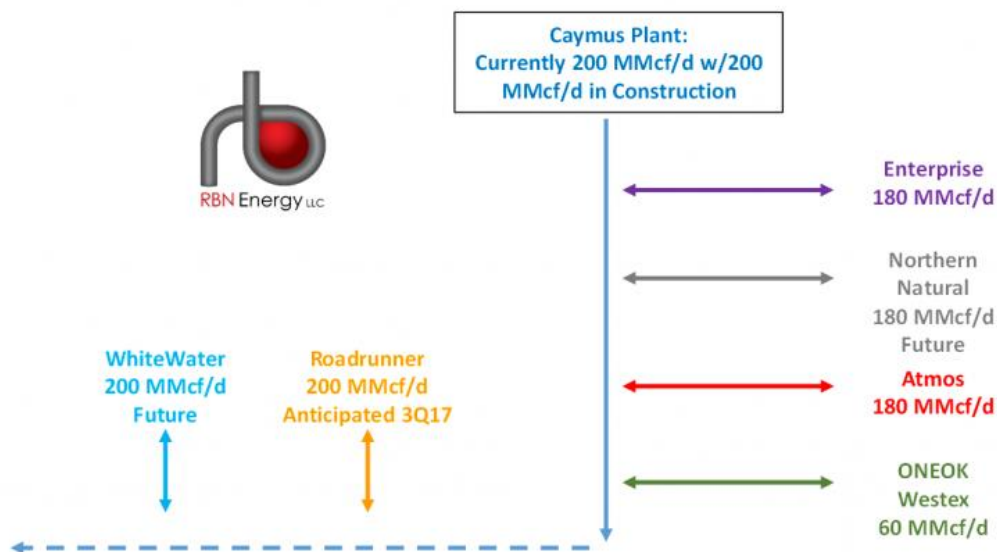


Figure 2. Vaquero Residue Header. Sources: Vaquero, RBN Energy

When complete, Vaquero's Waha header will serve to provide producers access to gas markets in Mexico, the Midcontinent, the Dallas area via Atmos and the Houston Ship Channel via Enterprise's Texas intrastate system. Thus, Vaquero has effectively built a gas minihub at Waha with connectivity to many of the key pipelines within the area. For more on Waha gas hubs, see [Part 1](#) and [Part 4](#) of our Waha series.

Vaquero's Lariat pipeline and Caymus processing facility are part of the significant buildout in Permian infrastructure needed to handle growing volumes of crude oil, natural gas and NGLs over

the next few years. As with many of the other midstream projects in the basin, the company's ambitious outlook seems to be lining up quite well with activity in the Permian.

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"You Send Me" was the debut single for soul singer and crossover star Sam Cooke in 1957. The song rose to #1 on both the Billboard Hot 100 and Billboard's Rhythm & Blues Records chart, and ranks #115 on Rolling Stone's list of The 500 Greatest Songs of All Time.