



VIEW*S* & VISIONS

A publication of Bowles Rice LLP

Fall 2012



Midstream Sector is Key to Transporting Natural Gas Resources to Market

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James W. Crews became vice president of Northeast development for MarkWest Energy Partners in October 2011. He previously held various positions with NiSource Gas Transmission and Storage - NGT&S (and its predecessor Columbia Gas Transmission) from 1995 to 2011. Most recently, he was managing director of NGT&S's Supply & Origination group and was responsible for building the NiSource Midstream Services subsidiary to provide unregulated gathering and processing services in the Appalachian Basin. During his tenure at NiSource, he was director of commercial operations, manager of gas control, manager of marketing, manager of business development and engineering supervisor.

Mr. Crews has spent his entire professional career in the energy industry. From 1982 to 1985, he worked at Cabot Oil and Gas's drilling and production division in Charleston, West Virginia. In 1985, he moved to the nuclear power industry and served as a field service engineer for Babcock and Wilcox Nuclear Power in Lynchburg, Virginia. From 1987 to 1995 he worked in engineering, storage, and planning for Washington Gas Light Company in Washington D.C. He also served as president of WVONGA in 2010-2011.

Mr. Crews received a bachelor's degree in petroleum engineering from West Virginia University and is a registered professional mechanical engineer in Virginia and Ohio.

Until Federal Energy Regulatory Commission (FERC) Order 636 was implemented in 1993, many oil and gas operations were integrated from the wellhead to the burner tip. Although Order 636 was touted as removing interstate pipelines from the merchant function with the "shipper must hold title" rule, it also led to the formation of competitive natural gas marketing companies and the separation or disposition of other supply chain functions, including the mid-stream sector of the business. Although there were companies that catered to the exploration and production sector (producers) prior to the order, many integrated energy companies separated their various business units based on their investment risk profile.

Today's oil and gas industry is separated into three sectors:

The **upstream sector** includes the exploration and production companies that operate and maintain everything from the reservoir to the wellhead.

The **midstream sector** gathers the gas from the producer wellheads and well pads and removes the natural gas liquids (NGLs), including the



contaminants, making the gas merchantable or "pipeline quality."

The **downstream sector** includes the gas marketers, intrastate and interstate pipelines (hereafter referred to as pipelines) and local distribution companies (LDCs). The pipelines operate virtual paper pools or simply "pools," where producers, marketers and local distribution companies buy, sell, and trade gas supplies at a sort of "gas mall" in much the same manner that stocks or commodities are traded at the various exchanges. These pools are the first place that natural gas realizes any value, due to its physical condition and remote location of the wellhead. Pipelines then transport it from the pools or receipt points to industrial, commercial and residential customers located on the LDC system.

A common public misperception is that natural gas and oil are merchantable or ready for human consumption when they reach the surface of the earth. However, like most commodities, that



The Liberty Segment at the Houston Processing Facility in Houston, Pennsylvania

is not the case. At a minimum, both free water and water vapor must be removed or reduced to a level to prevent freezing when the gas is exposed to cold temperatures. In addition, most natural gas contains NGLs, including ethane, propane, butane and pentane, that must be removed prior to consumption.

Merchantable natural gas is almost 100 percent methane and, as such, equipment manufacturers design appliances to burn “pipeline quality” natural gas. The presence of the NGLs in the gas stream can lead to numerous combustion problems and even the evolution of carbon monoxide if insufficient oxygen is present during combustion. Companies like MarkWest, Dominion, Equitable and, more recently, Williams-Caiman, NiSource Midstream, Momentum, Energy Transfer Partners, Velocity, Ienergy, Crestwood and others have entered the Appalachian Basin to provide midstream services for the burgeoning Marcellus, Utica and Huron Shale plays.

The NGLs are extracted from the gas stream by subjecting the gas to various pressure and temperature conditions. The commingled NGLs are then separated or fractionated through a process called fractionation. The commingled stream is heated in a controlled environment such that the purity light ends are produced off of a series of distillation columns, with the heavier NGLs proceeding from the bottom of the column to the subsequent distillation column.

The purity ethane and propane is sold to the world petrochemical manufacturers, where they are converted to ethylene and propylene, respectively. Ethylene and propylene are the basis for the world’s plastics and many other valuable chemicals. Normal butane is converted to iso-butane and is used to raise the octane rating of gasoline. Condensate, or “drip gas” as it was once known, can be directly blended into the gasoline feedstock but is more commonly used in the world diluent



Clockwise: The Northeast Segment at the Siloam Fractional Facility located in South Shore, Kentucky; a section of the Majorsville Processing Facility in Dallas, West Virginia; and storage tanks at the Houston Processing Facility

market. As a diluent, it is re-injected into heavy oil or tar sand reservoirs to reduce the viscosity of the heavy oil and aid in moving the valuable oil to the wellbore.

To avoid double taxation at the corporate and investor level, the Internal Revenue Service (IRS) created provisions in the tax code for the formation of Master Limited Partnerships (MLPs). Through this provision, the IRS incited the development of energy infrastructure by ensuring that these entities would only be taxed at the investor or partner level, creating an advantage for these entities to raise valuable capital to support infrastructure buildout. Many of the companies mentioned earlier are structured as MLPs to take advantage of this provision in the tax code.

As the unconventional reservoirs, including the Marcellus, Utica and Huron Shales, continue to evolve and become more prolific in the nation’s energy portfolio, the midstream sector will scurry to stay one step ahead of the producers to provide the necessary infrastructure to get these valuable commodities to market. Ultimately, when the economy begins to recover and grow, the pipelines and LDCs will expand to serve the market needs and displace imports from hostile nations abroad. ▽

