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MIDSTREAM BUSINESS REPORT

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ENBRIDGE ENERGY PARTNERS, L.P.

Enbridge Energy Partners, L.P. (EEP)

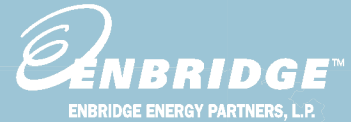
Enbridge Energy Partners, L.P. ("the Partnership") is a publicly traded master limited partnership (MLP) engaged in two main businesses: crude oil transportation and storage – and natural gas midstream services. The Partnership manages a diversified portfolio of primarily fee-based energy transportation and midstream services, with a focus on optimizing long-term investor value and maintaining a relatively low investment risk profile. Enbridge Energy Partners' major systems are associated with premium energy basins in North America, which have strong long-term production profiles. The strategic location of the Partnership's major systems continues to generate significant internal growth opportunities. The Partnership's units trade on the New York Stock Exchange (NYSE) under the symbol EEP.

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Enbridge Inc., through a wholly owned subsidiary, is the general partner and a strong sponsor for the Partnership. Enbridge, headquartered in Calgary, Alberta, Canada, is a large cap corporation with strong credit ratings and a solid international reputation for managing energy delivery systems. Shares of Enbridge trade on the NYSE and the Toronto Stock Exchange (TSX) under the symbol ENB.



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Quarterly Distributions (dollars per unit)

Year	Q1	Q2	Q3	Q4
2007	\$0.925	\$0.925	\$0.95	\$0.95
2008	\$0.95	\$0.99	\$0.99	\$0.99
2009	\$0.99	\$0.99	\$0.99	\$0.99

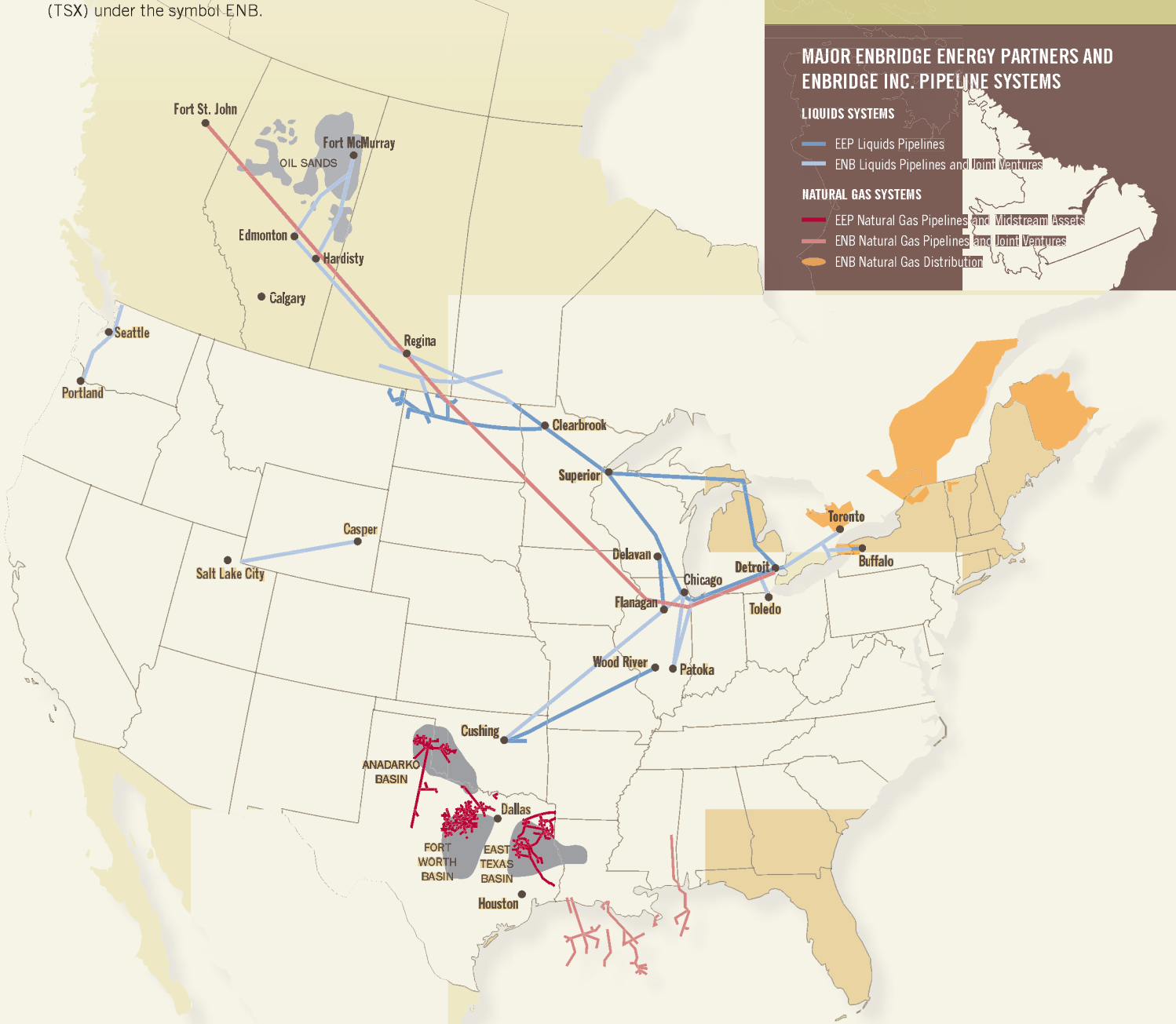
MAJOR ENBRIDGE ENERGY PARTNERS AND ENBRIDGE INC. PIPELINE SYSTEMS

LIQUIDS SYSTEMS

- EEP Liquids Pipelines
- ENB Liquids Pipelines and Joint Ventures

NATURAL GAS SYSTEMS

- EEP Natural Gas Pipelines and Midstream Assets
- ENB Natural Gas Pipelines and Joint Ventures
- ENB Natural Gas Distribution



THE CHANGING MIDSTREAM LANDSCAPE

As never before, the freshly minted decade brings a new mandate for the energy industry—produce cleaner energy from fewer resources while using cutting-edge technology funded by fewer dollars.

Midstream planners must find a way to determine the timing and locations of sustainable production, the best partnership prospects, the best-fit technology and up-to-the-minute costs of service, supplies and capital. Nowhere is this need more obvious than in the Marcellus shale gas play in Ohio, Pennsylvania, West Virginia and New York.

The play is showing phenomenal initial-production rates from its wells. The Appalachian Basin currently produces about 2.5 billion cubic feet per day, comprised of 2 billion from conventional Appalachian wells and 500 million from the Marcellus. By 2013, Marcellus production could top 4.5 billion cubic feet per day. If other plays perform the same, the U.S. will have enough gas to meet demand for the next 100 hundred years. The trick will be to fine-tune the timing of midstream projects to avoid overbuilding capacity ahead of production, while ensuring takeaway lines and processing capabilities are in place as wells come onstream.

Industry experts predict the midstream sector will invest more than \$10 billion in the Marcellus alone, during the next three years, to install infrastructure into, out of, and all through the Appalachian region. Analysts forecast a need for more than 6 billion cubic feet per day of pipeline capacity, 250 million cubic feet per day of processing capacity, and 40 mil-



lion cubic feet per day of fractionation capacity. New petrochemical plants also might be on the horizon.

To support this new surge of opportunities for the entire value-chain of midstream, Hart Energy Publishing is launching new initiatives on several fronts. Our mission is to bring actionable intelligence to the entire midstream space and deliver that knowledge through an expanded range of media, including print, digital newsletters, webcasts, audio and video interviews, and conferences.

To kick off our first initiative, *Oil and Gas Investor*, in conjunction with its sister magazine, *PipeLine and Gas Technology*, produced the inaugural Marcellus Midstream Conference and Exhibition in Pittsburgh on April 20.

The conference included up-to-the-minute information by industry executives as diverse as pipeline operators, gas processing and storage managers, heads of analytical and coalition associations, and capital providers.

For the majors, the acquisition of best practices and strategies will no doubt be exported to foreign shale plays around the world.

This Midstream Business Report was distributed to Marcellus Midstream Conference and Exhibition attendees and to a sample of *PipeLine and Gas Technology* and *Oil and Gas Investor* subscribers. The contents include articles, maps and tables about the entire midstream industry across the U.S., and are not to be missed!

—Jeannie Stell, Editor-in-Chief, *PipeLine and Gas Technology*

Energy Events Calendar

Marcellus Midstream Conference and Exhibition	April 19-20	Pittsburgh	Westin Hotel Downtown	marcellusmidstream.com
Offshore Technology Conference	May 3-6	Houston	Reliant Park	octnet.org
AGA Operations Conference	May 11	New Orleans	Hilton Riverside	www.aga.org
DUO 2010: Developing Unconventional Oil	May 17-18	Denver	Sheraton Denver Downtown	hartduo.com
American Gas Assoc. Financial Forum	May 17-19	Palm Beach, Fla.	The Breakers	aga.org
Bentek Energy Benposium	June 8-10	Houston	The Houstonian	bentekenergy.com
ECW 2010: Energy Capital Week	June 14-15	Houston	Omni Hotel	energycapitalweek.com
Summer NAPE Expo	Aug. 26-27	Houston	GRB Convention Center	napeonline.com
International Pipeline Conference & Exhibition	Sept. 27-Oct. 1	Calgary	TELUS Convention Center	Internationalpipelineconference.com
GIS for Oil and Gas Conference	Oct. 24-28	Houston	Marriott Westchase	gita.org
Leak Detection and Monitoring	Nov. 8-9	Galveston	Moody Gardens	leakdetectionconference.com
DUG East: Developing Unconventional Gas	Nov. 1-2	Pittsburgh	Lawrence Convention Center	dugeast.com
CO ₂ : 8th Annual EOR Carbon Management Workshop	December	Houston	Omni Hotel	co2conference.net

E-mail details of your event to Jeannie Stell, jstell@hartenergy.com. For more, see the calendar of all industry financial, business-building and networking events at OilandGasInvestor.com and PipeLineandGasTechnology.com.

The Alerian MLP Index

In 2006, Dallas-based Alerian launched the Alerian MLP Index (NYSE: AMZ) to provide investors and corporate management teams with an unbiased, comprehensive benchmark for the performance of the energy master limited partnership universe.

The index is a composite of the 50 most prominent energy MLPs, calculated using a float-adjusted, market capitalization-weighted method and disseminated by the New York Stock Exchange in real time.

The Alerian MLP Index, and its pipeline and storage subset, the Alerian MLP Infrastructure Index, are the underlying benchmarks for NYSE-listed exchange-traded notes (ETNs) that provide investors with transparent exposure to the index portfolios through a single investment.

Although affected by the 2008 economic downturn, the AMZ exhibited a net return of more than 11% for the two-year period between 2008 and 2009. The S&P 500 fell some 20% during the same period.

In 2009, the AMZ outperformed other markets, adding more than 76%. Today, the

growth trajectory of these companies is better than the S&P 500, which was up a moderate 27% over the same period. Analysts expect MLPs to continue to outperform, citing a number of factors including strong access to capital and continued demand for yield-oriented securities amongst retail and institutional investors.

The dividend yield on the AMZ has stayed close to 7% thus far in 2010, supported by greater stability and sustainability of cash flows as compared to other asset classes, including electric and natural gas utilities and real estate investment trusts (REITs).

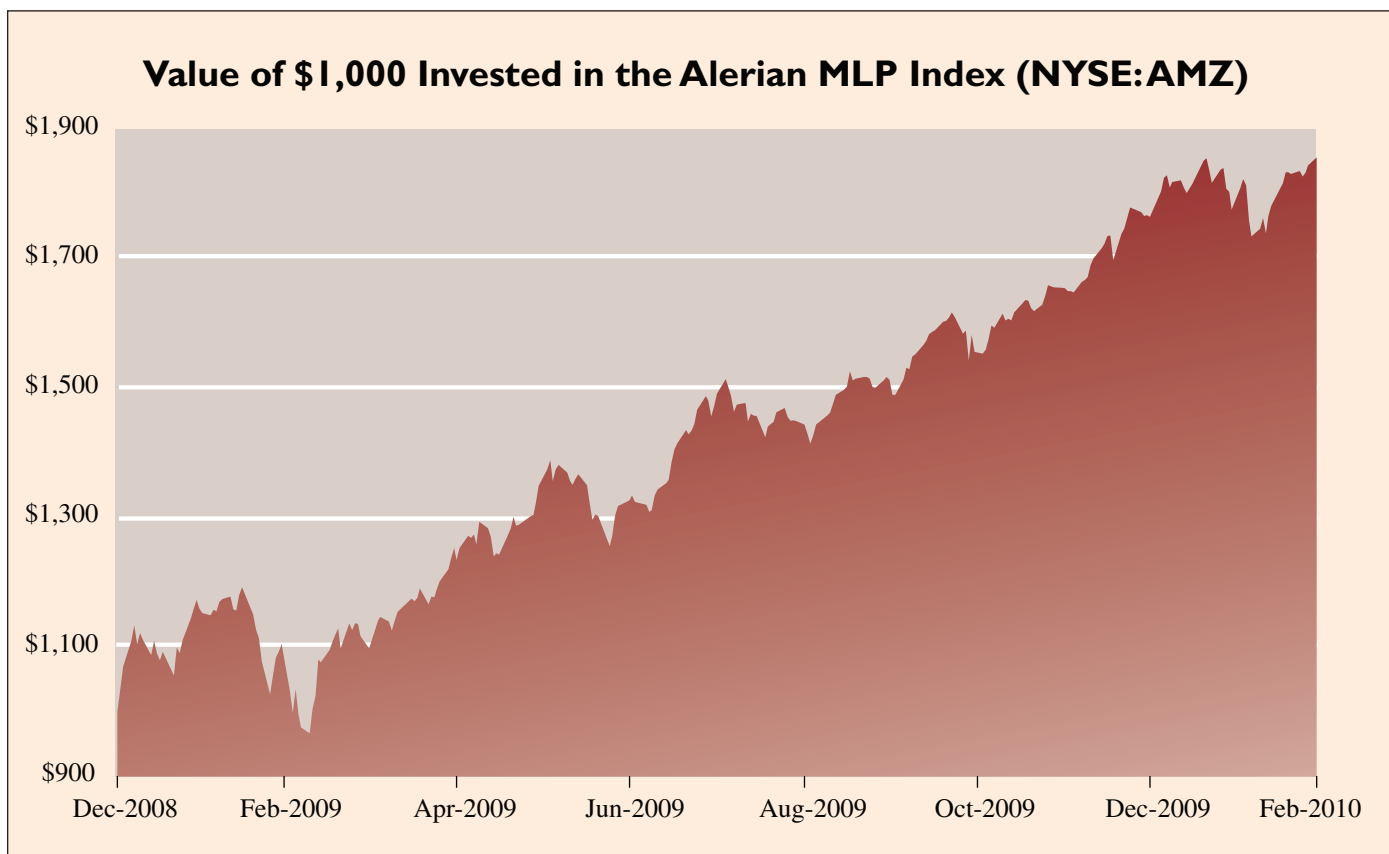
The fee-based business model of most energy MLPs accounts for the strength of their cash flows. Because MLPs do not take title to the products that they transport and store, commodity prices do not have a direct impact on their revenue or credit profiles.

This emerging asset class reached new heights in February 2010, surpassing \$150 billion in market capitalization. We expect strong growth to continue from acquisitions and organic investment by existing compa-

nies and initial public offerings by new companies.

—Kenny Feng, president and chief executive for Alerian Capital Markets

After experiencing rapid growth in 2009, Alerian reorganized its business in March of this year to focus on the growth and development of the Alerian Indexes. Just as indexing strategies and exchange-traded funds have grown exponentially as tools for both retail and institutional investors in nearly all asset classes, the MLP space will likely follow in the same direction. The company recently brought in a director of business development, and is also focused on R&D and technology investment, expecting growth to double in 2010 as MLPs continue to be adopted as a mainstream asset class.



Alerian MLP Index Constituents*Prices, shares outstanding, and IWFs as of the January 15, 2010, intra-quarter monthly rebalancing*

Name	Ticker	Price	Shs Out	Mkt Cap	IWF*	Adj Shs	Adj Mkt	Weight
Alliance Holdings GP LP	AHGP	\$28.01	59.9	\$1,677	0.2057	12.3	\$345.0	0.35%
AmeriGas Partners LP	APU	\$41.01	57.1	\$2,340	0.5590	31.9	\$1,308.0	1.33%
Alliance Resource Partners LP	ARLP	\$42.69	36.7	\$1,565	0.5541	20.3	\$867.2	0.88%
Buckeye GP Holdings LP	BGH	\$30.28	28.3	\$857	0.3789	10.7	\$324.7	0.33%
Buckeye Partners LP	BPL	\$56.35	51.4	\$2,897	0.9520	48.9	\$2,757.9	2.81%
Boardwalk Pipeline Partners LP	BWP	\$30.62	192.6	\$5,897	0.2816	54.2	\$1,660.9	1.69%
Calumet Specialty Products Partners LP	CLMT	\$19.99	35.2	\$704	0.4373	15.4	\$308.0	0.31%
Copano Energy LLC	CPNO	\$24.22	57.9	\$1,401	0.8720	50.5	\$1,221.9	1.25%
Duncan Energy Partners LP	DEP	\$24.47	57.7	\$1,411	0.4020	23.2	\$567.4	0.58%
Dorchester Minerals LP	DMLP	\$23.22	29.8	\$693	0.8189	24.4	\$567.4	0.58%
DCP Midstream Partners LP	DPM	\$29.80	34.6	\$1,031	0.6485	22.4	\$668.8	0.68%
Enbridge Energy Partners LP	EEP	\$54.25	101.4	\$5,499	0.7168	72.7	\$3,941.6	4.02%
Enbridge Energy Management LLC	EEQ	\$51.87	16.4	\$850	0.9115	14.9	\$774.9	0.79%
Encore Energy Partners LP	ENP	\$20.34	45.3	\$921	0.4864	22.0	\$447.8	0.46%
El Paso Pipeline Partners LP	EPB	\$24.57	134.1	\$3,295	0.3712	49.8	\$1,223.1	1.25%
Enterprise Products Partners LP	EPD	\$32.22	609.2	\$19,630	0.6714	409.1	\$13,179.8	13.45%
Enterprise GP Holdings LP	EPE	\$40.28	139.2	\$5,607	0.2196	30.6	\$1,231.1	1.26%
Energy Transfer Equity LP	ETE	\$33.44	222.9	\$7,454	0.5099	113.7	\$3,800.5	3.88%
Energy Transfer Partners LP	ETP	\$45.34	189.0	\$8,572	0.6532	123.5	\$5,598.9	5.71%
EV Energy Partners LP	EVEP	\$30.41	23.5	\$714	0.8136	19.1	\$580.8	0.59%
Ferrellgas Partners LP	FGP	\$21.99	69.5	\$1,527	0.6369	44.2	\$972.7	0.99%
Genesis Energy LP	GEL	\$19.88	39.5	\$785	0.8280	32.7	\$649.9	0.66%
Holly Energy Partners LP	HEP	\$40.90	22.1	\$903	0.5468	12.1	\$493.8	0.50%
Kinder Morgan Energy Partners LP	KMP	\$63.45	211.1	\$13,395	0.8775	185.2	\$11,754.0	11.99%
Kinder Morgan Management LLC	KMR	\$56.18	85.5	\$4,806	0.8546	73.1	\$4,107.0	4.19%
Legacy Reserves LP	LGCY	\$21.42	39.8	\$852	0.7119	28.3	\$606.5	0.62%
Linn Energy LLC	LINE	\$28.25	129.9	\$3,670	0.9697	126.0	\$3,559.0	3.63%
Magellan Midstream Partners LP	MMP	\$43.20	106.6	\$4,605	0.9946	106.0	\$4,579.5	4.67%
MarkWest Energy Partners LP	MWE	\$29.45	66.3	\$1,952	0.8746	58.0	\$1,706.9	1.74%
Targa Resources Partners LP	NGLS	\$23.36	67.1	\$1,568	0.6830	45.9	\$1,071.2	1.09%
Navios Maritime Partners LP	NMM	\$16.45	32.9	\$541	0.6123	20.2	\$331.5	0.34%
Inergy LP	NRGY	\$36.63	59.8	\$2,191	0.9088	54.4	\$1,991.2	2.03%
Natural Resource Partners LP	NRP	\$25.54	69.5	\$1,774	0.5265	36.6	\$933.8	0.95%
NuStar Energy LP	NS	\$58.40	60.2	\$3,516	0.8008	48.2	\$2,815.7	2.87%
NuStar GP Holdings LLC	NSH	\$28.82	42.5	\$1,226	0.8342	35.5	\$1,023.0	1.04%
ONEOK Partners LP	OKS	\$64.26	96.4	\$6,195	0.5488	52.9	\$3,399.7	3.47%
Plains All American Pipeline LP	PAA	\$54.87	136.3	\$7,479	0.7954	108.4	\$5,948.8	6.07%
Pioneer Southwest Energy Partners LP	PSE	\$23.21	33.1	\$769	0.3772	12.5	\$289.9	0.30%
Penn Virginia GP Holdings LP	PVG	\$17.00	39.1	\$664	0.4840	18.9	\$321.5	0.33%
Penn Virginia Resource Partners LP	PVR	\$23.08	51.8	\$1,196	0.6012	31.1	\$718.8	0.73%
Regency Energy Partners LP	RGNC	\$21.75	96.1	\$2,090	0.6599	63.4	\$1,379.2	1.41%
Spectra Energy Partners LP	SEP	\$29.69	80.3	\$2,385	0.2599	20.9	\$619.9	0.63%
Suburban Propane Partners LP	SPH	\$48.87	35.2	\$1,722	0.9480	33.4	\$1,632.1	1.67%
Sunoco Logistics Partners LP	SXL	\$69.88	31.0	\$2,165	0.5916	18.3	\$1,280.8	1.31%
TC Pipelines LP	TCLP	\$37.39	46.2	\$1,728	0.6176	28.5	\$1,067.5	1.09%
Teekay LNG Partners LP	TGP	\$28.12	52.3	\$1,472	0.5036	26.4	\$741.2	0.76%
Teekay Offshore Partners LP	TOO	\$20.53	37.7	\$774	0.5871	22.1	\$454.4	0.46%
Western Gas Partners LP	WES	\$20.22	62.9	\$1,272	0.4257	26.8	\$541.6	0.55%
Williams Pipeline Partners LP	WMZ	\$23.35	33.6	\$784	0.5210	17.5	\$408.3	0.42%
Williams Partners LP	WPZ	\$30.79	52.8	\$1,625	0.7620	40.2	\$1,238.3	1.26%

*Investable weight factor

Inergy

IN THE PIPELINE

CERAWEEK: New “shale gale” drives billions in midstream investment

A “shale gale” has hit North America, creating investment opportunities and risks for the midstream-energy industry, said panelist Kenneth Yeasting, senior director for IHS CERA, speaking at the recently held CERAWeek conference in Houston.

“Between 2006 and 2012, we will have built 9 billion cubic feet per day of pipeline capacity in Texas and Louisiana to support the new shale plays,” he said. “That is the equivalent of two of the proposed Alaskan gas pipeline.”

Yeasting noted there are “tens of billions of dollars” of investment opportunities in midstream in North America. Investors should diversify their portfolios by seeking companies that “do best when they do what they do best,” including pipeline and storage companies with good locations and interconnectivity.

Panelist Thomas Lane, partner with Energy Capital Partners, agreed, saying, “I think there will be some \$60 billion invested in infrastructure in shale plays during the next three to five years. We like the gathering business. We also see good investment opportunities in gas treating and conditioning.”

Stu Porter, chairman and chief executive of Denham Capital, referred to Jeffries & Co.’s estimate of \$150 billion to be spent on infrastructure during the coming decade.

“We look for upstream resource opportunities and underserved markets that need infrastructure when we invest,” he said, and noted that \$2 billion had already changed hands through joint ventures in midstream. He observed that, in the short term, Barclays

Capital predicts another \$10 billion will be raised by master limited partnerships (MLPs).

Greg Harper, senior vice president and group president for CenterPoint Energy pipelines and field services, is focused on the Haynesville shale play for good returns on investment.

“I want to be in the Haynesville,” he said. “There, you have much of the gas resource spread over about three Louisiana parishes. In the Marcellus, the resource is spread over five states, and the terrain is difficult.”

Nathan Ticatch, vice chairman for PetroLogistics LLC, said there are “tremendous opportunities” for midstream investment and that assets need to be put in place all over the map.

“It’s a dynamic situation and the challenge is to be sure that assets that are put in place will have long-term viability,” he said. New gas-storage facilities will be a good long-term investment, he said, because liquefied natural gas (LNG) will be coming into the U.S. for storage on an opportunistic and seasonal basis. Also, the Marcellus shale play will displace southern gas normally shipped into the Northeast and will drive a need for more Texas storage capacity.

Imported LNG will also encourage storage operators to move to a new business model, said Lane. “Storage operators will find injection rates to be just as in-demand as withdrawal capabilities. Storage operations will be like a parking lot. We won’t own the commodity. We will just charge fees for taking it in and out.”

Center Point’s Harper agreed. “In the past, it’s always been about the withdrawal rates, but that has changed. Now it is about injection, and I would be charging as much for that as for withdrawal capabilities.”

Bruce Bilger, chairman and head of global energy for Lazard, observed that storage facilities qualify as MLP business models, but Harper said he was not convinced that storage MLPs would work because many are based on risky, short-term contracts. However, they could work as MLPs if they have long-term capacity-based contracts, he added.

Lane admitted that storage facilities also present a challenge, because “a lot of things can go wrong” when attempting to construct a facility that far underground.

“The value of storage is what you can do with it,” said Ticatch. “Salt dome storage has technical challenges and there is only a small group of people who know how to do that. We have seen some with high cost-overruns, and some that were total failures. There is a significant development risk to building storage facilities.”

ONEOK Partners: U.S. fractionation capacity tight, demand growing

Tulsa, Oklahoma-based Oneok Partners LP’s executives say that, while 2009 was an “economically challenging” year for the country as a whole, including the midstream industry, industry fundamentals remain strong for the long haul.

“Fundamentals across the natural gas liquids (NGLs) industry remain strong,” said Terry Spencer, chief operating officer, during a recent conference call to discuss Oneok’s fourth-quarter results. “We expect fractionation capacity to remain tight and additional NGL supplies to continue to be developed. Demand for fractionation capacity is increasing and so are



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the fees. We've seen some contracts are being negotiated with firm-demand fee structures."

Meanwhile, chemical companies are projecting double-digit volume growth in 2010, driven by polyethylene and basic plastics as well as continued strong exports to Asia, he said. Although commodity prices were down throughout the year, the company was able to "somewhat balance this situation" through volume increases in gas and NGLs.

"Our natural gas volumes processed increased nearly 3% for the fourth quarter and for the year, and remain strong because of our presence in the growing natural gas liquids-rich Bakken shale in the Williston Basin in North Dakota and the Woodford shale in Oklahoma. These areas continue to be very active development areas driven by favorable drilling economics

due in large part to the NGLs content and associated crude oil and condensate production," Spencer said.

The company plans to spend \$115 million on growth capital in 2010, including \$32 million for well connects and the rest for upgrades and expansions. Oneok is considering more expansions in the Bakken and Oklahoma due to the strength of the plays. Last year, the company expanded the Grasslands gathering and processing facilities in the Bakken. Also, its western Oklahoma facilities are at or near capacity.

"The need for continued expansion of our NGL infrastructure is driven by the long-term development plans of gas and NGL producers within our core areas, especially in the Bakken shale and Woodford shale and some outside our core areas. We are in discussions with producers in the Willis-

ton Basin about NGL infrastructure needs and takeaway capacity to accommodate this group," he said.

For 2009, Oneok's inter- and intrastate pipelines were nearly 90% subscribed under demand-based rates, compared with 83% in 2008. Continued supply growth in the Midcontinent region, especially in the Woodford shale, will provide the midstream operator with an opportunity to develop and build new pipelines.

Spencer said the company saw higher NGL volumes gathered, fractionated, marketed and transported. Volumes of NGLs fractionated in the fourth quarter rose by 35% to 482,000 barrels per day (bbl. per day), while the volumes of NGLs transported on the company's gathering lines rose by 50%. The amount of NGLs transported via its distribution lines rose by 25%.

"The primary driver for these in-

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<p>March 25, 2010 Acquisition of interests in E&S-based LNG in Bitter Springs</p> <p>EP El Paso Pipeline Partners</p> <p>Financial Advisor</p>	<p>February 17, 2010 \$200 million</p> <p>BOARDWALK PIPELINE PARTNERS</p> <p>Common Stock</p>	<p>February 1, 2010 \$154 million acquisition of the Granger Gathering System and Plants</p> <p>Western Gas Partners LP</p> <p>Financial Advisor</p>	<p>January 16, 2010 \$201 million repurchase of incentive deferred tax rights</p> <p>Energy Transfer</p> <p>Financial Advisor</p>	<p>January 19, 2010 \$1.2 billion acquisition of interstate gas pipeline, midstream assets and interests</p> <p>Williams Partners LP</p> <p>Financial Advisor</p>	<p>November 18, 2009 \$281 million</p> <p>NuStar Energy LP</p> <p>Common Stock</p>
<p>September 1, 2009 \$81 million acquisition of interest in Reynolds (joint venture)</p> <p>REGENCY</p> <p>Financial Advisor</p>	<p>July 18, 2009 \$530 million acquisition of natural gas liquids business</p> <p>TARGA</p> <p>Financial Advisor</p>	<p>July 27, 2009 \$119 million acquisition of interest in DG</p> <p>EP El Paso Pipeline Partners</p> <p>Financial Advisor</p>	<p>July 20, 2009 \$1.2 billion Alberta Clipper joint funding arrangement</p> <p>ENBRIDGE</p> <p>Financial Advisor</p>	<p>July 18, 2009 \$187 million acquisition of United Basin midstream assets</p> <p>Western Gas Partners LP</p> <p>Financial Advisor</p>	<p>June 16, 2009 \$221 million</p> <p>ONEOK</p> <p>Common Stock</p>
<p>April 9, 2009</p> <p>LEGACY</p> <p>Financial Advisor</p>	<p>March 5, 2009 \$1.2 billion merger with Regal gas midstream Holdings</p> <p>MAGELLAN</p> <p>Financial Advisor</p>	<p>February 27, 2009 \$1.1 billion Reynolds (joint venture)</p> <p>REGENCY</p> <p>Financial Advisor</p>	<p>February 27, 2009 \$45 million credit facility</p> <p>REGENCY</p> <p>Financial Advisor</p>	<p>January 21, 2009 \$200 million convertible preferred shares</p> <p>seaspan</p> <p>Financial Advisor</p>	<p>November 11, 2008 \$118 million acquisition of Powder River Basin midstream assets</p> <p>Western Gas Partners LP</p> <p>Financial Advisor</p>
<p>July 6, 2008</p> <p>Constellation Energy</p> <p>Structuring Advisor</p>	<p>September 17, 2008 \$734 million acquisition of interests in DG and B&E</p> <p>EP El Paso Pipeline Partners</p> <p>Financial Advisor</p>	<p>September 11, 2008 \$149 million</p> <p>REGENCY</p> <p>Common Stock</p>	<p>May 6, 2008 \$584 million</p> <p>EQUITABLE RESOURCES</p> <p>Common Stock</p>	<p>November 15, 2007 \$575 million</p> <p>EP El Paso Pipeline Partners</p> <p>Structuring Advisor/Initial Public Offering</p>	<p>September 2007 \$780 million acquisition of SAGU and LBU</p> <p>TARGA</p> <p>Financial Advisor</p>

creases was the completion of the Overland Pass pipeline, which reached more than 113,000 bbl. per day in the fourth quarter.

“In February, throughput reached 143,000 bbl. per day, getting us closer to our target of over 200,000 bbl. per day in the next three to five years, compared with Overland Pass’ expandable capacity of 255,000 bbl. per day,” he said. He noted that the Arbuckle pipeline’s throughput rose to 97,000 bbl. per day, which exceeded the company’s expectations.

“For the year, operating income was lower, primarily due to narrower NGL product-price differentials, offset partially by higher NGL volumes from our recently completed growth projects. The average price differential between the Conway and Mont Belvieu ethane markets was nearly 25% lower in fourth-quarter 2009, compared with the same period in 2008, and was nearly 27% lower compared with the 2008 average,” Spencer said.

FERC approves \$430-million Trunkline LNG expansion in Lake Charles

In March, Houston-based Southern Union Co. received approval from the U.S. Federal Energy Regulatory Commission (FERC) to bring its \$430-million Trunkline LNG infrastructure enhancement project in Lake Charles, La., into service.

The project will support its import terminal, which has a sendout capacity of 1.8 billion cubic feet per day (Bcfd), peak sendout of 2.1 Bcfd and storage capacity of 9 Bcf

The project includes the construction of an NGL-extraction facility and four ambient air vaporization units. The facility will be the only LNG-regasification terminal in North America to utilize ambient air vaporization technology, which improves fuel efficiency during regasification.

The NGL extraction facility will provide the terminal’s customer, BG LNG Services, with more options for

sourcing its LNG supply. BG’s contract runs until 2030.

“The technologically advanced project showcases the leadership position that Trunkline LNG enjoys within the industry,” says Eric Herschmann, president and chief operating officer of Southern Union. “The long-term nature of our contract with BG, coupled with the stable nature of Trunkline LNG’s cash flows, will benefit the company and its shareholders for decades to come.”

Southern Union is a diversified natural gas company, engaged primarily in transportation, storage, gathering, processing and distribution. In addition to its LNG import and regasification terminal, it owns and operates one of the nation’s largest natural gas pipeline systems, including more than 20,000 miles of gathering and transportation pipelines.

Oxy plans gas processing plant in Kern County to support oil play

Occidental Petroleum Corp., based in Los Angeles, plans to build a natural-gas processing plant in Kern County, California, to accelerate development of the state’s largest oil discovery in 35 years.

The new plant, scheduled for completion in about a year, is needed to process associated wet gas that flows from the wells along with the crude. President and chief financial officer Stephen Chazen says, “Occidental estimates that the field it discovered last year near Bakersfield may hold the equivalent of 250 million barrels of crude. Efforts to determine how wide and how deep the field extends have been frustrated because of the lack of processing facilities.”

Of the discovery, Chazen says, “It’s very exciting. Some smart geologists did this. It wasn’t done by engineers, fancy tools or satellites from space. It looks like a deepwater discovery, with a thick reservoir and a lot of pay zone. It needs no stimulation, so there is not

a lot of money here for Halliburton.”

The play holds an estimated 150 million to 250 million gross barrels of oil equivalent within Oxy’s outlined area, where it has drilled six wells to date.

The producer will look for additional reserves outside of the defined area, and believes that other structures of this type exist elsewhere in its 1.1-million-acre position in California. Oxy has a drilling program to exploit such opportunities during the next five to 10 years.

Delhi Gas buys rights to Atmos’ Louisiana storage facility

Dallas-based Atmos Energy Corp.’s subsidiaries, Atmos Pipeline and Storage LLC (APS) and Fort Necessity Gas Storage LLC, agreed to provide Delhi Gas Storage LLC, a subsidiary of Icon NGS LLC, the exclusive option to develop the proposed Fort Necessity salt-dome natural-gas storage project in Franklin Parish, Louisiana.

Under the agreement, Delhi will drill a brine disposal well and undertake tests to define the characteristics of the brine-disposal formation.

If Delhi completes the well and decides to proceed with development, it has the right to exercise its option, contribute the brine well test results and acquire a controlling interest in Fort Necessity, which will own all of the project assets. APS will retain a capital position in Fort Necessity and will share in a variable percentage of the profits, based on the amount of further investments by Delhi.

Upon its exercise of the option, Delhi will have the sole responsibility and discretion for managing Fort Necessity and will provide funding for all future development costs of the storage project.

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MARCELLUS MIDSTREAM

Pipelines and processing and storage, oh my! The Marcellus shale play is growing up, and midstream developers are crucial to its success. Is a new Pennsylvania supply hub on the horizon?

ARTICLE BY JEANNIE STELL

The new buzz in the shale-gas sector is Marcellus midstream. Producers may have to time their drilling to chase new midstream facilities. But luckily, the pipelines, processing and storage builders and operators are poised for action as E&Ps continue to see upside value in the dry gas and liquids-rich sections of the Marcellus.

In fact, liquids are moving to the forefront of discussions as oil continues to trade at a substantial premium to gas, 16-to-1 at press time. Yet, obstacles litter the yellow brick road to riches. Although Northeast markets eagerly consume propane, there is a noticeable lack of demand for ethane, and the play's production is just this side of the level needed to drive new fractionating and liquids takeaway construction.

Also, producers, builders, operators and capital-providers do not agree as to what is needed, and where. For example, Alan Armstrong, president of Williams Cos. Midstream Gathering & Processing, would like to see a change in the way new infrastructure is planned in the shale plays, and says the Marcellus is a good place to start. Armstrong leads Williams' midstream businesses in Canada and the U.S., and serves as a board member

and the chief operating officer for Williams Partners LP.

"Today, gathering is picked up by individual producers or small midstream companies," he says. "They build one gathering system to connect to a transmission line to get to the closest available market. The problem is, when that pipeline is saturated, producers' netback begins to fall."

A better plan would be to flow gas to a hub with large takeaway lines, he advises. (Williams built Opal Hub, the first gas trading hub, in western Wyoming in the mid-1980s.) After producers pay for gathering, processing and transportation to the hub, they can sell into a competitive daily market to get the best price. Also, should a pipeline outage occur, producers can switch to another and keep gas moving.

"A hub would also allow blending of rich, dry and contaminated gas to meet pipeline specifications at a lower cost. That has yet to play out, but it is certainly what we would like to bring to the Marcellus. In the past, there hasn't been enough production from the Devonian shale to make that productive."

Armstrong suggests a hub could be sited where a convergence of large transmission lines already exists, such as the

Spectra Energy's pipe-stringing operations in Franklin County, Pennsylvania, are part of its Texas Eastern Transmission Pipeline TIME II project, in Ohio and Pennsylvania, to bring up to 150 MMcfd of gas into the New Jersey market area. Photo courtesy of Spectra Energy.



Leidy storage facility in northern Pennsylvania.

“Today, that is more of a market-area hub than a supply hub, but it could become both. A southern hub would also make sense with Transco’s planned Keystone Connector pipeline and with Dominion, Texas Eastern, Equitable and Columbia Gas pipelines converging in the southwestern Pennsylvania area. Or, the Marcellus might have two hubs, one each in northern and southern Pennsylvania,” he says.

Williams is a good candidate to build a Leidy hub because it operates the venerable Transco pipeline system. Transco starts in south Texas, moves gas from onshore and offshore Gulf of Mexico gathering, then travels along the eastern seaboard to terminate in New York City. It is the largest single pipeline system (by volume) in the U.S., transporting some 8.6 billion cubic feet per day (Bcfd).

Yet, given the success of the Marcellus, will Transco continue to move Gulf-based gas to the Northeast?

“That’s a good question,” says Armstrong. “It is somewhat dependent on the timing of the Marcellus resource base. It is yet to be seen how much Marcellus gas can supply the Northeast markets. I don’t expect our portion of the production to completely displace southern gas, but overall, the Marcellus has the potential for backing down the need to bring up gas from the Gulf of Mexico, if drilling and production is dramatically accelerated.”

Before it can be accelerated, and the play’s potential fully exploited, the industry must overcome the lack of comprehensive infrastructure and address state and landowner issues, community issues and stakeholders’ concerns in an agreeable manner, Armstrong says.

“When a production field is rapidly developed like this, those issues can retard the resource from meeting its maximum potential as quickly as it otherwise could,” he says. “For now, production is being connected to the 2.8-Bcfd Leidy line which provides access to the Leidy Hub, where Transco has some 100 Bcf of storage.”

The Leidy was originally designed to provide Transco shippers with connections to significant market-area storage, flowing excess production into storage during the summer and then reversing and supplementing traditional supplies during the winter to serve New York and surrounding markets. It wasn’t initially designed to serve Marcellus gas, but has become a fortunate placement for Williams.

MLPs and JVs

In addition to its Marcellus plans, Williams is an old hand at forming MLPs. Its first, Williams Energy Partners (now Magellan Midstream LP), was formed in 2001 and sold in 2003. The company then created the midstream-focused Williams Partners LP (WPZ) in 2005 and the interstate gas-pipeline-focused Williams Pipeline Partners LP (WMZ) in 2007.

Recently, Williams completed a \$12-billion restructuring that transformed Williams Partners into one of the largest energy MLPs in the country. Williams contributed most of its interstate gas-pipeline and midstream assets to Williams Partners in exchange for \$3.4 billion in cash and 203 million Williams Partners units. The exchange boosted Williams’ ownership of Williams

Partners to 84%.

“The new Williams Partners is now much larger than the old WPZ,” says Armstrong. The restructuring increased the partnership’s size and interests to a comparable level with Kinder Morgan, Energy Transfer Partners and Enterprise Product Partners. “This strategy gives us better cost of capital due to scale. Because it is investment grade, we are able to issue debt at a lower cost.”

Williams Partners now owns 100% of the Transco system, plus interests in Northwest Pipeline (65% as of March 1) and Gulfstream (24.5%). The partnership’s large-scale midstream assets are concentrated in major producing basins in Colorado, New Mexico, Wyoming, onshore and offshore the Gulf of Mexico, with a growing presence in the Marcellus shale. There, Williams will fund, begin construction and own the Springville Gathering System. The 28-mile, 20-inch, 375-million cubic feet per day (MMcfd) high-pressure line will move Cabot Oil and Gas production from Susquehanna County in northern Pennsylvania to the Leidy lateral.

Last year, Williams formed a joint venture with Atlas Pipeline Partners. The project, named Laurel Mountain Midstream, operates a gas-gathering system serving producers in southwestern Pennsylvania. Some of the gas comes from older, rapidly depleting Devonian shale wells, which are being replaced by growing Marcellus production.

The JV has long-term commitments that include nearly all of Atlas Energy’s Marcellus production—one of the top-five acreage holders in the play. Williams initially owned 51% of the Laurel Mountain joint venture, but its ownership interest was transferred to Williams Partners as part of the restructuring transactions.

Elsewhere in the Marcellus, Williams Partner’s Transco entity plans to build the Keystone Connector pipeline as a joint venture with Dominion. The line will run though Atlas assets in southwestern Pennsylvania and terminate at an interconnection with Transco in southeastern Pennsylvania. The schedule for that has yet to be nailed down.

Meanwhile, Williams’ E&P business unit formed a joint venture with Rex Energy, capturing assets along the Marcellus trend line at the northern border of Atlas’ acreage. The Laurel Mountain system will serve that new production as more wells are drilled. Williams also plans connectors to other pipelines that will move gas for its other customers along with its E&P business unit.



When a production field is rapidly developed, such as the Marcellus shale play, growth issues can retard the resource from meeting its maximum potential as quickly as it otherwise would, says Alan Armstrong, president of Williams Cos. Midstream Gathering & Processing.



Dominion Transmission Inc.'s Hastings fractionation facility in Pine Grove, West Virginia, separates rich Marcellus gas liquids into propane, butane, ethane, natural gasoline and other liquids that are shipped to markets by pipeline, train, barge or truck.

“The Marcellus holds great promise for the economies of Pennsylvania and West Virginia,” says Armstrong. “If I lived in either of those states, I’d be excited to watch the job growth for years to come. It won’t be a flash in the pan. This play will be growing for the next two decades, and even in its decline it will still require a lot of manpower to manage the wells and infrastructure.”

He points out that the opportunity is less certain for New York due to differences of opinion on water resources and hydraulic fracturing. “Until those rules get settled, it will be awhile before the opportunity there is developed.”

Right place, any time

Although the shale play is considered to be new and growing, it’s important to remember that U.S. oil production began in Pennsylvania. And at least one large-cap midstream operator has been in the area for quite some time with legacy assets. With regard to the shale play, its pipeline-placement is now more a matter of “right place, any time,” as opposed to a savvy forecast made 60 years ago.

Houston-based Spectra Energy Corp.’s principle asset in the Marcellus is its 1940s-era Texas Eastern pipeline. Designed to move gas from the Gulf Coast to high-demand markets in the Northeast, including New York and New England, the Spectra Energy Transmission-owned-and-operated line runs north through Ohio, then west across Pennsylvania. The 9,200-mile, 6.7-Bcfd system includes 75.1 Bcf of storage capacity.

“It cuts right through the heart of the Marcellus shale play,” says Bill Yardley, group vice president for Spectra Energy, Northeast Transmission. “It’s well-positioned in the sweet spot in southwestern Pennsylvania and northern West Virginia. That’s

one of the two big areas of development—the other being the northeast corner near New York.”

The fee-based system hooks up to Spectra Energy’s Algonquin Gas Transmission pipeline, a 1,120-mile, 2.44-Bcfd system that serves New England, New York, New Jersey and Boston. By accessing both pipelines, producers’ gas can reach virtually all East-Coast markets.

Not one to rest on its laurels, the company recently entered into agreements with three shippers to transport gas to New York City via its New Jersey-New York Expansion Project. Says Yardley, “This project will be achieved through expansion of both our Algonquin and Texas Eastern systems and will be fed by El Paso’s Tennessee Gas Pipeline (TGP) in Pennsylvania. This is a great way to participate in the northern part of the Marcellus.”

TGP has announced its Northeast Upgrade project to provide 636 million a day of additional capacity from its 300 Line in Pennsylvania to an interconnect in New Jersey, with most of the capital spending to take place in 2013.

Going forward, Spectra Energy’s first Marcellus project will be the Texas Eastern Appalachia to Market expansion (TEAM 2012). The 200 MMcfd expansion is expected to be turned on in late 2012. The midstream operator signed a binding agreement with an affiliate of Range Resources Corp., one of the early pioneers in the play, to ship a minimum of 150 MMcfd into eastern markets.

“We will file with FERC later this year and start construction in 2012,” says Yardley. “We will follow TEAM 2012 with the TEAM 2013 expansion, an additional 500-MMcfd capacity expansion. Our hope is to continue this expansion program, with one new TEAM expansion each year,” he says.

Yardley is confident the producers are satisfied with the



The Texas Eastern pipeline, a 9,200-mile, 6.7-Bcfd transmission system “cuts right through the heart of the Marcellus shale play,” says Bill Yardley, group vice president, for Spectra Energy, Northeast Transmission.



Spectra Energy’s versatile TEAM-expansion projects allow producers to decide which project best fits as their production grows. Construction should begin in 2012.

phased-in approach, based on the results of the recent TEAM 2013 open season, which received “an overwhelming response,” he says.

Yet, the company finds it must consistently fine-tune its model as its shippers’ needs evolve. It evaluates the service it provides to each producer in order to provide a custom fit. To better serve its Marcellus shippers, Spectra Energy opened a Pittsburgh office in 2009.

“We need to understand whether they simply want to get into the pipeline, or if they want to take their supply all the way to Boston or New York,” Yardley explains. “We then have to determine how that requirement fits with our portfolio and the best way to meet their needs. Even keeping up with the volume of requests for interconnects is a challenge. But it’s a great problem to have.”

Yardley points out that, as the Marcellus continues to grow, producers can access storage and other markets through the Ontario hub, if need be, noting that it is another accessible “spoke in Spectra Energy’s wheel of gas transmission infrastructure.”

Spectra Energy owns Union Gas, a local distribution company based in Ontario with service in Ontario, Quebec and the U.S. It owns and operates several depleted-reservoir storage pools, including 160 Bcf of capacity at the Dawn storage hub and facility in southern Ontario, just over the U.S.-Canada border near Detroit. That facility includes a massive header line that connects to multiple pipelines.

Spectra Energy’s storage assets in the Northeast are another strategic piece in its asset portfolio, including 143 Bcf of capacity through its interests in the Leidy (25%) and Oakford (50%) storage fields. The company has a 50% interest in the Steckman Ridge 12-Bcf storage facility that came online in 2009.

The variety of Marcellus gas characteristics poses its own set of challenges for Spectra Energy and for its clients, the produc-

ers. Some gas volumes can be delivered immediately into the sales-gas stream, while other gas must be processed prior to transportation.

Ethane production

“We are in the middle of a gas quality discussion with producers and end-users like the local distribution companies. Most of the pipeline tariffs were crafted decades ago, and were just not meant to address a number of the issues being faced today, particularly with CO₂ and ethane. The industry is wrestling with this and will have to reach consensus on what these specifications should be.”

With regard to ethane takeaway, Yardley says, “I think people are starting to consider dedicated ethane-takeaway pipelines to Sarnia, Carthage or New Jersey—areas where the ethane can be used. It’s an expensive proposition, but the quantity of ethane that has to be sent out will drive the need for a pipeline.”

“There is no market for ethane in the Northeast,” agrees Paul Ruppert, senior vice president for Richmond, Virginia-based Dominion Transmission Inc. Historically, that has not been a problem on the Dominion system because nearly all the ethane removed is re-injected into the sales-gas stream, or tail gas. The reinjection meets the Btu-per-standard-cubic-foot tariff limits on the outlet specifications.

However, some recent Marcellus production has ethane content too high for it to be left in the tail gas and still meet tariff gas-quality specifications. For now, pipeline operators have issued waivers to producers so they can ship off-spec gas.

Solutions have been proposed, including a new-build pipeline to take the ethane to markets in the South. But that option is not a short-term solution, notes Ruppert.

“In the near-term, some are dealing with the issue by blending high-Btu, ethane-laden gas with low-Btu gas,” he explained. “And some pipelines have granted selected waivers of gas qual-

ity for a period of time. However, neither is a reliable or long-range solution. We believe a long-term solution is going to be required, and that producers will become increasingly supportive as the magnitude of the problem and the required solution become clearer.”

The Marcellus shale gas play is a great opportunity for Dominion, he says. “Our workforce in the area is trained and talented. Having the midstream assets already in place is a good starting point from which to build.”

Dominion’s Northeast transmission system, comprised of some 3,500 miles of pipeline, runs from Virginia, West Virginia, Ohio and Pennsylvania into upstate New York. The operator’s midstream system gathers gas, extracts heavy hydrocarbons and moves sales gas to market.

“The system is right in the footprint of the Marcellus, creating synergy for the Marcellus shale-gas producers. We’ve built more than 3,000 miles of gathering lines there, serving both the wet, high-Btu gas and the dry, low-Btu gas streams,” says Ruppert.

Dominion’s liquid-extraction plants, connected to high-Btu gas gathering, are in West Virginia. “We’ve recently announced our Gathering Enhancement Project to expand our West Virginia gathering system and will include additional extraction facilities,” he says.

The Gathering Enhancement Project will reduce pressures in the gathering system and increase Dominion processing capacity to 280 MMcfd from 230 MMcfd. It will also increase fractionation capacity to 560 million gallons per day. The \$253-million project is expected to be completed by the fourth quarter of 2010.

Dominion has also proposed the \$600-million Appalachian Gateway Project, which is designed to lessen the bottleneck that is preventing some of the gas produced in West Virginia and southwest Pennsylvania from getting to customers in the Northeast. The project will provide over 480 MMcfd of firm transportation for new Appalachian supplies, and is fully subscribed by Appalachian producers.

Dominion plans to add 17,000 horsepower of compression, and 110 miles of new transmission pipeline. Construction is scheduled to begin in 2011, with service commencing in 2012.

The \$22-billion market-cap company’s hub-and-spoke transmission system includes an underground gas storage system—the largest in North America—including storage facilities in West Virginia, Pennsylvania and New York.

“At Dominion Transmission, we operate 17 storage pools in the Marcellus Appalachian Fairway. Dominion transmission operates 760 Bcf of underground storage capacity. Including our



“There is no market for ethane in the Northeast,” says Paul Ruppert, senior vice president for Richmond, Virginia-based Dominion Transmission Inc.

affiliate, Dominion East Ohio, the company operates more than 900 Bcf of capacity,” says Ruppert.

All of Dominion’s storage fields are developed from depleted sandstone and reef formations among the most prolific gas plays in the Appalachian Basin. “We are fortunate to have storage pools with both good containment and deliverability,” observes Ruppert. “We know when we place gas in these reservoirs, they will hold it in place and release it back to the market at acceptable rates to meet wintertime peaking needs.”

Each of Dominion’s storage fields operates at different pressures, as high as 5,000 psi and as low as 500 psi. “So we have both base-load and peaking pools, depending on the characteristics of each facility. We operate all the facilities as an integrated system,” he says.

Today, Dominion’s gas storage is fully subscribed. “We think there is a great opportunity for new storage development. We are always looking to grow our assets. And we’d welcome the opportunity to grow our gas storage business.”

Business model

“The company’s business model, to link new gas supply to market, is the same tried-and-true strategy it has employed for years,” says Ruppert.

“For example, with our Dominion Hub I Project, we were the first company to contract with customers to build a takeaway project from the Rocky Mountain Express (Rex) pipeline at Clarington, Ohio, to Dominion’s transmission system. The Northeast is an area of high energy consumption,” he says. “Customers value the diversity of supply we make available to them.”

In fact, the region has access to Canadian gas, conventional and unconventional Appalachian production, Rex gas and liquefied natural gas (LNG) from the Chesapeake Bay. Such diversity ensures reliable, competitive supplies for Northeastern consumers. Despite the gas-on-gas competition, the region continues to be a premium market with high demand that producers seek to access.

Dominion’s business model led it to acquire the Cove Point LNG re-gasification terminal, sited on the Chesapeake Bay in Lusby, Maryland, just south of Baltimore. After the purchase from Williams Cos. on Sept. 5, 2002, the import service was re-activated. Dominion expanded that facility, nearly doubling its size to 1.8 Bcfd of send-out capacity and 14.6 Bcf of storage held in seven above-ground tanks.

“Our strategy has ensured that we will always be well-positioned to get new supplies to market,” states Ruppert. “That model drives new infrastructure, and we certainly like to build infrastructure, especially in the Northeast and mid-Atlantic.”

Dominion’s transmission business is a regulated service provider and its model has a bias for reservation rates such as those typically approved by FERC. This is reflected in its transportation and storage contracts where customers are charged for each dekatherm of capacity reserved, whether used or not.

“In contrast, on the gathering and processing side, for several years we have followed a model where rather than charging a fixed or variable fee for our service, we retain gas in-kind,” he explains. “That retention can be compared to a percent-of-production fee.” □

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SIX MIDSTREAM EXPERTS PIPE UP ABOUT WHAT KEEPS THEM UP AT NIGHT

ARTICLE BY GARY CLOUSER

From new investments to old regulations, midstream builders, owners and operators and the companies that finance them are in the midst of one of the biggest stages of flux the sector has ever known. New shale plays demand new infrastructure support, conventional players are struggling with low-price gas, and landowners are torn between line-of-sight facilities and the boom-town Marcellus-driven wealth pouring into Pennsylvania and West Virginia.

To get a snapshot of the current thinking and strategies across the U.S., Oil and Gas Investor asked a group of midstream-industry leaders to tell us what keeps them up at night.

The group includes Timothy Day, managing director of the Houston office of investment bank, First Reserve Corp.; Robert Lane, managing director of advisory firm Madison Williams and Co.; Jay Seegers, partner with law firm Vinson & Elkins LLP; Tom Miesner, manager of advisory firm Pipeline Knowledge & Development; Byron Kelley, chairman, president and chief executive for the midstream company Regency Energy Partners LP; and Greg Hopper, managing director for Black & Veatch, an engineering, construction, consulting and storage-project developer firm.

CAPITAL FLOW

Timothy Day, First Reserve Corp.

“There is no question that significant investment is flowing to the North American midstream sector and there are specific reasons for that.

“First, capital is funding large infrastructure build-outs in the rapidly expanding shale plays. Estimates suggest that current projects are in excess of \$10 billion. Assuming the shale plays continue to evolve as we expect, the \$10-billion estimate would only minimally address actual infrastructure needs.

“Additionally, E&P operators will require a significant amount of capital to develop large acreage positions in these capital-intensive plays. They are looking to midstream companies and financial investors as partners to help fund and execute the build out of this important part of their value chain.

“In some cases, producers are looking to sell all of their interests or a partnership interest in their midstream assets to free up cash from non-core operations for use in funding future drilling projects. Some have already done so. This trend provides opportunities for investors to acquire attractive, unwanted midstream assets at fairly attractive valuations in strategic regions where the producers are committed to drilling and will be providing volumes.

“First Reserve recognizes these opportunities as smart, strategic investments that align extremely well with our focus on making diverse investments in the energy sector. As such, we are actively evaluating opportunities to partner with E&P producers and midstream operators to help fund a portion of the infrastructure.”



FOLLOW-ON EQUITY

Robert Lane, Madison Williams

“Upstream companies executed midstream monetizations last year as a way to access additional capital and keep the drill bit turning, when traditional credit was tight and the recession was not yet in the rearview mirror. The oil and gas industry saw more than a dozen midstream deals in 2009, totaling \$2.5 billion. In fact, our firm assisted in three of these transactions in 2009, including Carrizo Oil & Gas’ \$35-million sale of its Barnett shale gathering and compression to Delphi Midstream Partners.

“As capital markets continue to open, we’re seeing more follow-on equity offerings in the midstream sector this year. We participated in four public equity-offerings by midstream master limited partnerships (MLPs) in just the first five weeks of 2010, totaling some \$2 billion. This compares to only two follow-on offerings for less than \$500 million for the same period last year.

“We expect a number of additional midstream equity follow-on offerings this year, in addition to as many as six to eight new initial public offerings (IPOs) of MLPs. To compare, there were only three MLP IPOs in 2008 and none in 2009.

“The strong market reception that we are seeing this year is different from the frenzy that drove MLPs to historically high prices and low yields in mid-2007, and fueled both high-multiple, over-levered acquisitions and an influx of money that saw MLPs as a low-risk alternative to money-market funds.

“Instead, today’s investors as a whole understand MLPs



and the fact that partnerships are using new equity to fund smart, conservative growth. In many cases, MLPs are pursuing more fee-based revenue generating alternatives and are keeping a watchful eye on their credit ratios.

“We believe that the current round of announced acquisitions, which are getting done at healthy, but not insane multiples, as well as a number of completed and announced restructurings, will compliment organic midstream sector growth and IPOs, and will provide midstream investors with handsome returns in 2010 and over the long run.”

REGULATION CHALLENGES

Jay Seegers, Vinson & Elkins

“Developers of midstream projects, such as gathering, processing or transmission facilities, are often called upon to make significant capital investments prior to having certainty that they can obtain necessary federal and state permits for their projects, and that they will have the ability to recover their investments within the existing regulatory system.



“They face several questions throughout the development process, including whether they will have the ability to condemn property for the project; what regulatory regime will oversee the process; what authorizations are necessary to commence construction; whether a regulatory regime exists that will impede the recovery of their investment; and whether regulatory oversight will change in the future. The lack of clarity in these areas continues to challenge developers.

“Because they are making substantial gathering and processing investments in new plays, there is often very little established regulatory oversight in these areas, although there is increasing pressure from various stakeholders to strengthen regulatory oversight. This is especially true for plays in densely populated areas.

“In places such as the Barnett shale, municipalities have united to lobby state agencies and legislators for more oversight and regulation for both drilling operations and emissions from processing plants and compressor stations. These efforts might lead to more scrutiny of environmental impact and create uncertainty about operating costs for midstream projects, as well as the timing and scope of drilling.

“An additional area of uncertainty for large gathering projects is whether the Federal Energy Regulatory Commission (FERC) will attempt to regulate the project as a transmission facility. Developers are attempting to remove this uncertainty early in the development process by petitioning FERC to rule that certain facilities will be non-jurisdictional gathering facilities once they are constructed and in service.”

HIGH STAKES

Tom Miesner, Pipeline Knowledge & Development

“Midstream developers face two main issues today—balancing the often-conflicting demands placed on them by myriad stakeholders, and renewing the workforce.

“When I first started in the business, management concerns

were focused on their owners, mostly integrated oil companies in the case of liquid lines and investors with a utility mindset in the case of natural gas.

“Now, customers, landowners, employees, regulators, legislators, environmental agencies and special interest groups are demanding their seat at the table as well. Unfortunately, the safety, reliability and environmental responsibility demands of these stakeholders are seen as competing with the owner’s profit and return expectations. Also, the not-in-my-backyard mentality contributes to developers’ difficulty.

“Increased communication is key. Experience teaches us that well-informed stakeholders are better prepared to reach common solutions. Industry associations like INGAA, AOPL, API, AGA and APGA, as well as individual companies, must spend more time educating and building relationships than they did 10 years ago.

“One great example of increased stakeholder education is the Common Ground Alliance (CGA), a broad-based coalition of those involved with underground utilities. Because damage by excavation equipment is a major cause of pipeline releases, CGA promotes communication about underground utilities and has developed really great best-practice materials to share with any interested party.

“Operators know asset integrity is critical to safety, reliability, environmental performance and efficiency. If they meet those criteria, much of the concerns go away.

“Today, operators are using technologies like iInternal line-inspection devices; direct assessment programs; geospatial mapping of facilities, hazards and sensitive areas; and risk-based approaches in their integrity programs.

“Another major concern for pipeline operators is workforce renewal. Operators are hiring bright young people, but the workforce age distribution has a dumbbell shape with concentrations at the high and low ends of the curve.

“During the past year or so, our training practice has really picked up. I take that as a sign operators, vendors, contractors and consulting companies are responding to this need.

“Before investing in midstream, capital providers should strive to understand the industry and the quality of management. Investors should understand what infrastructure supports their properties. In the Marcellus shale for example, production sometimes waits for pipelines before it can get to market.”

SHALE TAKEAWAY

Byron Kelley, Regency Energy Partners

“We are very pleased to have completed our Haynesville Expansion project, along with the \$47-million Red River lateral extension. Regency’s expansion in the Haynesville shale isn’t limited to the Haynesville Expansion project, though.

“We’ve announced two expansions to our Logansport gathering system in north Louisiana, which is scheduled for completion in mid-2010. Those expansions will increase our gathering, treating and interconnect capabilities, and provide additional high-value takeaway options in north Louisiana.

“In addition, our South Texas gathering infrastructure di-



rectly overlays the Eagle Ford shale. We have already added Eagle Ford wells to our gathering system and, from 2008 to 2009, our volumes in South Texas increased. We expect a further increase in 2010.

“Not only has Regency expanded its takeaway capacity in the Haynesville and Eagle Ford regions, we also placed more than 10,000 horsepower of compression in the Marcellus shale for contract compression services. We believe the Marcellus shale will require significant horsepower additions over the next few years.”



“First, other than the power-generation sector, gas-demand growth is projected to be flat in most parts of the country, so why build new storage? The simple answer—if there is one—is that storage requirements must be evaluated on a geographic sub-market basis. One sub-market can be long on capacity, while another is short. For example, some may question whether the storage-rich Gulf Coast needs new high-deliverability salt storage, but few challenge the need for reservoir storage in the emerging Rocky Mountain basins.

“Second, storage values are very site-specific. Most low-cost storage fields close to large market centers were developed years ago. Therefore, in what amounts to a trade-off between market proximity and good geology, developers are increasingly siting new projects at remote locations on the pipeline grid. This can lower project costs, but increase the cost of pipeline transportation to liquid market centers.

“Third, for developers, it is sometimes said there are no bad projects, only bad timing. In truth, there are bad projects, and even the good ones rely on strong project-execution teams to make them profitable. The value of storage fluctuates wildly with gas prices and market activity, and storage fees must clear the market in the good and bad times.” □

STORAGE 101

Greg Hopper, Black & Veatch

“Natural gas storage serves two essential purposes in North America. First, it’s an operational balancing tool. Second, it’s a price-arbitrage tool. This makes storage quite valuable and the relative economics provide access to investments in an otherwise capital-intensive midstream business.

“There are three questions we hear from clients: Does North America need more storage? How does location affect storage valuations? How do construction costs affect new projects?”

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MOVING MARCELLUS ETHANE

Producers working the wet-gas areas of the Marcellus are rewarded with high-value liquids. Yet, finding nearby markets for the liquids presents a challenge. Let the buildout begin.

ARTICLE BY DEBBIE HAGEN

Excitement over the amount of natural gas to be produced in the Marcellus shale is generating increasing buzz and enthusiasm across the industry.

Of the six most significant shale plays—the Barnett, Haynesville, Fayetteville, Woodford, Eagle Ford and Marcellus—the combined geography mass of the first five would fit into that of the Marcellus. Recent gas-supply studies indicate that the amount of recoverable gas in the shale plays will have a major impact on the nation's energy supply and ultimately could influence U.S. energy policy. In fact, gas shale in the U.S. is the equivalent of the historic crude oil reserves of the Middle East.

As recently as the winter of 2000, when California had its energy crisis, industry veterans believed that the U.S. had only enough gas reserves to last a mere 10 years. The trend was to build multibillion-dollar investments in liquefied natural gas (LNG) import facilities. However, due to the application of improved technology in horizontal drilling and fracturing in shale basins—especially in the Marcellus—that reserve estimate is now closer to 100 years. Consequently, LNG imports are likely on hold for the foreseeable future.

New investment in gas and gas liquids midstream infrastructure could amount to \$10 billion by 2013, according to a study released in January 2010 by energy investment and

Inergy LP's wholly owned, regulated subsidiary, Central New York Oil And Gas Co. LLC, is building pipelines in Bradford County, Pennsylvania, to gather Marcellus shale gas into storage at its Stagecoach facility.



merchant banking firm Tudor, Pickering, Holt & Co. (TPH).

TPH's report predicts that gas production in the Marcellus will go from 0.5 billion cubic feet per day (Bcfd) to about 4 Bcfd by 2013; 5 Bcfd by 2015; and over 7 Bcfd by 2020. At the same time, rig counts are projected to go from 80 in 2010 to over 200.

Rich gas versus lean gas

In April 2009, the U.S. Department of Energy estimated that the Marcellus contains 250 to 350 trillion cubic feet of recoverable gas. For the most part, Marcellus shale gas is lean and dry. But, with the vast size of the play—spanning from West Virginia, Ohio, Pennsylvania and into upstate New York—the amount of gas and the content of that gas vary significantly across the play. Studies show that parts of the Marcellus in northern West Virginia and southwestern Pennsylvania contain rich gas. In contrast, the northern and eastern parts of the Marcellus contain leaner gas.

As gas production increases across the rich Marcellus region, the natural gas liquids (NGLs) content can be too great to inject into gas transmission pipelines due to the gas hitting the maximum heat content (Btu) limits and dew point specifications of those pipelines.

Today, rich gas is more valuable due to the NGLs' value upgrade, meaning the NGL price, tied to oil, is higher than the price of gas. When that's the case, there is an incentive to process NGLs even if they could be left in the gas stream. In other instances, regardless of economics, pipeline specifications may require the processing of NGLs, including ethane.

The petrochemical industry is the only major consumer of the ethane component of NGLs. Most liquids-rich shale plays discovered to date have been relatively close to petrochemical demand points—primarily on the Gulf Coast with much smaller demand near Chicago and Sarnia, Ontario—but far from local gas demand. In the case of the Marcellus, it is the opposite. The ethane, which is 55% to 60% of the NGLs, must be transported long distances to petrochemical companies, which can be from 300 to 1,000 miles away, while the gas is close to the large interstate pipelines which serve the Northeast gas hubs.

Currently, Marcellus pipelines are flowing rich, unprocessed gas because the volume is still relatively low. The need for gas processing with ethane extraction is yet to be an issue.

“As volumes reach a critical mass, and heat content and dew point restrictions kick in, there will be some amount of ethane extraction required,” says Bill Gautreaux, president of Kansas City-based Inergy Services LP, one of the companies leading the effort to find solutions for NGLs in the Marcellus. “Today, however, there is currently no transportation infrastructure or local demand for ethane.”

Ethane demand

There is concern that net exports of chemical derivatives could moderate, long term, as new cost-advantaged petrochemical capacity in the Middle East and Asia is placed into service. Until then, exports are expected to remain fairly robust because the U.S. has the third-lowest ethylene feedstock cost behind the Middle East and Canada, according to Wells Fargo in its February 2010 NGL Snapshot.

The Hodson Report, which tracks petrochemical consumption rates, shows an average consumption of about

800,000 barrels per day (bbl. per day) during the past 12 months, with January 2010 peaking at 847,000.

Marcellus liquids yields are a function of whether gas is rich or lean, with 85% predicted to be lean. In addition, the relative gallons per meter of the liquids content has been ranging from some 4.5 to as high as 6, with Btu content as high as 1,350. Rich gas has been yielding liquids content of about 23%.

Within that 23%, about 55% is ethane, according to Jack Lafield, president and chief executive of Caiman Energy LLC, a Dallas-based gathering and processing company that will market its NGLs from Inergy's new processing plant in West Virginia.

By 2013, liquids production could exceed 100,000 bbl. per day in the rich-gas areas. By 2015, that number could reach 150,000 bbl. per day. Yet, there is no pipeline infrastructure in or near the Marcellus dedicated to transporting ethane, or any liquids mixture, to a market that can use it.

Conversely, there is very strong demand for propane, the second-largest product in the gas liquids stream. For now, the Texas Eastern Products Pipeline (Teppco) system ships propane from Mont Belvieu, Texas, to terminals in Ohio, Pennsylvania and New York.

Inergy LP is building a 5-million-barrel Finger Lakes Storage facility for propane and butanes at Watkins Glen, New York. It is connected to the Teppco system and will have rail-car and tank-truck loading facilities.

“We expect this facility to be essential for dealing with summer surplus in the Marcellus,” says Inergy's Gautreaux. “We are positioning that where the propane price is, on average, one of the highest in North America during winter. We also see good demand for the C5-plus streams.”

Gautreaux adds that within two to three years, liquids production with high ethane content is expected to necessitate a liquids pipeline takeaway solution to reach markets that can consume ethane, which are still primarily Sarnia, Chicago, and the U.S. Gulf Coast.

“As an alternative in the near term, certain pipelines have provided tariff waivers relating to Btu content and ethane percentage,” says Caiman's Lafield. “That should allow for the construction of midstream facilities that will help perpetuate the development of the rich region of the Marcellus shale. Otherwise, gas will not get developed or it will be shut in at the wellhead, putting producers and the midstream infrastructure in a difficult ‘wait and see’ position.”

The buildout begins

Most industry experts agree that a pipeline solution for ethane takeaway will be warranted and justified. As a solution becomes apparent, the wildcatters who were the first to amass millions of acres of leaseholds in the Marcellus may begin deploying rigs more aggressively.

Just as infrastructure buildouts have occurred in other shale plays, there will likely be a rush of companies staking their claim to build out in the Marcellus.

In first quarter 2010, the buildout had already begun. Buckeye Partners LP and Nova Chemicals Corp. announced a plan to develop a 400-mile mixed-NGL pipeline from the Marcellus to Sarnia. The proposed Union Pipeline Project would ship mixed NGLs, principally for use as a petrochemical feedstock. Separately, during Oneok Inc.'s recent analyst conference, its executives also made reference to the

evaluation of an NGL pipeline project from the Marcellus region to Sarnia.

According to Gautreaux, “Ultimately, we believe that a pipeline solution to Sarnia will involve the cooperation of multiple parties, including BP, which owns and operates the Sarnia fractionation and storage complex, and the Windsor-St. Clair terminal facilities.”

Alternatively, Cumberland Plateau Pipeline Co. (CPPC), based in Tulsa, is proposing the development of a 1,050-mile, 16-inch-diameter ethane pipeline that will move liquids from the Marcellus to the end-use markets in the Louisiana Gulf Coast, the largest ethane consuming region in North America.

Yet, several issues in play mean that creating a solution for the ethane takeaway in the Marcellus is not going to be easy. First, the petrochemical industry is a global market and the U.S. often competes against global facilities with a lower cost of feedstock, such as the newer Middle Eastern olefins crackers that are vertically integrated and located at the feed-

Unless a new use for ethane is established soon (unlikely), the biggest potential ethane demand market still lies in the Gulf Coast.

stock production source. This limits the ability for significant growth in U.S. demand for petrochemical feedstock in North America

Second, the Marcellus not only lacks ethane takeaway, but will require much more buildout of gathering and processing. Additionally, NGLs will need to be fractionated somewhere to achieve premium economics that are greater for a C3-plus stream than chemical feedstock purchase values.

There is also a growing amount of liquids displacement occurring from declining gas production in Western Canada and growing demand for C4 and C5 for bitumen-crude diluents in the West, as evidenced by the buildout of the Southern Lights Pipeline, due to be completed in third-quarter 2010, which will move C5 from Chicago to Western Canada.

Third, getting gas producers or the midstream sector to underwrite the volume and tariffs needed to construct a pipeline will be difficult. Some processors, such as MarkWest Energy Partners LP, have elected to build their own local fractionation, counting on ethane rejection in the near term. This creates a desire for an ethane-only pipeline solution. A pipeline project may require a full y-grade stream or at least a butane, natural gasoline and ethane mix to reach minimum volumes required to justify the project. However, if a company builds local fractionation in the Marcellus, it is not interested in delivering a full y-grade stream and accepting lower netbacks on C3-plus components.

Cooperation and competition

Alignment of interests will also be influenced by competition, future joint ventures and potential consolidation of the independent producer and midstream sectors. With the potential for more than \$10 billion of new infrastructure investment, large pipeline owners will be attracted to the buildout. Further competition and consolidation will ensue.

Already, supermajors and large E&P investors have begun

to jump, as evidenced by Statoil’s JV with Chesapeake Energy Corp.; ExxonMobil Corp.’s acquisition of XTO Energy Inc.; and most recently, Anadarko Petroleum Corp.’s \$1.4-billion JV with Mitsui E&P USA LLC, an affiliate of Mitsui & Co. Ltd., whereby Mitsui will participate as a 32.5% partner in Anadarko’s Marcellus assets in north-central Pennsylvania.

These competing concerns create a conundrum for capital-seekers. Producers want to prioritize capital for exploration and production, yet they are reluctant to aggressively drill without certainty of liquids takeaway. Gatherers and processors are looking for firm commitments of volume from producers before expanding their systems. Midstream groups are reluctant to underwrite volume and tariff risk on a liquid takeaway project without a better understanding of volume development. Marketers and petrochemical end-users generally lack capital because their experienced investors are leery of periods of price weakness that threaten financial viability.

Meanwhile, although a pipeline to Sarnia or Chicago might have lower-cost, lower-minimum-required volumes, existing infrastructure and proximity to the Marcellus, any new pipeline might struggle to provide a solution large enough to satisfy long-term growth of ethane takeaway needs in the Marcellus. Perhaps a pipeline to the Gulf Coast should be given the strongest consideration, but its underwriting may be jeopardized and diluted by the first-phase economics and timing of the Sarnia-Chicago solution.

Unless a new use for ethane is established soon (unlikely), the biggest potential ethane demand market still lies in the Gulf Coast. But a pipeline project of that magnitude would not only be extremely costly, it would likely take years to complete.

As a result, a Gulf Coast pipeline has a lower likelihood of gaining traction, at least right now, says Inergy’s Gautreaux. “Yet, over the long term—depending on the amount of rich gas—it may be the only complete solution for ethane in the Marcellus.”

The takeaway solutions that involve Sarnia and Chicago could be based on some existing pipeline infrastructure and rights-of-way in the areas between the Marcellus and both Chicago and Sarnia. Such a plan could defray cost and mileage and shorten timing. Along with the olefins cracker demand in Chicago and Sarnia, there is available fractionation capacity and a gateway pipeline, BP Plc’s Eastern Delivery System, which travels north from Ohio to Windsor, Ontario, storage and on to its 11-million barrel NGL fractionation and storage complex at Sarnia.

Many industry experts believe that because Sarnia and Chicago are closer than the Gulf Coast to the Marcellus, they represent a better source of variable and flexible demand. However, the large relative size of the Gulf Coast and its olefins-cracker demand continues to make that theory debatable.

In the end, with competition heating up, and with more news coming from the major players in the Marcellus on a daily basis, it is anyone’s guess as to what the ultimate answer will be. The best advice is to stay tuned. □

Debbie Hagen is president of Hagen and Partners, an integrated marketing communications firm based in Leawood, Kansas.

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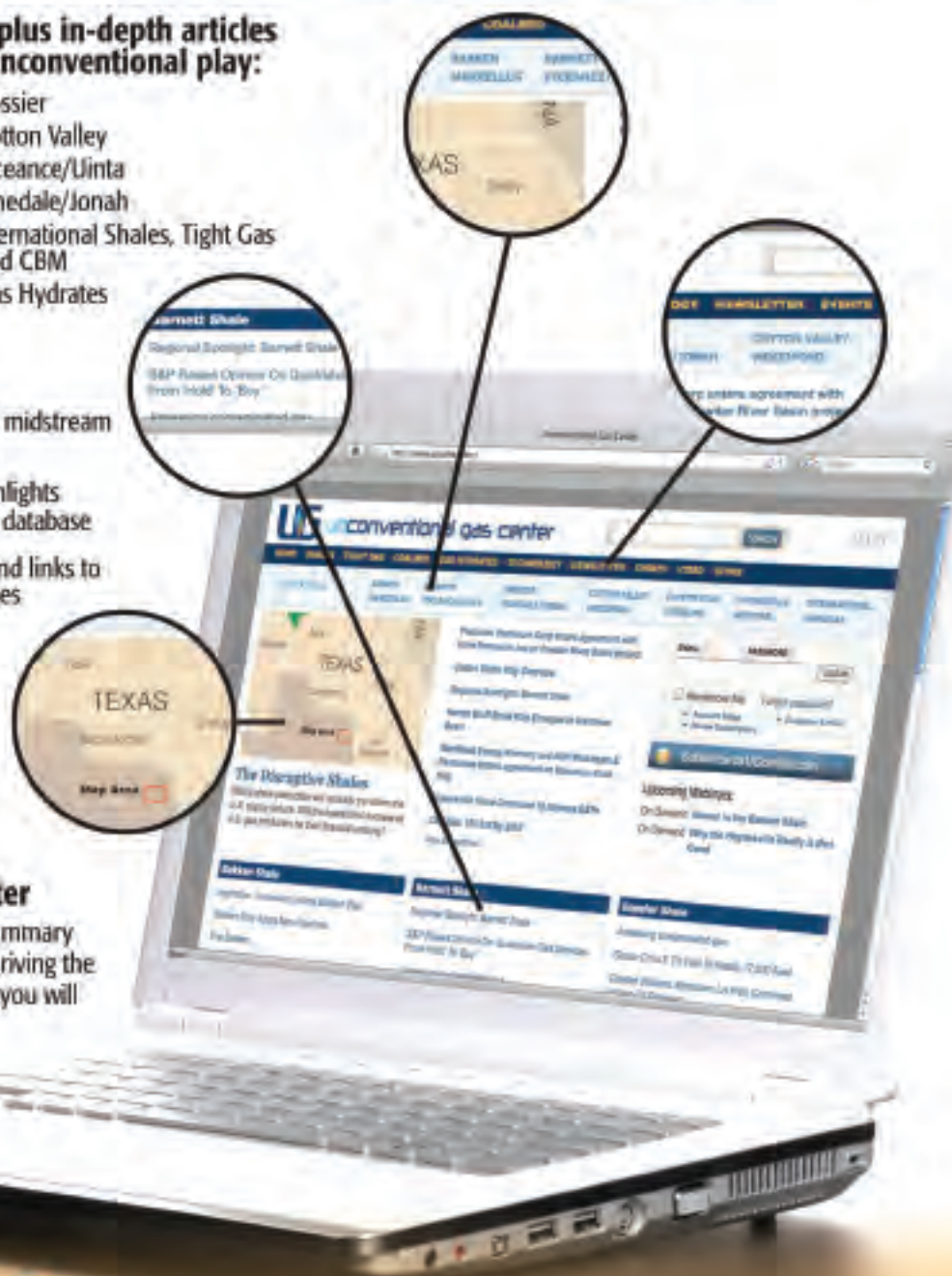
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AN ENTERPRISING LEADER

Mike Creel reveals Enterprise's secrets—and lucky timing—as his team continues to plot the future for the largest publicly traded energy partnership.

INTERVIEW BY LESLIE HAINES

As president and chief executive, Michael Creel led Enterprise Products Partners LP into phenomenal growth during the past three years, and he plans to continue to do so. Since the company's IPO in 1998, its asset base (\$26 billion in September 2009) has grown through acquisitions and organic growth to claim title as the largest publicly traded energy partnership.

The company controls more than 49,000 miles of pipelines, 190 million barrels of natural gas liquids (NGLs), refined products and oil storage, 27 billion cubic feet of gas storage, 25 gas-processing plants, 18 fractionation facilities, a Houston Ship Channel import-export terminal, 69 tow boats, 136 barges and six offshore-hub platforms.

Creel is on the board of directors for the partnership's general partner and has been a member of the executive leadership team for 11 years. He was executive vice president in 2001, chief financial officer in 2000 and senior vice president in 1999. He is group vice chairman and chief financial officer of privately-held Enterprise Products Co. and a director of the general partner of Duncan Energy Partners LP. He holds a bachelor's degree in accounting from McNeese State University, is a member of the AICPA and the Texas Society of Certified Public Accountants and is a certified public accountant with more than 30 years of energy-industry experience.

Investor Mike, given all of the holdings of Enterprise Products, how do you define the direction of the company?

Creel The midstream is our focus area. We've built a pretty impressive set of assets but we've done it a little differently than most MLPs. We're focused more on building a business as opposed to simply looking for cash flow.

Investor Have the shale-gas plays created opportunities for Enterprise?

Creel Yes, certainly. In the Rocky Mountains, we were fortunate to have a project with Teppco Partners LP—the Jonah Gas Gathering System. The reason we had an interest there was not so much for the gathering as the processing. As a result, we built three gas-processing plants in the Rockies—one in Wyoming and two in northwest Colorado. Each has the capacity to process about 750 million cubic feet per day. We were looking at a third plant at our Meeker facility, but then producers started slowing down due to gas prices.



Investor And you have pipeline assets there as well?

Creel That's right. Our Mid-America-Seminole NGL Pipeline comes down from Wyoming and Colorado, through New Mexico and Texas, then extends through the Midcontinent and Upper Midwest. We bought that from Williams for \$1.2 billion in 2002, when they needed to sell some assets. At the time, it was the only pipeline that could move liquids out of the Rockies. With that, and teaming up with Teppco on the Jonah-Pinedale Field, and building gas plants, we had as much as 30,000 to 35,000 barrels of liquids per day per plant. That gave us the opportunity to expand that Mid-American Pipeline System.

Investor Tell us about your plans for the Eagle Ford shale play.

Creel With the Eagle Ford, it's another instance where we were well-positioned because of our existing assets. We bought a gas gathering system from Lewis Energy Group in South Texas and, as part of the GulfTerra Energy Partners acquisition in 2004, we acquired seven processing plants there. So, before anyone thought about the Eagle Ford and what implications that might have, we had pipeline and processing assets there. We're also extending our pipeline through the Eagle Ford, a big-diameter pipeline, and we're segregating our system into crude oil and dry- and wet-gas systems so we can provide the most value to the producers.

Investor You seem ahead of the competition.

Creel The benefit is that we offer more services to the producers. We not only gather and process their gas, but we have an ethane pipeline coming out of South Texas and we've got NGL pipelines all over, so we can move products to the highest-value markets. We can do things other midstream companies can't, at least for now. We're not looking to give anyone an opportunity to get ahead of us.

Investor Have you taken a look at the Marcellus?

Creel Yes, we already have a pipeline going through Ohio and Pennsylvania that was a part of our Teppco merger, and we're smack in the rich-gas part of the Marcellus. There's a market for propane, but ethane is the tough part. There is no native market for ethane in the Northeast, so what do you do with the stuff? We know the markets up in Canada need the ethane, and have assets nearby, so that might be part of the overall solution for the Marcellus. We knew the Teppco

merger would result in some immediate cost benefits and growth opportunities, but we have been pleasantly surprised by our success in generating revenue above our original projections.

Investor What's your biggest challenge to working your assets?

Creel We ask a lot of our people, so I think the challenge is finding the right kind of people for our business. Frankly, everybody doesn't fit well in Enterprise, just as everybody doesn't fit well in a General Motors or an ExxonMobil. We need people who are self-motivated, that know the business, that are not wanting to sit around and wait for someone to tell them how to go out and create value; we want people that know how to do that. We've got a great team of executives. We have officers, directors and managers that really get a charge out of seeing how they can create value. The challenge for us is to make sure those people stay motivated, to make sure they're compensated properly and that they're enjoying what they're doing.

Investor You've been successful in raising capital even in difficult markets.

Creel Yes, because the cost of capital is more reasonable for us than for other partnerships. Certainly the end of 2008 was not a pretty time for anybody. Even in the midst of the darkness of fourth-quarter 2008, when people were contemplating jumping out windows, we completed the first public debt offering of a BBB-rated company. In January 2009, we were the first issuer of equity in the U.S. in any industry. Although the equity and the debt were more expensive than we

In January 2009, we were the first issuer of equity in the U.S. in any industry.

would have liked, we demonstrated to the investment community, the rating agencies and our customers that we had access to capital. That was extraordinarily important. We scaled back our capital budget significantly, but we still finished the year with about \$1.5 billion of growth capex. We started 2010 with almost \$2 billion in liquidity, so we've been very successful in raising money. We don't over-lever, we don't take risks that are inappropriate for the company.

Investor For 2010, are you looking for acquisitions or organic growth?

Creel All of the above. We're not looking for any big chunky acquisitions because we think it would be difficult to find a company or a partnership where we like all the assets. We've done some discreet purchases of assets, some bite-size pieces in the range of \$50 million to \$200 million. We know there are some majors out there looking to sell assets and we're waiting to see what those are. The \$1.5 billion that we've already committed for 2010 is primarily organic growth.

Investor What's your biggest project this year?

Creel It's probably going to be our \$1.5-billion Haynesville Extension Pipeline. That's a two-year project. It will go into service in the third quarter of 2011. It's a big 42-inch pipeline coming out of northwest Louisiana and extending down to our Acadian pipeline system. It's another instance of being in the right place at the right time. If you look in southeast

Louisiana, we have a big gas pipeline system there, the Acadian pipeline system. We bought that from Shell in early 2001. We are building a pipeline from northwest Louisiana diagonally southeast to our Acadian pipeline system, which will help Haynesville producers realize more value for their gas.

Investor There's so much expansion going on, what about the price of pipe?

Creel The price of steel and pipe is starting to go up, but we already own the pipe. We already have the mill space, so we're kind of insulated from those costs.

Investor You reserve mill space well in advance?

Creel I'd like to tell you that we're just smart and we had a lot of forethought, but the fact of the matter is that we had a project to build an offshore port called the Texas Offshore Port System. That partnership had already bought steel slab and materials to make pipe. When we pulled out of that, we got the pipe and the mill space as part of that project. So we already had it.

Investor That turned out to be fortuitous.

Creel It could have been a lot worse. Pipe and steel prices peaked in second-quarter 2008. Near the end of 2008 they just came crashing down. We've seen a gradual recovery of prices for pipe, steel and slab. What we haven't seen is a lot of upward pressure on contractor wages. There was a lot of pressure when things were blowing and going in the Barnett shale and the Rockies. There was pressure after the hurricanes that drove a need for those skills all over the U.S. We're not seeing that anymore. In fact, we've seen construction



wages in the Rockies coming back down. Same thing in Texas. If anything, what you're seeing in Louisiana with these new projects is construction wages are holding where they are, which in a downturn is probably a good thing.

Investor Do you worry about over-piping the Haynesville or Eagle Ford?

Creel I don't see that in the Eagle Ford so much because we do have a very good position there. There are a number of intrastate pipes going through Texas already. Haynesville is a little different. The thing that's a little unnerving to me about the Haynesville is that you have so much new takeaway capacity coming in there. Talk about a herd mentality, everyone wants to go to Perryville. And that's the puzzle: there will be a huge bottleneck at Perryville. There's a lot of gas in Perryville so the basis is working against producers and it's going to net back to a lower price. Our Haynesville Extension will get producers closer to end customers and inter-connect with a boatload of other takeaway options by going to the Southeast.

Investor Is there any pet project you're really excited about?

Creel We've got a lot of exciting projects. We're working to see how we can expand our business in a meaningful way. I think the thing you need to take away about Enterprise is that there isn't just one person leading the way. We've got a management team and a group of employees that are all committed to the success of the partnership. Everyone plays well with each other.

Investor Even through the mergers?

Creel We've gone through a lot of mergers with different corporate personalities. In 1998, Enterprise was a private company and acquired Tejas from Shell. We had people with a Shell background. We acquired the Mid-America Pipeline System from Williams, another big company. We did the GulfTerra acquisition in 2004, bringing in an El Paso culture. The impressive thing about all of those is to bring them all together and not lose small-company mentality. By that I mean our focus, our drive, the ability to do things quickly and get them done right the first time.

Investor How do you do that?

Creel We don't let the culture get diluted. We used a consultant when we have done mergers. So, if there was going to be a bad guy, it was going to be the consultant. We really wanted to structure the organization first and then fill it in with the people. We thought it would be best for each position and for the company as a whole. At the end of the day, there were a fair number of people from each acquisition that wound up in key positions.

Investor Did they stay?

Creel Over time, some of those people felt like this wasn't the organization for them. The people who like this kind of flat organizational structure—access to senior management, deep involvement in projects—are the people who get off on this. Also, we've got a chairman, Dan Duncan, who has boundless energy. He runs circles around all of us. □

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SHALE GAS JVs

Midstream joint ventures are emerging as a creative solution for owning costly transportation assets. Here's a run-down of some of the more prominent shale-driven JVs.

ARTICLE BY GARY CLOUSER

The rapidly expanding shale plays are, by their very nature, occurring in areas lacking necessary midstream infrastructure to get gas to markets. The phenomenon has prompted some pioneering E&Ps to form joint-venture (JV) partnerships to raise capital, create midstream systems and build value every step of the way. It's one method to enable cash-strapped E&Ps to focus more closely on timing production-ready upstream projects with much-needed midstream facilities.

First among such agreements between E&Ps and midstream companies was the deal between Range Resources Corp., a producer based in Fort. Worth, and MarkWest Energy Partners LP, a midstream company headquartered in Denver. MarkWest would go on to form two more significant joint ventures in the play.

Range-MarkWest JV

The Range-MarkWest deal, signed in June 2008, called for MarkWest to build and operate gas gathering pipelines and processing facilities for Range's Marcellus shale production. MarkWest has since formed a second JV with Midstream & Resources (M&R), a Houston-based private-equity fund, for additional capital commitments to help keep pace with the phenomenal growth of Range.

When the original agreement was announced, MarkWest expected to invest some \$50 million (2008), followed by an additional \$125 million (2009) in the project.

"Having the pipeline and processing infrastructure in place will be important for us to develop the reserve potential of the play," said John Pinkerton, chairman and chief executive of Range, in a public statement. During the previous four years, Range had invested more than \$700 million in leasehold, drilling and infrastructure.

Frank Semple, chairman, president and chief executive of MarkWest, was quick to approve the deal because the JV established MarkWest's presence in the prolific Marcellus shale.

Simply put, MarkWest will construct and own the midstream systems that Range would need for its Marcellus development, and Range will commit to using that infrastructure. Range will not own a financial stake in the midstream, nor will MarkWest own a stake in production. The delineation is clear: Range owns production and MarkWest owns the midstream facilities which other producers will be able to use.

Range, which drilled the first commercially viable Marcellus well in 2004 and its first horizontal well in the region in 2007, is currently producing more than 100 million cubic feet per day (MMcfd) of gas, a milestone it reached in December 2009—nearly a four-fold increase over the previous year. Range's 2010-production goal is 200 MMcfd, which it plans to double by the end of 2011.

In an interview with *Oil and Gas Investor* in February,

Rodney Waller, senior vice president for Range, discussed the agreement with MarkWest.

"We were looking for an experienced midstream company that understood shale plays and had expertise in the liquids market," he said. "We wanted a midstream company that had the capability and resources to stay ahead of our drilling. We also wanted to partner with a company that understood that communication would be ongoing and adjustments would need to be made as development progressed. We found that MarkWest exceeded all of our criteria."

Waller added that Range's successful JV with MarkWest will likely set a model for others to emulate as they recognize the need for cooperation between midstream companies and producers.

It was a win-win arrangement, Waller said. Letting MarkWest handle the midstream issues allowed the E&P to use



A coating inspector checks the millage on a pipe section of Regency Energy's Haynesville Expansion project.

Midstream JVs

its capital for exploration and production, which, for Range, has a far greater rate of return than does the midstream business. The infrastructure expansions interconnected with MarkWest's existing gathering, processing, fractionation and marketing network in Kentucky and West Virginia.

MarkWest-Midstream & Resources JV

In January 2009, MarkWest formed another significant deal, this time with Midstream & Resources. The JV is known as MarkWest Liberty Midstream & Resources LLC. As MarkWest's financing partner, the JV allowed capital resources to keep pace with the expanding scope of the play by building and operating midstream services in the Marcellus.

MarkWest would own 60% and M&R would own 40%. MarkWest agreed to contribute \$100 million of existing Marcellus assets to the JV, and to be the operator. M&R invested \$200 million of capital needed through 2009. To maintain the 60/40 capital structure, MarkWest agreed to invest some \$200 million by the end of 2011.

In August 2009, MarkWest and M&R amended their JV, due to dramatic growth in shale-gas production, to allow MarkWest to maintain its capital flexibility. Under the amendment, M&R invested an additional \$150 million, which is expected to be the majority of capital required for 2010. MarkWest will contribute the majority of future capital required until it has invested 51% of the JV's total capital.

MarkWest and M&R will keep the 60/40 ownership split until January 2011, when the ownership percentage will be adjusted to 51/49, respectively.

"The JV expanded the capital base to provide sufficient flexibility to further leverage off of the existing infrastructure initiatives and capture additional growth opportunities that will directly benefit the JV partners and the producing community," said John Raymond, managing partner and chief executive of M&R.

In December 2009, MarkWest Liberty's Marcellus infrastructure was expanded with an additional 120 MMcfd of cryogenic gas-processing capacity, 20 miles of gathering and residue gas pipelines and 21,000 horsepower of compression. MarkWest's total Marcellus shale infrastructure capacity is about 180 MMcfd, including 155 MMcfd of cryogenic processing capacity for high-Btu gas.

Next, the midstream company plans a 120-MMcfd cryogenic plant in Majorsville, West Virginia, for third-quarter 2010, a 200-MMcfd processing plant and a 37,000-barrel-per-day fractionator at its Houston, Pennsylvania, processing complex in early 2011.

In September 2009, MarkWest Liberty announced a third significant agreement, this time with Chesapeake Appalachia LLC, a subsidiary of Chesapeake Energy Corp., and Statoil Natural Gas LLC, a subsidiary of StatoilHydro ASA. The producers agreed to process their gas at MarkWest Liberty's Majorsville processing plant.

Atlas-Williams JV

While MarkWest was strengthening its position as midstream operator to the stars, Atlas Pipeline Partners LP, based in Philadelphia, got in on the action as well.

In April 2009 Atlas formed a JV with a subsidiary of Tulsa, Oklahoma-based Williams Cos. to form Laurel Mountain Midstream LLC. The venture will develop and expand the participants' presence in the southwest area. The agreement marked Williams' midstream entry into the region.

In the JV, Laurel Mountain Midstream acquired Atlas Pipeline's existing Northern Appalachian Basin gathering system, which at the time included 1,800 miles of intrastate gas gathering with an average 100 MMcfd that served 6,900 wells. The Marcellus production growth of Atlas Energy Resources LLC, an Atlas Pipeline Partners affiliate, had propelled a 30% increase in the gathering system's throughput the previous year.

Williams took a 51% interest in and operation of Laurel Mountain Midstream in exchange for \$100 million and a \$25.5-million note payable to the JV. In addition to acquiring existing physical assets, Laurel Mountain Midstream entered into gathering agreements with Atlas Energy that granted a long-term dedication of existing and future Atlas Energy acreage and production in the venture's area of interest, which at the time included 550,000 acres and an estimated 4- to 6 trillion cubic feet of resource potential. To maintain the dedication, the JV is obligated to expand and connect its gathering system to serve Atlas Energy's new production.

The bulk of Laurel Mountain Midstream's current assets and anticipated growth areas are in southwestern and north-



Pipes are set up and ready to go during construction of Regency Energy's Haynesville Expansion project.

eastern Pennsylvania. Laurel Mountain Midstream is currently initiating construction of significant expansions in southwestern Pennsylvania that will serve Atlas Energy's core Marcellus acreage and third-party producers.

"The Laurel Mountain Midstream venture is an ideal growth opportunity for Williams," says Alan Armstrong, president of the company's midstream business. "Our long experience operating large-scale, reliable midstream assets will benefit the producers as they ramp up their drilling programs over the next several years."

Gene Dubay, president and chief executive of Atlas Pipeline, said the JV will provide the financial leverage needed to fund anticipated growth in the Marcellus.

Dominion-Williams JV

Another key player in the Marcellus is Richmond, Virginia-based Dominion, which in August 2009 announced a JV with Williams to move Rockies and Marcellus gas to East Coast markets via the Keystone Connector, a proposed 1-Bcfd pipeline beginning at the Rockies Express pipeline in eastern Ohio and ending at Williams' Transco Station 195 in southern Pennsylvania. The JV will create synergies for the partners. Dominion is a major producer of Appalachian gas and operates transportation and storage systems in the heart of the Marcellus Shale. Williams produces, gathers and processes Rockies and Marcellus gas and operates the

Transco pipeline that serves major markets in the Northeast.

"If you overlay a map of the Marcellus shale with a map of our facilities, you would see it is the same area," said Dominion company spokesman Daniel Donovan. "Our system has many entry and exit points—it is a regional pipeline designed to gather Appalachian gas and deliver the gas from storage to markets. We have expertise in gathering, processing, extraction, storage and transmission of natural gas, so we can be heavily involved in the midstream portion of the Marcellus shale going forward."

Rex-Stonehenge JV

Another JV was announced, in December 2008, between State College, Pennsylvania-based Rex Energy Corp. and Westminster, Colorado-based Stonehenge Energy Resources. They formed Keystone Midstream Services LLC by investing some \$25 million to build a gathering system and cryogenic gas processing plant in Butler County, Pennsylvania.

Stonehenge (60%) contributed its 40-MMcfd Sarsen cryogenic gas plant. Rex Energy (40%) contributed its existing gathering system in Butler County. Rex Energy reserved 20 MMcfd of capacity in the Sarsen gas plant for 2010 and 40 MMcfd of capacity thereafter.

Benjamin Hulburt, Rex Energy's president and chief executive, said at the time the JV was launched that it "signif-





Crane operators lower pipes into a trench during construction of Regency Energy's Haynesville Expansion project.

icantly reduces Rex Energy's capital investment in necessary infrastructure in Butler County and leverages the extensive experience of the Stonehenge management team."

Regency-Alinda-GE JV

Although the Marcellus is grabbing the most attention, it is not the only shale play involving midstream JVs. In March 2009, Regency Energy Partners, a Dallas midstream company, Alinda Capital Partners LLC and General Electric Capital Corp., an affiliate of GE Energy Financial Services (GE EFS), announced a three-way JV in the Haynesville shale.

Regency contributed its Regency Intrastate Gas System (RIGS), a \$400-million, 320-mile intrastate pipeline in northern Louisiana, in exchange for a 38% stake in the JV. GE EFS, which owns the general partner of Regency, contributed \$126.5 million for a 12% stake. Alinda Capital, which, through its association with GE EFS, jointly owns local gas distribution companies and intrastate pipelines, invested \$526.5 million in exchange for a 50% stake.

In the fall of 2008, shortly after Regency announced its original expansion, access to traditional sources of capital was limited. Waiting for the financial markets to improve was not an option as commitments had been made to producers, who vitally needed this project to timely move forward. Regency had already begun purchasing materials, and the company was concerned that if it didn't move on the project, someone else would move ahead with a competing pipeline.

"We wanted to stay on schedule with the project while securing financing under terms accretive to our unitholders in 2010 and beyond," says Byron Kelley, chairman, president and chief executive of Regency Energy. "The creative structure of the Haynesville joint venture provided access to one of the most efficient costs of capital available, and allowed Regency to develop a fully-financed, strategic project."

The JV ensured that the enterprise was well funded, with nearly \$1.3 billion in equity capital and no debt, Kelley says. "From our partners' perspectives, the joint venture provided a unique opportunity to invest in a major intrastate pipeline with long-term contracts in a fast-growing production area."

Chris Beale, managing partner of Alinda, says "Alinda

made the investment because the Regency pipeline system is an essential infrastructure link between the Haynesville shale and the trunklines that serve major gas markets."

The JV began construction of the Haynesville Expansion Project in May 2009, and has since announced a \$47-million extension, called the Red River Lateral, to further increase capacity. In September, Regency used proceeds from a private placement to buy an additional 5% interest in the JV from GE EFS, increasing its ownership interest to 43%, while GE EFS retained a 7% partnership interest.

The Haynesville Expansion project and the Red River Lateral began service in January 2010. These projects, combined with the previously existing RIGS system, bring the total pipeline capacity to 2.1 Bcfd.

"The Haynesville Expansion Project was specifically constructed to provide much needed takeaway capacity for Haynesville shale gas in north Louisiana and is the first major project to be placed in service in the region," Kelley says. "We continue to see impressive drilling results in the Haynesville, and the joint venture is currently evaluating additional expansions to RIGS, which we believe is well positioned for future growth in the region."

BG-Exco JV

Also in the Haynesville, BG Group Plc, the London-based international gas conglomerate, and Dallas-based Exco Resources announced a deal in June 2009 that was primarily production oriented, but with some direct and indirect midstream implications.

The deal, which marked BG's entry into the Haynesville, called for BG to take a 50% interest in projects owned by Exco in a \$1.3-billion agreement involving producing and non-producing assets in areas of mutual interest covering 120,000 acres. The deal also involved a 50% stake in Exco's midstream assets in the Haynesville valued at \$249 million. BG and Exco plan to jointly develop the midstream business. Exco holds 700 miles of pipeline and gathering assets and is constructing a 29-mile line to transport Haynesville gas.

Other shale JVs

Midstream JVs are also springing up in the Woodford shale in Oklahoma and the Eagle Ford shale in South Texas.

Chesapeake Energy Corp, Oklahoma City, formed a JV with Global Infrastructure Partners (GIP), a New-York based private-equity firm, in which Chesapeake sold a 50% interest in some midstream assets and contributed those assets to a new entity, Chesapeake Midstream Partners LLC. GIP paid \$588 million for a 50% interest in the new entity, which was substantially all of Chesapeake's midstream assets in the Barnett shale and a majority of its non-shale midstream assets in the Arkoma, Anadarko, Delaware and Permian basins.

Chesapeake's midstream assets not included in the JV will be operated under a separate company, Chesapeake Midstream Development LP, and include gas gathering assets in the Fayetteville, Haynesville and Marcellus plays and other areas in Appalachia.

In May 2009, also in the Woodford, Boston private-equity firm Arclight Capital Partners LLC announced that it was investing \$62.5 million in a JV with MarkWest to build a 50-mile gas pipeline. That deal involves MarkWest selling a 50% interest in the Arkoma Connector pipeline, now online. □

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TRANSFORMATIVE EVENTS

A Sempra executive discusses recent transformative events affecting energy. Some events caused havoc in the markets. Others, surprisingly, provided solutions.

ARTICLE BY JEANNIE STELL

During a Houston midstream-energy conference earlier this year, Russell Murrell, vice president of business development for San Diego-based Sempra Pipelines and Storage Corp., talked about recent transformative events, their impact on the energy industry and his view of short-term and mid-term opportunities.

“Everybody wants to know: Are we oversupplied with gas? Are we long? Are we short? What about shale? What about LNG? We want to put a label on it and put it to bed. We want to feel certain that we have the right answer. There are a lot of engineers in this business and that’s the way these guys like to operate.”

Murrell noted that, after a sustained period of volatile financial and energy markets, decision-makers are looking for direction on which to base planning strategies as the global economy stabilizes.

Yet, today, hard-and-fast answers are not so easy to come by, he said. As an example, he pointed to the analysts’ predictions a few years ago that warned industries that electric generation could fail to meet demand due to the lack of inexpensive feedstock. The U.S. was going to have to find a way to attract new liquefied natural gas (LNG) away from Asia and into North American terminals to feed power plants.

At the height of this perceived gas shortage, a transformative event in the form of new shale-gas production technology turned the situation upside down.

“We moved into oversupply as we ‘found’ all this domestic shale production,” said Murrell. “That solved all the problems. In fact, we’ve flipped completely the other way, where we’re just drowning in gas. And there’s going to be no more

volatility, right? We are just going to be long for as far as anybody can see.”

During the credit crisis and resultant recession of 2008 and 2009, rig counts dropped, sinking to about 50% of prior levels. Yet, most of the laid-down rigs were from conventional gas plays. Even where rigs were stockpiled in unconventional plays, production leveled off, but did not precipitously fall due to high production rates per well.

Gas prices continued to fall, yet many E&Ps with robust hedging programs happily continued to produce. The U.S. experienced record gas storage-injection rates in 2009. “Everything seemed to be plugging along, and everyone thought they had a handle on it. You know, a funny thing happened. We sort of got tested,” said Murrell.

Mother Nature intervened, he said. By the fall season of 2009, weekly temperature averages had dropped into the chilly zone all the way south to Galveston and Orlando and west to San Francisco. During the winter, Houston saw snow not once, but twice, and the Eastern Seaboard was continually buried under several feet of the fluffy stuff. New Yorkers experienced more than their fair share of snow days while wondering whatever happened to global warming.

“It only took one good, hard, cold front,” he laughed. “In the face of all the hype about oversupply and how much gas we had in storage, we saw \$17 gas in Florida and in New York. When we see these types of transformative events, it

“In the face of all the hype about oversupply and how much gas we had in storage, we saw \$17 gas in Florida and in New York,” said Russell Murrell, vice president of business development for Sempra Pipelines and Storage Corp.



challenges all of us to step back and question how we think about things and how we view the markets.”

Deliverability

Murrell contends that \$17 gas “at the end of the pipe” is due to bottlenecks of deliverability. “What really matters is the ability to deliver the product to the end-use destination,” he said. “Because at the end of the day, that’s where the rubber meets the road.”

Another transformative event, affecting the previously smooth stream of deliverability, is the shift from mostly transporting conventional offshore gas to now transporting onshore non-conventional supply, he said. “That has a lot of ramifications.”

One result is the switch of thinking away from hurricane-vulnerable offshore production outages to onshore shale-gas supply. But shale-gas has weather challenges, too.

“I think the trade-off for hurricane risks is that now we have freeze-off risks. I would hope the solution for that is storage. There’s no certain way to avoid supply disruption. You can have hurricanes; you can have freeze-offs. I think the market had an opportunity to step back and appreciate that effect this winter.” The key point, he said, was that demand was met.

“The demand was met with a combination of tools, including the shale supply, the new LNG that’s coming in and the vast amount of gas that was in storage and available to be withdrawn and delivered.”

Another transformative event underway is changes to the pipeline grid as new unconventional gas supplies are brought online.

“The pipeline constraints are shifting around,” said Murrell. “And, I think, will continue to do so. They’re moving to new places. As a midstream-asset developer, that’s something we’re watching very closely. We’re trying to stay out in front of that and anticipate where we think those bottlenecks are going to be, where is the next constraint, who is going to be feeling that pain and how we can provide services and solve a problem for someone.”

Rocky Mountain Express

Rocky Mountain gas producers are familiar with the pain. For years they had bemoaned the lack of takeaway capacity. Competition for pipeline space continually squeezed producers’ netbacks, sometimes to less than \$1 per thousand cubic foot. Finally, in 2009, the long-awaited Rocky Mountain Express Pipeline (Rex), one of the largest gas pipelines ever constructed in North America with more than 1,600 miles of pipe, was completed, stretching all the way into the Clarington Hub in Monroe County, Ohio.

Transformative event: At completion, Rex was met head-on with huge rates of gas production coming out of the Marcellus shale play in Pennsylvania and West Virginia. While it hasn’t happened yet, some insiders expect the Marcellus gas production to displace the need for Rockies gas in the Northeast sometime during the next several years.

Murrell has been watching that scenario develop very closely as well. After all, the Rockies Express was developed by Rockies Express Pipeline LLC, which is a joint development of Kinder Morgan Energy Partners LP, ConocoPhillips, and, yes, Sempra Pipelines and Storage.

While some pipelines might be in the wrong places, oth-

ers need to be built in the right places. And now might be the right time to begin such projects.

“Speaking a little bit about the development climate, for those of us in the business, we’ve seen prices for labor and material costs come down,” said Murrell. “Certainly, that’s good. Capital costs and availability, I would say, are ever so slightly better.”

Going forward, Murrell sees opportunities in both the short-term and mid-term. “We consider short-term to be anything less than five years. In the short term, our midstream focus is going to be largely on gathering assets. We will probably also look at some pipeline infrastructure coming out of the Marcellus play and maybe some pipeline infrastructure out of the Southeast.”

Sempra is also looking to move southern shale gas beyond where it’s going now and into other markets. “We think there is a possibility that once all of the southern shale gas is absorbed at Perryville (near Delhi, Louisiana) or Station 85, there may be a need for more pipelines to move gas out of the Southeast.”

“We consider short-term to be anything less than five years. In the short term, our midstream focus is going to be largely on gathering assets.”

Mid-term, Sempra will consider building pipelines into and throughout Florida and some intrastate lines in California. Elsewhere, it will look at building new takeaway capacity to move shale gas out of western Canada’s Horn River play.

Even with careful planning, Murrell expects more transformative events to change the face of U.S. energy. “There will be some wildcards that we all know are out there,” he said. “We all hear a lot about them. LNG, obviously, is a significant wildcard. That’s a topic all unto itself, and one you could spend all day on. The face of the global economic recovery is another big wildcard and governmental intervention here in the U.S., as well as abroad, are others.”

Individually, any of those conditions could have a significant impact on the energy industry, he said. “All three of them collectively that are in play right now have the ability to cause transformative events in our industry. So, obviously we all need to be watching those very closely and staying in touch with them.” □

Sempra Pipelines develops and operates gas infrastructure throughout North America. Its affiliates also manage gas and electricity distribution in the U.S., Mexico, Argentina, Chile and Peru. The company is a subsidiary of Sempra Energy, which reported \$8 billion in revenue in 2009 and, with 13,800 employees worldwide, develops energy infrastructure, operates utilities and provides related products and services to 29 million consumers worldwide.

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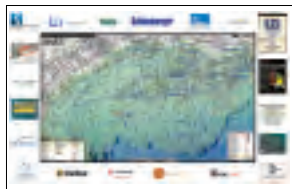
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THE PRODUCTION-INFRASTRUCTURE GAP

Watch out for shifting dynamics between E&Ps, traditional midstream MLPs and private-equity providers. Can the midstream projects keep up with production?

ARTICLE BY MELTEM DEMIRORS

As shale developments ramp up, significant volumes of natural gas are coming online in areas of the U.S. where midstream infrastructure assets are still immature. The combination of cost advantage, abundant domestic supply and a reputation as the cleanest fossil fuel have enabled shale-gas deposits to play a significant role in the national energy mix.

In fact, nearly 50% of all electric-power-generation capacity growth is expected to come from gas during the next 25 years, increasing the share of gas to 23% of total energy consumption. Roughly 40% of the gas production will come from shale and other unconventional resources.

However, without midstream infrastructure, the industry will struggle to capitalize on the coming wave of shale gas from prolific plays such as the Haynesville, Marcellus and others, according to Chuck Chakravarthy, a director in the oil and gas strategy practice at Deloitte Consulting LLP. During the next 20 years, the industry will have to invest up to \$210 billion in midstream infrastructure—some 20% of which will be required for gas gathering and processing. The remainder will be spent on interstate pipelines, storage and LNG facilities.

Building all that infrastructure won't be easy, Chakravarthy says. "Widely varying estimates of potential recoverable reserves, peak production volumes and decline rates make sizing of these investments difficult and risky, resulting in the possibility of either over- or under-building capacity for actual requirements."

According to current data, a significant gap exists between estimated peak production rates and planned capacity for gas gathering and processing facilities and pipelines. This gap highlights the need for additional investment.

Shale plays have attracted significant midstream activity, but it has been fragmented so far. The recent surge of activity in the major shale plays and the desire by individual companies to benefit from a first-mover advantage has led to a variety of types of construction financing. In particular, there are three ways that midstream infrastructure is being funded.

First, independent E&Ps are planning, financing, building and owning their own systems. Devon Energy

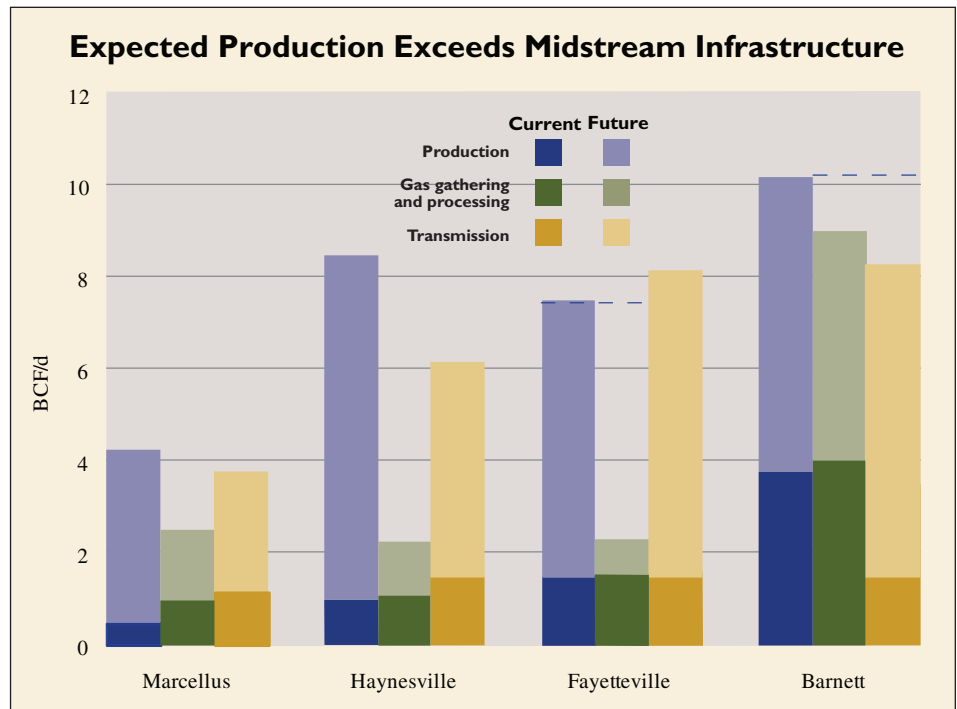


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Corp., Chesapeake Energy Corp. and a number of other E&Ps took this route during the past 15 years, when capital was readily available and few midstream players were stepping up to provide the necessary infrastructure early in the development of the new shale plays. At that time, there was a rush by the producers to have their gas be first-to-market. Controlling the much-needed midstream infrastructure was the way to make that happen.

In today's challenged capital markets and with the moderate outlook for gas prices, E&Ps are building less independently.

Those that do build systems for their plays appear to want to monetize those midstream assets fairly quickly. Companies prefer to focus their capital dollars and return-on-capital-employed on core com-



A significant gap exists between estimated peak production rates and planned midstream-facility capacities, according to individual company reports.

“While the industry has benefitted from the availability of capital through private equity, the result is a fragmented approach to infrastructure development, with a wide range of parties adding capacity in an uncoordinated manner,” says Rachael Goydan, a senior manager at Deloitte Consulting LLP.



petencies such as exploration, rather than an enabling investment in assets.

The second type of financing is by the midstream companies themselves. Currently, much of the shale midstream assets are divided among a number of midstream master limited partnerships (MLPs) that own gathering, processing, treating, compression, and connector pipelines in shale basins. This is a relatively fragmented market with less than a dozen companies. Most of them have an enterprise value of less than \$5 billion. Only a handful of companies are valued at more than \$5 billion.

Many of these companies face challenges in raising the capital needed to develop additional midstream infrastructure. Specifically, they have a higher cost of debt due to low investment-grade credit ratings and the high cost of raising equity due to traditionally high distribution yields.

New partnerships

The third type of finance comes from private-equity-backed midstream companies. Due to the financial difficulties many midstream MLPs face, the attractiveness of reliable annuity streams, and the five- to 15-year investment horizon, private-equity-backed MLPs have become increasingly popular over the past two years. Recently, more than 20 midstream companies have been backed by private-equity firms that have invested or jointly developed some \$9 billion in midstream assets.

This type of partnership is likely to continue while capital markets remain lukewarm and the need for infrastructure investment continues to grow. It is likely that larger midstream players that are able to diversify away risks, such as steep decline rates and an unpredictable mix of rich and lean gas, will be better positioned in the market. Moreover, those that can consolidate demand for takeaway-connector capacity through scale and scope will be better prepared to survive in the changing midstream landscape.

“While the industry has benefitted from the availability of capital through private equity, the result is a fragmented approach to infrastructure development, with a wide range of parties adding capacity in an uncoordinated manner,” says Rachael Goydan, a senior manager at Deloitte Consulting LLP. “As a result, few field-wide synergies have been captured. In order to bring hydrocarbon resources to market

quickly and efficiently, a more coordinated approach is needed.”

Goydan advises partnering with private-equity providers to develop midstream infrastructure as an effective solution for several reasons.

“Midstream assets are less influenced by commodity-price volatility and, if structured appropriately, can return a steady revenue stream from long-term fixed volume or fixed-fee contracts,” she says.

This arrangement meets the private-equity investor’s preference for long-term, predictable, annuity-like cash flows. In return, the private-equity investor typically enables monetization of more mature midstream assets while infusing much-needed capital into the MLP to build the necessary infrastructure in less mature shale basins. In the past two years, the industry has seen increasing partnering of private-equity investors with midstream operators, E&Ps and MLPs to develop unconventional midstream assets.

Some recent examples include the deal between Chesapeake Energy Corp. and Global Infrastructure Partners; Energy Transfer Partners and Energy Spectrum Capital; and Carrizo Oil & Gas and Avista Capital Partners.

Sampat Prakash, a principal and the U.S. oil and gas consulting leader at Deloitte Consulting LLP, says, “While this sort of investment has been essential for an infrastructure buildout, its opportunistic and fragmented approach makes it unclear whether there is an opportunity for the development of a ‘grander’ design to both build scale and balance out supply and demand in a way that will allow for the eventual exit of these rolled-up assets.”

Prakash also explains that a continuation of the current piecemeal approach within and across the various shale plays is likely to result in overcapacity in certain geographies as multiple players try to capitalize on first-mover advantage.

“This could be the precursor to low utilization of assets, reduced revenues and an inability to meet financial commitments among midstream MLPs,” he says. “This sets the stage for noteworthy industry consolidation.”

Trevar Thomas, a principal at Deloitte Consulting LLP, points out that these new market dynamics make it fairly



A continuation of the current piecemeal approach within and across the various shale plays is likely to result in overcapacity in certain geographies as multiple players try to capitalize on first-mover advantage, says Sampat Prakash, a principal and the U.S. oil and gas consulting leader at Deloitte Consulting LLP.

clear that consolidations or rollups of smaller players will happen either within basins or across adjacent basins.

“Who is best positioned to lead this charge?” Thomas asks. “On the surface, it may seem one or more of the larger well-capitalized, diversified midstream MLPs would be best-suited for this role. However, cash flow related to shale plays is not yet mature or certain enough for large MLP portfolios to dramatically absorb these assets.”

Additionally, because of their MLP structure, there would be a need to raise significant equity capital in order to purchase assets and continue to build out infrastructure, resulting in dilution of existing unitholders. Although a few large players have the ability, scale and scope to build out these assets, most are internally focused on restructuring existing assets rather than buying new ones.

Chakravarthy agrees, saying, “This leaves the door open for a strategically-oriented and well-capitalized private-equity investor to partner with a savvy midstream builder and operator.”

Such a partnership would enable the partners to consolidate assets and extract benefits from common interconnected capacity. The companies could ration capital expenditures with intelligent sizing, while also increasing utilization by balancing demand in multiple gathering systems. Coordination might also reduce commodity risk by balancing rich and lean gas streams.

“Furthermore,” he adds, “the partners could create fee-based assets with sufficient size and scale in one or more shale plays that meet the buying criteria of a larger, diversified MLP with critical mass, diversification and certainty of cash flow. Alternatively, the private-equity investor could



Trevar Thomas, a principal at Deloitte Consulting LLP, says new market dynamics make it fairly clear that consolidations or rollups of smaller players will happen either within basins or across adjacent basins.

plan to eventually exit through a public offering.”

The bottom line is that unconventional-gas sources, especially shale gas, will be a major and growing element of North American energy production. Private-equity-backed MLPs will, in the short term, provide much of the capital needed for the infrastructure growth required to bring this gas to market. Yet, in the long term, success in the shale-gas midstream sector will require a combination of capital, operational knowledge and a vision for developing assets in a strategic and coordinated way—which means there is still much more to the story of private equity’s new role in shale-gas infrastructure. □

Meltem Demirors is a business analyst at Deloitte Consulting LLP.

Shale Midstream Asset Build-out

	Enterprise Value	Number of Companies	Current Strategy
Independent E&Ps	\$5-\$40B	10-15	Divest midstream assets in mature plays while holding onto assets in growth plays (e.g., shale)
Midstream MLPs	<\$5B	8-10	Achieve first-mover advantage to look to aggregate smaller players when financially possible
	>\$5B	3-5	Focus internally to rationalize operations and restructure prior to major investments
Private Equity-backed Midstream Companies	Private	20+	Differs by fund: Long term: Buy assets to support infrastructure fund Short term: Achieve first-mover advantage, then sell asset to larger buyer

Three types of companies are focused on buildouts of midstream assets in shale plays, each with different strategies based on their core competencies, financial stability and size.

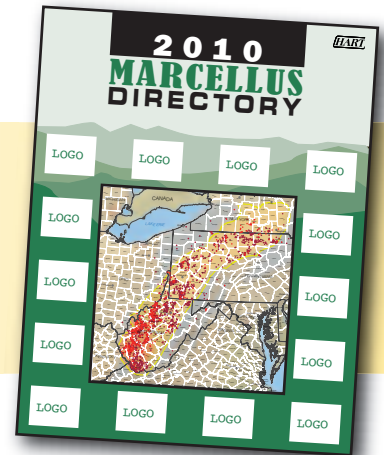
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Major Pipeline Projects On The Horizon

By Bruce Beaubouef, Editor,
PipeLine and Gas Technology

1. Alberta Clipper

Enbridge Energy Partners LP, Houston, is nearing completion of its Alberta Clipper crude oil pipeline comprised of 1,000 miles of 36-inch pipe between Hardisty, Alberta, and Superior, Wisconsin. Initial capacity will be 450,000 barrels per day (bbl. per day) and eventually ramp up to 800,000. Although the 672-mile Canadian portion of the pipeline, from Hardisty to Gretna, Manitoba, is mechanically complete, poor weather conditions during late 2009 delayed completion along other portions of the right-of-way. The line will go into service in mid-2010 after the U.S. portion of the pipeline is complete.

2. Keystone Pipeline

TransCanada Corp., Calgary, is nearing completion on the final construction phase of the \$5.2-billion Keystone pipeline. The 2,148-mile pipeline will transport crude oil from Hardisty, Alberta, to Wood River and Patoka, Illinois, and to Cushing, Oklahoma. The Canadian portion of the project involves the conversion of 537 miles of existing pipeline from gas to oil service and construction of 232 miles of pipeline, pump stations and terminal facilities. The U.S. portion of the project includes construction of 1,379 miles of pipeline and pump stations. When complete, Keystone will have an initial capacity of 435,000 bbl. per day and will be expanded to 590,000 bbl. per day. Although the company has firm commitments for 495,000 barrels per day with an average contract term of 18 years, the start date will be moved back to second-quarter 2010 due to a need to have 9 billion barrels in place in storage to begin operations.

3. Ruby Pipeline

El Paso Corp., Houston, reports that construction of the Ruby Pipeline is one step closer and could begin soon. The



project received a positive final environmental impact statement from FERC, contracts have been signed and pipeline construction companies have been selected. The \$3-billion project includes 675 miles of 42-inch line starting at Opal Hub in Wyoming and terminating at interconnects near Malin, Oregon. As designed, it will have an initial capacity of up to 1.5 billion cubic feet per day (Bcf/d) and will traverse portions of Wyoming, Utah, Nevada and Oregon. Four compressor stations are proposed, including one near the Opal Hub; one south of Curlew Junction, Utah; one at the mid-point of the

project, north of Elko, Nevada; and one in northwestern Nevada.

4. Haynesville Extension

Enterprise Products Partners LP and Duncan Energy Partners LP, both based in Houston, plan to extend their jointly-owned Acadian Gas LLC subsidiary into Northwest Louisiana via the Haynesville Extension project, a 249-mile, 30- and 36-inch pipeline. The system will give shippers access to nine interstate pipelines, 150 end-use markets, a storage facility and Henry Hub. The



pipeline is expected to be in service in September 2011 with an initial capacity of 2.1 Bcf/d.

5. Fayetteville Express Pipeline LLC

Kinder Morgan Energy Partners LP, Houston, and Energy Transfer Partners LP, Dallas, recently received FERC approval for construction and operation of their joint venture pipeline, the Fayetteville Express. The \$1.25-billion project

includes 187 miles of new 42-inch pipe to run from Conway County, Arkansas, eastward through White County, and interconnect with Trunkline Gas Co. in Panola County, Mississippi. The \$1.25-billion pipeline will have an initial capacity of 2 Bcf/d, and, pending other regulatory approvals, will begin service late 2010 or early 2011.

6. 300 Line Expansion

Tennessee Gas Pipeline Co., a subsidiary of El Paso Corp., has launched a 300 Line Expansion project to link Ap-

palachian gas production to Northeast markets. The expansion will include 128 miles of 30-inch pipeline, two new compressor stations (totaling 55,000 horsepower) and upgrades to seven existing compressor stations to support seven looping segments in Pennsylvania and New Jersey. Tennessee plans to execute a phased construction during 2010 and 2011, pending receipt of the necessary regulatory approvals. Upon completion, the project will increase gas-delivery capacity by some 350,000 dekatherms per day and provide access to diversified gas supplies from the Gulf Coast and Rocky Mountains. Tennessee held two open seasons, one in 2008 and one in 2009, and has executed a binding precedent agreement with a shipper for the full capacity. Pending receipt of approvals, construction will begin in second-half 2010 for an in-service date of November 2011.

7. Appalachian Gateway Project

Dominion Transmission Inc. plans a \$600-million Appalachian Gateway Project, including 110 miles of 20-, 24- and 30-inch pipe and four compressor stations (totaling 17,000 horsepower) in West Virginia and Pennsylvania, with ultimate delivery to Texas Eastern Transmission at Dominion's Oakford Station in Delmont, Pennsylvania. Current plans call for the 484,260-dekatherms-per-day project to start in 2011 and wrap up in 2012.

8. Union Pipeline

Buckeye Partners LP, Houston, and Nova Chemicals Corp., a wholly owned subsidiary of The International Petroleum Investment Co. of the Emirate of Abu Dhabi, are considering a joint venture to build a mixed natural-gas liquids (NGLs) transmission system. The pipeline would begin in Pittsburgh, Pennsylvania, and end at the NOVA Chemicals Corunna olefins cracker near Sarnia, a market that has historically had limited NGL feedstock flexibility. Buckeye would develop, construct, own and operate the Union Pipeline and would conduct an open season to solicit additional customer interest in the market in Sarnia prior to executing definitive agreements.

Frac-Spread Margins Wilt as Warmer Weather Arrives

Decreases in natural gas liquids (NGLs) prices resulted in frac-spread margins dropping for all NGLs aside from C₅₊, which was also the lone NGL to experience a price increase the week of March 22.

The largest drop in margin was for ethane, which fell 35% at Conway and 21% at Mont Belvieu. En*Vantage reported in its most recent *Weekly Energy*

Report that the export demand for ethylene is down due to the recent surge in U.S. ethylene prices combined with the recent shutdown of ethylene plants.

The report noted that ethane inventories could increase in April due to these aforementioned outages. “There could be considerable volatility with ethane prices over the next several weeks; however with gas-to-crude ratios heading

down, gas processors should still be enjoying very healthy ethane frac spreads,” according to the report.

Pentanes-plus (C₅₊) margins were up 2% at both hubs that week due to the NGL’s close relationship with crude prices.

The most profitable NGL to make at Mont Belvieu and Conway was C₅₊ at US\$1.36 per gallon at Conway and \$1.37/gal at Mont Belvieu. This was followed in order by iso-butane at \$1.08/gal at Conway and \$1.05/gal at Mont Belvieu; butane at 90¢/gal at Conway and \$1.00/gal at Mont Belvieu; propane at 70¢/gal at Conway and 73¢/gal at Mont Belvieu; and ethane at 18¢/gal at Conway and 31¢/gal at Mont Belvieu.

Natural gas in storage for the week of March 5, according to data available from the U.S. Energy Information Administration, was down 111 billion cubic feet to 1.626 trillion cubic feet

The most profitable NGL to make at Mont Belvieu and Conway was C₅₊ at US\$1.36 per gallon at Conway and \$1.37/gal at Mont Belvieu.

(Tcf). This was 4% below the storage level of 1.697 Tcf recorded last year at the same time and 1% above the five-year average of 1.607 Tcf.

Normal spring temperatures are expected throughout much of the country according to the U.S. National Weather Service. The forecast predicts that warmer than normal spring temperatures are expected in the New England region into the Tri-State area, as well as along the West Coast and into the Southwest. Colder temperatures are anticipated along the Gulf Coast into Florida as well as parts of the Midwest.

—Frank Nieto, Editor,
Gas Processors Report

Current Frac Spread (Cents/Gal)				
Date: Mar. 22, 2010	Conway	Change from prior week	Mont Belvieu	Change from prior week
Ethane	46.14		60.02	
Shrink	27.71		28.71	
Margin	18.43	-35.11%	31.31	-20.70%
Propane	108.66		112.32	
Shrink	38.29		39.66	
Margin	70.37	-4.58%	72.66	-5.79%
Normal Butane	133.44		144.60	
Shrink	43.35		44.90	
Margin	90.09	-2.39%	99.70	-2.06%
Iso-Butane	149.67		147.73	
Shrink	41.63		43.13	
Margin	108.04	-1.61%	104.60	-11.31%
Pentane+	182.50		184.85	
Shrink	46.36		48.02	
Margin	136.14	2.14%	136.83	2.23%
NGL \$/Bbl	43.89	-5.45%	46.69	-5.29%
Shrink	15.27		15.82	
Margin	28.62	-6.59%	30.87	-6.25%
Gas (\$/MMBtu)	4.18	-3.24%	4.33	-3.35%
Gross Bbl Margin (in cents/gal)	65.36	-6.66%	71.75	-6.56%
NGL Value in \$/MMBtu				
Ethane	2.54	-19.11%	3.30	-13.25%
Propane	3.77	-4.11%	3.90	-4.94%
Normal Butane	1.44	-2.67%	1.56	-2.46%
Iso-Butane	0.93	-2.07%	0.92	-9.12%
Pentane+	2.35	0.72%	2.38	0.72%
Total Barrel Value in \$/MMBtu	11.04	-6.79%	12.07	-6.38%
Margin	6.86	-8.83%	7.74	-7.99%

Price, Shrink of 42-gal NGL barrel based on following: Ethane, 36.5%; Propane, 31.8%; Normal Butane, 11.2%; Isobutane, 6.2%; Pentane+, 14.3%, Fuel, frac, transport costs not included. Conway gas based on NGPL Mid-continent zone, Mont Belvieu based on Houston Ship Channel. Source: *Gas Processors Report*.