

On-Purpose Production, Condensates Keep Heavy Chemical Markets Afloat

Petrochemical industry growing and adjusting to the development of shale plays

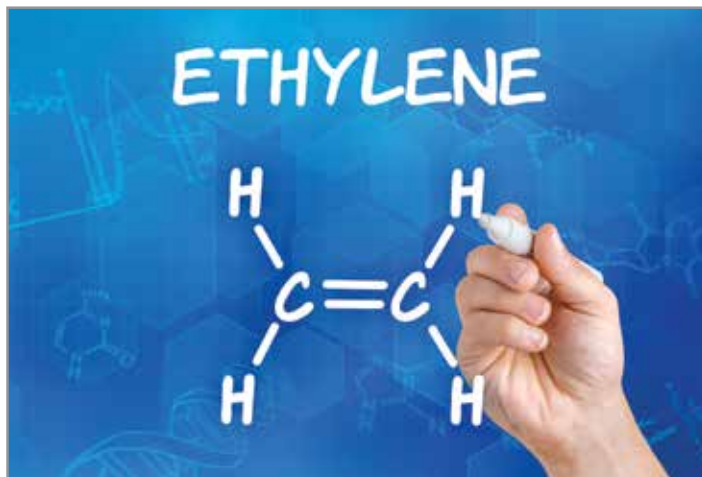
BY NICOLE JOHNSON | HART ENERGY

Ethylene is poised to become the petrochemical poster child of growth as North American shale gas continues to revolutionize the energy industry.

On the other side of the molecule, heavier chemicals such as butadiene (BD)—and propylene to a lesser extent—are at first glance “losers” in the shale gas boom versus ethylene.

However, plans to bring on-purpose units online are setting the stage for propylene producers to profit from the changing feed slate. At the same time, producers with ethane/propane (E-P) mix-flexibility crackers will see butadiene economics turn in their favor as light naphthas are processed from condensates rather than ethane, according to BASF Corp. business director Robert Sawchuk

Speaking at the Platts Inaugural Petrochemical seminar in Houston last month, Sawchuk said seven new propane-dehydrogenation units (PDH) are poised to come online in the U.S. over the next few years—with an eighth PDH under consideration—to take advantage of feedstocks derived from shale gas. In the case of BD, only one butane-dehydrogenation unit (BDH) is set to be debottlenecked amid consistently marked volatility in the global BD market.



Poster Child | Ethylene is becoming a hot property in the North American petrochemical industry thanks to the advent of the shale plays.

Since 2012, the advent of shale gas in the Eagle Ford formation has yielded greater natural gas liquids (NGLs), but the percentage of butane output has been about 2% of total NGL production in the area. According to Sawchuk, the butane percentage will remain at that level through 2032.

In recent years, BD has ranged from as high as \$1.70 per pound (/lb) to as low as 10 cents/lb, Sawchuk said. Given the BD market’s particularly

Continued on
Page 12

HIGHLIGHTS FROM TODAY’S EDITION



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Downturn Ahead

Increased interest rates will likely cause a downturn in MLP market performance.

PAGE 5

Liquids Development

Williams and Boardwalk are planning two NGL projects that will feed domestic and export markets.

PAGE 5



Western Force

Rail will continue to be the dominant transportation source in the Bakken, according to Morgan Stanley’s Evan Calio.

PAGE 11

Heating Up

North American developers will spend more than \$4 billion on new pipelines in 2013.

PAGE 6

Make Your Case

The oil and gas industry needs to trumpet its success to counter extremists, according to John Fund.

PAGE 8

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NGL PRICES & FRAC SPREAD | Week in Review

Crude Downturn Causes NGL Prices To Fall

BY **FRANK NIETO** | EDITOR, MIDSTREAM MONITOR, MIDSTREAMBUSINESS.COM

Heavy natural gas liquids (NGL) prices took a downturn this week as they followed the same curve for West Texas Intermediate crude oil, which fell below \$100 per barrel (bbl.) as inventories rose and consumer confidence metrics trended downward. Additionally, new data from the Energy Information Administration (EIA) revealed that NGL extraction levels reached record highs in August, which is likely to prove to be a headwind for the market going forward.

The largest downturn of any NGL this week was for Conway isobutane as it took an 8% downturn to \$1.51 per gallon as the Midcontinent's lone isomerization unit returned to service. This was

CURRENT FRAC SPREAD (CENTS/GAL)				
November 4, 2013	Conway	Change from Start of Week	Mont Belvieu	Last Week
Ethane	20.00		25.55	
Shrink	23.87		23.40	
Margin	-3.87	-1.96%	2.15	44.96%
Propane	113.54		115.54	
Shrink	32.98		32.33	
Margin	80.56	4.05%	83.21	0.92%
Normal Butane	145.93		146.32	
Shrink	37.33		36.61	
Margin	108.60	-5.22%	109.71	-5.03%
Isobutane	151.32		150.98	
Shrink	35.86		35.16	
Margin	115.46	-9.20%	115.82	-3.00%
Pentane+	199.78		207.36	
Shrink	39.92		39.15	
Margin	159.86	-4.95%	168.21	-3.74%
NGL \$/Bbl	42.05	-2.95%	43.47	-2.45%
Shrink	13.15		12.90	
Margin	28.90	-2.83%	30.57	-2.09%
Gas (\$/mmBtu)	3.60	-3.23%	3.53	-3.29%
Gross Bbl Margin (in cents/gal)	66.39	-2.38%	70.77	-1.84%
Gross Bbl Margin (in cents/gal)				
Ethane	1.10	-4.17%	1.41	-0.51%
Propane	3.94	1.83%	4.01	-0.29%
Normal Butane	1.58	-4.72%	1.58	-4.60%
Isobutane	0.94	-7.86%	0.94	-3.07%
Pentane+	2.58	-4.61%	2.67	-3.65%
Total Barrel Value in \$/mmbtu	10.14	-2.50%	10.61	-2.09%
Margin	6.54	-2.10%	7.08	-1.48%

NGL PRICES						
Mont Belvieu	Eth	Pro	Norm	Iso	Pen+	NGL Bbl
Oct. 23 - 29, '13	25.55	115.54	146.32	150.98	207.36	\$43.47
Oct. 16 - 22, '13	25.68	115.88	153.38	155.76	215.22	\$44.56
Oct. 9 - 15, '13	25.44	113.38	150.08	152.68	212.88	\$43.81
Oct. 2 - 8, '13	25.08	109.62	145.18	147.98	206.10	\$42.47
September '13	24.91	110.95	135.38	136.84	218.42	\$42.63
August '13	25.01	105.63	134.40	136.61	219.58	\$42.03
3rd Qtr '13	24.87	102.65	132.06	134.86	215.56	\$41.21
2nd Qtr '13	27.12	91.38	124.01	127.46	204.12	\$38.82
1st Qtr '13	25.68	86.42	157.72	166.41	222.63	\$42.07
4th Qtr '12	26.59	88.74	162.76	181.71	215.67	\$42.69
Oct. 31 - Nov. 6, '12	28.86	97.30	162.30	189.72	224.58	\$44.85
Conway, Group 140	Eth	Pro	Norm	Iso	Pen+	NGL Bbl
Oct. 23 - 29, '13	20.00	113.54	145.93	151.32	199.78	\$42.05
Oct. 16 - 22, '13	20.87	111.50	153.16	164.22	209.44	\$43.33
Oct. 9 - 15, '13	22.50	109.56	150.68	156.20	204.62	\$42.69
Oct. 2 - 8, '13	20.90	105.80	144.40	150.82	196.62	\$40.97
September '13	20.59	108.24	132.50	137.44	209.98	\$41.14
August '13	21.29	102.79	132.20	139.92	212.37	\$40.82
3rd Qtr '13	20.80	99.22	129.23	142.77	209.94	\$40.07
2nd Qtr '13	20.71	85.37	116.50	123.91	204.86	\$36.89
1st Qtr '13	23.94	81.81	153.43	160.39	222.63	\$41.11
4th Qtr '12	18.45	79.24	164.46	174.39	209.16	\$39.94
Oct. 31 - Nov. 6, '12	17.92	84.30	159.60	175.83	213.60	\$40.54

(Above) Data provided by Bloomberg. Individual product prices in cents per gallon. NGL barrel in \$/42 gallons | Source: Frank Nieto

(Left) 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 Midcontinent zone, Mont Belvieu based on Houston Ship Channel.

Shrink is defined as Btus that are removed from natural gas through the gathering and processing operation.

the lowest price at the hub in a month and resulted in a 9% decrease in its frac spread margin. The Mont Belvieu price fell 3% to \$1.51 per gallon despite being in what should be its prime demand season. The positive for the product was that it was nearly identical in value to its Conway counterpart for the first time in a month.

Isobutane's sister product, butane, fell 5% at both hubs. As with isobutane, butane prices were nearly identical at \$1.46 per gallon. The reason for the spread being so narrow is because the bulk of the demand is coming from liquefied petroleum gas (LPG) and not their local markets. Both hubs also saw their margins tumble at identical 5% rates.

The fall and winter are also typically the prime demand seasons for C₅₊ prices, but low condensate prices are providing strong com-

NGL PRICES & FRAC SPREAD | Week in Review

petition. Refiners and producers are being presented an interesting choice between the two products as a diluent to produce crude from Alberta oil sands and a blendstock to make winter-grade gasoline. The Conway price just barely dipped below the \$2 per gallon threshold for the first time in a month. The Mont Belvieu price of \$2.07 per gallon was also the lowest it had been in a month.

Ethane prices continued to struggle due to storage overhangs, but there is reason for optimism as ethane cracking capacity is operating at its highest capacity in months with the Williams' Geismar, Louisiana plant being the lone major cracker offline due to an explosion in June. It is not expected to come back online until April. Despite this unit, which has the capacity to crack more than 600,000 tonnes per year of ethane, being offline En*Vantage anticipates ethane inventories decreasing by 9 million bbl. from August 2013 to February 2014. "If this drop were to occur it could put upward pressure on ethane prices until rejected ethane volumes come back onto the market," the company said in its October 31 Weekly Energy Report.

Meantime, ethane prices fell 4% to 20 cents per gallon at Conway, its lowest price since it had a slightly lower value the week of July 10. The Mont Belvieu price dropped 1% to 26 cents per gallon, the same level it has traded at for the past 11 weeks.

KEY NORTH AMERICAN HUB PRICES	
2:30 PM CST / November 4, 2013	
Gas Hub Name	Current Price
Carthage, TX	3.48
Katy Hub, TX	3.53
Waha Hub, TX	3.51
Henry Hub, LA	3.57
Perryville, LA	3.49
Houston Ship Channel	3.54
Agua Dulce, TX	3.59
Opal Hub, Wyo.	3.58
Blance Hub, NM	3.47
Cheyenne Hub, Wyo.	3.53
Chicago Hub	3.75
Ellisburg NE Hub	3.53
New York Hub	3.18
AECO, Alberta	3.30

Source: Bloomberg

trend for NGL prices this week caused the theoretical NGL bbl. price to fall 3% at both hubs. The Mont Belvieu price dropped to \$43.47 per bbl. with a 2% drop in margin to \$30.57 per bbl. The Conway

The lone NGL to have any sort of positive when it comes to price this week was propane, which was largely flat at \$1.16 per gallon at Mont Belvieu and gained 2% in value to \$1.14 per gallon at Conway. The Conway price was the highest figure it has been since it was \$1.16 per gallon the week of August 28. The reason for these relative positives is that propane inventory levels fell below the five-year average for the first time this year as LPG exports and increased crop-drying demand have worked off much of the overhang.

The overall downward trend for NGL prices this week caused the theoretical NGL bbl. price to fall 3% at both hubs. The Mont Belvieu price dropped to \$43.47 per bbl. with a 2% drop in margin to \$30.57 per bbl. The Conway

RESIN PRICES – MARKET UPDATE – OCTOBER 31, 2013					
TOTAL OFFERS: 17,418,54 lbs		SPOT		CONTRACT	
Resin	Total lbs	Low	High	Bid	Offer
LLDPE - Film	6,167,336	0.66	0.78	0.67	0.71
HDPE - Inj	2,726,300	0.655	0.775	0.69	0.73
PP Homopolymer - Inj	2,188,944	0.7	0.79	0.73	0.77
HDPE - Blow Mold	1,766,368	0.715	0.73	0.68	0.72
LDPE - Inj	1,248,208	0.7	0.745	0.71	0.75
PP Copolymer - Inj	962,644	0.75	0.895	0.74	0.78
LDPE - Film	843,920	0.75	0.82	0.75	0.79
LLDPE - Inj	738,000	0.68	0.72	0.68	0.72
HMWPE - Film	396,828	0.77	0.77	0.72	0.76
GPPS	190,000	0.91	0.91	0.87	0.92
HIPS	190,000	1.03	1.03	0.99	1.04

Source: Plastics Exchange – www.theplasticsexchange.com

price decreased to \$42.05 per bbl. with a 3% drop in margin to \$28.90 per bbl.

The most profitable NGL to make at both hubs was C₅₊ at \$1.60 per gal. at Conway and \$1.68 per gallon at Mont Belvieu. This was followed, in order, by isobutane at \$1.16 per gallon at Conway and Mont Belvieu; butane at \$1.09 per gallon at Conway and \$1.10 per gallon at Mont Belvieu; propane at 81 cents per gallon at Conway and 83 cents per gallon at Mont Belvieu; and ethane at negative 4 cents per gallon at Conway and 2 cents per gal. at Mont Belvieu.

Heating demand was sufficiently high enough that there was a very small build in natural gas in storage levels the week of October 25, the most recent data available from the EIA. According to the report, storage rose 38 billion cubic feet to 3.779 trillion cubic feet (Tcf) from 3.741 Tcf the previous week. This was 3% below the 3.899 Tcf figure posted last year at the same time and 2% above the five-year average of 3.721 Tcf.

It is likely there will be a larger build this week as the National Weather Service's forecast for the week is calling for warmer-than-normal temperatures throughout the East Coast, Midwest and Gulf Coast. Parts of the Midwest along with the Rockies and West Coast are expected to experience cooler-than-normal temperatures, but it is unlikely that there will be large demand on either the heating or cooling end.

NEWS & TRENDS | Up To Date

Interest Rate Increase Cause MLP Underperformance In 2H 2013

BY **FRANK NIETO** | EDITOR, MIDSTREAM MONITOR, MIDSTREAMBUSINESS.COM

After a period of sustained growth, master limited partnerships (MLP) have underperformed compared to the Standard & Poor's (S&P) 500 in the second-half of 2013. The Wells Fargo MLP Index was down 6.2% from July 15 to September 16, compared to a 0.1% gain for the S&P 500 during the same time.

According to Wells Fargo Securities, there are several causes for this underperformance with a primary reason being investor concerns over higher interest rates on MLPs. "In all likelihood, the market has exited an unprecedented period of low interest rates, which we believe has provided an accommodative backdrop for MLP sector growth over the past ten years," the investment firm said in a recent research note.

The average interest rate is expected to increase from the current 2.9% to 4% in 2016 and 5.1% by 2018. Despite this being a notable headwind for the MLP sector, Wells Fargo anticipates that it should be fairly easy to overcome as long as interest rates increase at a measured pace and distributions grow steadily to maintain investor interest.

While the MLP market is more closely tied to commodity prices and the broader equity market, Wells Fargo noted that when the 10-year treasury rate has risen more than 50 basis points in a month the MLP market has underperformed the S&P 500 by 2%.

"This implies that although MLP performance is not meaningfully impacted by gradual movements in interest rates, sharp changes in interest rates can materially impact MLP performance," the report said. Even though the industry typically secures debt with fixed-rates, companies in the sector issue large amounts of debt and drastic increases in interest rates would have a negative impact.

According to Wells Fargo Securities, a 1% increase in rates would result in the compound annual growth rate to deteriorate by 80 basis points for upstream and small-cap pipeline MLPs, 60 basis points for gathering and processing MLPs, 40 basis points for propane MLPs, and 40 basis points for large-cap pipeline MLPs.

The report noted that this analysis is largely theoretical since interest rates have trended downwards for much of the past two decades, which is the same time that MLPs have been around. Thus MLPs have not yet operated in an environment with a cycle of increasing interest rates. At the same time, the sector has grown to include companies

that have higher risk assets such as E&P, processing and refining rather than just pipelines.

This growing riskiness has seen upstream MLPs underperform in the overall sector. According to a separate research note from Wells Fargo Securities, upstream MLPs underperformed in the overall market by 5.2% in August compared to the full MLP segment being down 3.5% in the same time frame.

Much of the upstream MLP segment's negative outlook was due to an 11% downturn in the price for Linn Energy, which accounts for 30% of the segment. As demand drivers have been improving throughout the fall for crude oil and natural gas liquid (NGL) prices, upstream MLPs are also gaining strength.

Williams, Boardwalk Launch Bluegrass Pipeline Open Season

BY **NICOLE JOHNSON** | HART ENERGY

Bluegrass Pipeline LLC, a joint venture between Williams and Boardwalk Pipeline Partners LP, began a binding open season on October 29 to determine industry commitments to natural gas liquids (NGLs) transportation capacity from the Marcellus and Utica shale plays to the petrochemical and export complex on the U.S. Gulf Coast.

The first phase of the Bluegrass pipeline is being designed to provide customers with 200,000 barrels (bbl.) per day of mixed NGLs takeaway capacity in Ohio, Pennsylvania and West Virginia. In the second phase of the project, capacity will be increased to 400,000 bbl. per day to meet market demand—by adding additional liquids-pumping capacity in particular.

The pipeline would deliver mixed NGLs to proposed fractionation and storage facilities that would connect to petrochemical facilities and product pipelines along the Louisiana and Texas coasts. In addition, the companies said fractionation and storage facilities would connect to a planned liquefied petroleum gas (LPG) export terminal that would offer producers an option for exporting butane and propane, which comprises about 30% of the average NGL barrel.

"We have seen significant interest from the producer community regarding the value that the Bluegrass Pipeline can offer the market," said Jim Scheel, senior vice president of corporate strategic development at Williams. "We have been in discussion with many Utica and Marcellus shale producers during the past year and we look forward to additional customer commitments before the end of this year."

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According to the statement, the Bluegrass pipeline project consists of three segments:

1. Constructing a new NGL pipeline from numerous natural gas processing plants in producing areas in Ohio, West Virginia and Pennsylvania to an interconnect with Boardwalk's Texas Gas Transmission LLC system near Hardinsburg, Kentucky;
2. Converting part of an existing pipeline on Texas Gas Transmission from natural gas service to NGL service from Hardinsburg to Eunice, Louisiana; and
3. Constructing a new NGL pipeline from Eunice, Louisiana to a proposed large-scale fractionation plant and expanding natural gas liquids storage facilities in the Lake Charles, Louisiana area, according to the companies.

"All segments will be constructed in parallel," Williams spokesman Tom Droege told Hart Energy in an emailed statement. "This is a 50-50 joint-venture. Williams is developing the north section and will be responsible for operating the Bluegrass pipeline."

John Haynes, senior vice president and chief commercial officer for Boardwalk Pipeline Partners commented: "We believe our project offers a number of well-defined market options, both domestic and international that offer attractive netbacks to the Utica and Marcellus producers. We are encouraged by our meetings with potential customers and are pleased to launch this Open Season."

In a separate October 1 announcement, Boardwalk Pipeline Partners and Williams agreed to continue developing an LPG export facility near Lake Charles, Louisiana.

"The Moss Lake LPG will be connected to the Moss Lake fractionation and storage facility and will be capable of loading VLGC [very large gas carriers] with over 500,000 bbl. of capacity," Droege noted. "Initial capacity is for 36 slots per year that will be readily expandable to handle additional supply. The LPG terminal's design capacity is 60,000 bbl. per day."

The Moss Lake facility is planned for a site on the Calcasieu River so tanker vessels could ship LPG to Asia, Europe and Latin America, Williams said. Planned storage capacity will offer 900,000 bbl. of "fully refrigerated propane and butane with a load-rate of 25,000 bbl. per hour," and the Boardwalk and Williams said they are working with several third-parties to reserve off-take capacity.

"Based on current market conditions, producers should benefit from the option to export propane and butane, which constitute approximately 30% of the liquids in an average NGL [natural gas liquid] barrel. The other NGL components—ethane, isobutane and natural

gasoline—are expected to serve demand among U.S. industries, manufacturers and refineries," according to the October 1 announcement.

From an economic perspective, having both domestic and export options is a good thing, Droege said.

"It allows for access to the highest-value markets for all of the components of the NGL barrel," he said. "The efficient movement of these NGLs to domestic and global markets supports the development of the United States' own energy resources and the renaissance in America's job-producing manufacturing complex. Furthermore, exporting LPG can help lower the country's trade deficit."

Boardwalk Pipeline President and Chief Executive Stan Horton added: "In addition to the variety of domestic markets that would be served by the Bluegrass pipeline and Moss Lake fractionation projects, Moss Lake LPG would offer customers access to attractive global markets for propane and butane, which in turn allows for continued production of natural gas, crude oil and other products that are integral to helping the U.S. gain its energy independence.

"Taken together, these critical infrastructure projects allow for the efficient movement of NGLs to domestic and global markets and support the development of the United States' own energy resources and the renaissance in America's job-producing manufacturing complex," Horton said.

Pending necessary regulatory approvals, the Moss Lake project could be completed by late 2015, according to Droege.

North America Spends \$4.3B On New Pipelines In 2013

The North American pipeline industry is in process of spending \$4.3 billion on new onshore pipelines in 2013 according to information from a new database, announced by leading energy business research and consulting firm Douglas-Westwood.

DW analyst Neha Rustagi, commented that, "the primary motives for newly announced North American onshore pipeline projects are to increase operators' access to shale plays, relieve bottlenecks in regions such as the U.S. Midwest, satisfy growing demand elsewhere, or replace aging infrastructure.

"The development of unconventional oil and gas extraction technologies has made the pipeline sector in the U.S. extremely dynamic and the timeliness of industry information is therefore critical. A classic example of the rate at which economics in the industry can change is the story of the Rockies Express (REX) pipeline. This is one

NEWS & TRENDS | Up To Date



Building Spree | The rapid development of shale plays lead to heavy spending in new pipelines this year according to a report from Douglas-Westwood.

of the longest to be built in recent U.S. history and was completed in 2009 with the intent to provide Rocky Mountain natural gas to Eastern markets. However, the pipeline became uneconomical just one year later, upon the surge in development of the giant Marcellus shales plays in the Northeastern U.S.

“Between 2011 and 2012, the number of productive wells in US shale oil plays increased from a few hundred to over 4,000. These developments have left many regions, such as the Northeast and the Bakken, with tremendous supply that is constrained by a lack of takeaway capacity. Where they have not yet been built rail and trucks have become a riskier, more expensive substitute. Pipeline infrastructure is similarly necessary in Canada to enable the transportation of oil from its vast landlocked reserves to both domestic and foreign markets. Output from Alberta’s crude oil reserves, the third largest in the world, has been forecast to increase 26% from 2012 to 2015 and over 5,000 miles of pipeline have been proposed for construction in Canada by 2018. The North American oil, gas and natural gas liquids markets will remain dynamic in at least the near-term, making the timeliness of pipeline intelligence critical to strategy development.”

Crosstex Energy To Expand Permian Gathering And Processing System

The Crosstex Energy companies will expand its natural gas gathering and processing system in the Permian basin by constructing a new gas processing complex and rich gas gathering pipeline system, the partnership said.

The initial investment of approximately \$140 million will include treating, processing and gas takeaway solutions for regional producers. The project, which will be fully owned by the partnership, is supported by long-term, fee-based contracts.

The new-build processing complex, called Bearkat, will be strategically located near the partnership’s existing Deadwood joint venture assets in Glasscock County, Texas.

The processing plant will have an initial capacity of 60 million cubic feet per day (MMcf), increasing the partnership’s total operated processing capacity in the Permian to approximately 115 MMcf per day. The partnership will also construct a 30-mile high-pressure gathering system upstream of the Bearkat complex to provide additional gathering capacity for producers in Glasscock and Reagan counties. The project is scheduled to be operational next summer.

Last week, Crosstex announced plans to merge its operations with Devon Energy’s midstream assets to form a new MLP.

Meritage Midstream Begins Open Season For New Powder River Basin NGL Pipeline

Thunder Creek NGL Pipeline LLC, a subsidiary of Meritage Midstream Services II LLC, started a binding open season for a new interstate, common-carrier pipeline system that will transport unfractionated natural gas liquids (NGLs) produced in Wyoming’s Powder River basin to potential delivery points on the Overland Pass Pipeline near the Colorado-Wyoming border and the Front Range NGL Pipeline near Lucerne, Colorado.

The open season began on October 30, and will close on November 29. The pipeline is expected to have a preliminary design capacity of 40,000 barrels per day and is expected to become operational in the second-quarter 2015.

The open season process provides potential shippers with the opportunity to make volume commitments and execute long-term transportation contracts with Thunder Creek. Shippers electing to make long-term volume commitments to Thunder Creek will be eligible to receive priority transportation service at a premium rate for their committed volumes. Shippers electing to make long-term acreage dedications above a minimum threshold will be eligible for discounted transportation rates on the pipeline for volumes not subject to a volume commitment.

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Meritage Chairman and Chief Executive Steve Huckaby said, “We are excited about the future of the Powder River basin. Our excitement is a reflection of rig counts across the basin and of the ongoing discussions we are having with producers who are planning long-term drilling programs. This is a basin with multiple economic formations offering many opportunities for producers. It’s our job to stand beside our customers, working with them to ensure they have the infrastructure and optionality they need to take advantage of those opportunities. The Thunder Creek NGL Pipeline is a significant extension of our Thunder Creek gathering and processing network and will give producers an integrated solution for moving their products to market.”

The Thunder Creek NGL Pipeline plans to offer producers in the liquids-rich Powder River basin multiple points of origin throughout the basin and options for delivering product to NGL markets at Mont Belvieu, Texas, and/or Conway, Kansas. Based on shipper interest, origin points for the Thunder Creek NGL Pipeline may include:

- Thunder Creek Gas Services’ planned 200 million cubic feet per day gas processing plant in Converse County, Wyoming;
- Thunder Creek Gas Services’ Fifty Buttes gas processing plant in Campbell County, Wyoming, which is in the engineering and permitting phase;
- Thunder Creek Gas Services’ 4-43 gas processing plant in Campbell County, Wyoming, which is in service;
- Access Midstream’s Bucking Horse gas processing plant near Douglas, Wyoming;
- Tall Grass Energy’s Douglas processing plant near Douglas, Wyoming;
- ONEOK’s Sage Creek gas processing plant in Converse County, Wyoming.

Thunder Creek will also consider additional origin points in the area upon shipper request.

U.S. DOE Awards Funds For Infrastructure Cybersecurity Development

The U.S. Department of Energy granted 11 awards totaling approximately \$30 million for the development of new tools and technologies to strengthen protection of the nation’s electric grid and oil and gas



Increasing Security Measures | The DOE awarded \$30 million in grants to protect the oil and gas industry from cybersecurity attacks.

infrastructure from cyber-attack, including an award of \$3.25 million to ViaSat Inc.

The company will work closely with Southern California Edison and a large utility headquartered in the South to investigate, develop, and deploy an enhancement to ViaSat’s critical infrastructure protection system that incorporates policy-based automated responses to cyber events, increasing the resiliency of transmission and distribution networks.

ViaSat’s cybersecurity system focuses on securing utilities’ operational grids, enabling energy, water, oil and gas, and transportation operations crews to manage security through a virtual display of the network. The system implements an authenticated and encrypted “security fabric” that protects machine-to-machine communications between devices, and provides grid operators with the ability to visualize the security state of the system. Sensors continually update the information in real time, creating a hierarchical view that operators can use to identify issues, then drill down to individual nodes to contain or fix problems as they arise.

John Fund: You Have To Keep Fighting For Energy

BY **STEVE TOON** | HART ENERGY

The ability to access affordable energy resources without excessive government intrusion goes far beyond the oil and gas sector’s mantra of jobs creation, said *Wall Street Journal* columnist and

NEWS & TRENDS | Up To Date

Fox News contributor John Fund. At its core, it's about America's freedom.

"America's exceptionalism in the world is built in part because we have a vibrant economy, and cheap and affordable energy has been at the center of our success," said Fund, speaking to oil and gas producers at Hart Energy's Executive Oil Conference in Midland recently. "When you take away energy, you take away freedom."

Instead, the oil and gas industry should soundly denounce extremists and trumpet its successes, something it has been lax in doing while diligently focused on drilling.

"You have a golden opportunity," he said, referring to the Energy Information Administration's recent report that the U.S. will soon surpass Russia as the world's leading oil and gas producer. "You have a headline that no one expected."

How many people believed the U.S. would become the number one energy producer in the world, he questioned? "That was what you built. Point out that incredible success, and that (future) success is in danger if you don't have the proper response from the federal government."

Fund quipped that President Obama's campaign promise, when he said he was "for all of the above" regarding energy sources, actually meant he was against resources below the ground.

More than framing political discussions around jobs, the energy industry must communicate to the average person why excessive government control and taxation of energy production is bad for them, he said. Short-term, higher gasoline and electricity costs will lead to a slowed economy. Longer term, America's global status will wane.

"You have to make that contrast and fight it home. Energy production is not just about the economy," he said. "It's about freedom. You have to keep fighting for energy."

Croatia, Hungary, Ukraine To Form Adriatic Gas Corridor

BLOOMBERG

Croatia, Hungary and Ukraine agreed to expand their existing pipelines to create a corridor that will carry natural gas through the three countries and connect to the planned Trans-Adriatic Pipeline (TAP) project.



Eastern Market | The development of the Trans-Adriatic Pipeline is expected to be formally announced soon according to Croatian Deputy Foreign Minister Josko Klisovic. (Courtesy: Republic of Croatia Ministry of Foreign and European Affairs.)

"The new infrastructure will enable us to send gas to eastern European markets," Croatian Deputy Foreign Minister Josko Klisovic said by phone in Zagreb, adding the countries' prime ministers are ready to sign a pact "soon."

By diversifying gas supplies, the corridor will increase the security of energy supplies in the region and help curb Europe's reliance on Russian gas after pricing disputes with Ukraine disrupted shipments to EU customers.

In Croatia, the corridor would connect to a planned liquefied natural gas terminal on the island of Krk, as well as to the planned link to the TAP in the south, Klisovic said.

The TAP is being developed by Germany's E.ON SE, Norway's Statoil ASA and Switzerland's Axpo. The pipeline will ship 10 billion cubic meters of Azeri gas each year to Italy from Turkey's EU border, via Albania and Greece.

Although the project can be financed by EU funds and interested companies, Klisovic said it is still too early to discuss cost.

Mexico's Pemex To Build Most Of Ramones II Pipeline Project

Petroleos Mexicanos will complete the second phase of the Los Ramones natural gas pipeline in two parts, after rejecting proposals to outsource the entire project earlier this month, the state-owned oil producer said.

One part will be developed alone by Pemex and the other by a joint venture between French energy firm GDF Suez and Pemex's TAG Pipelines unit.

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Once completed by the end of 2015, the 2.1 billion cubic feet (bcf) per day Ramones pipeline is scheduled to supply a fifth of Mexico's total natural gas demand.

Pemex said Ramones North, a 274-mile section extending from the town of Los Ramones in Nuevo Leon state to the city of San Luis Potosi, will be carried out in-house by two of its subsidiaries, TAG Pipelines and Gasoductos de Chihuahua.

Estimated investment for the section, which will include two gas compression stations, is \$1.05 billion.

Meanwhile, Ramones South, a 178-mile section, will take the pipeline further into Mexico's industrial heartland, from San Luis Potosi to Guanajuato state, and include another compression station.

Pemex said on its Twitter page that the southern section will be developed jointly by GDF Suez and TAG Pipelines. It is expected to cost \$795 million, Pemex said.

ENova, a unit of U.S. energy company Sempra Energy, is already developing the first phase of the Ramones pipeline along with a Pemex subsidiary.

Once both phases are completed, the Ramones pipeline will extend 750 miles from Agua Dulce, Texas, across the border and deep into central Mexico.

Replacing Coal With Natural Gas Could Slash Power-Plant GHG Emissions Globally

A new study by Siemens finds that while global electric-power demand is set to rise another 50% by 2030, net carbon-dioxide (CO₂) emissions could actually fall from current levels if coal-fired plants were replaced by natural gas-fired power.

"Global power demand is set to increase on average by nearly 3% per year over the current and next decade," according to Siemens. "Cumulatively, this moderate growth will cause overall power demand to rise by more than half of its current level between now and 2030. If new power plants are added as foreseeable, [then] associated CO₂ emissions are likely to increase by 25% or 3,500 megatons."

"If coal-fired power plants were replaced on a wide-scale with gas-fueled power plants by 2030, [then] CO₂ emissions in the power sector would even drop by 5% compared to today's levels," according to

Horst Wildemann, a professor at Technical University of Munich and co-author of the Siemens study.

"Of course, it would be illusionary to replace all coal-fired power plants with gas-fueled units – but the potentials identified are really impressive," Wildemann continued.

"In our study we examined the local situations and different needs in various regions of the world," added Michael Süß, member of the management board of Siemens AG. Süß presented the study results at the World Energy Congress this month.

"Of course, besides sustainability and the need for dependable power supply, economy is always important – there would be no point in closing down new, coal-fired power plants ahead of schedule just to cut CO₂ emissions, Süß said

"But it is equally apparent that all-out expansion of renewable-energy sources alone does not automatically improve the climate balance, as rising CO₂ emissions in Germany impressively highlight.

"On the other hand, shutting down aging coal-fired power plants not only reduces emissions significantly, but can also make economic sense, as has been proven in the United States. In our study, we analyzed various scenarios while keeping an eye on a three-way balance between sustainability, reliability and economy," Süß explained.

For example, the study found that Europe could save about €45 billion (US\$62 billion) "in its drive to expand power generation from renewable resources by 2030 if those sources were tapped at the best locations – while achieving the same ratio of renewables in the power mix," according to Siemens.

"In this scenario, new solar-power plants would be installed mainly in Europe's sunbelt in the South, while wind-power plants would be built in the windy northern regions of Europe."

As for the situation in the United States, "the US\$80-billion losses per year due to indirect costs of power failures could be saved if the quality of the grid were improved," according to Siemens.

Looking at China, "it would be possible – despite the doubling of power consumption – to freeze CO₂ emissions at today's level if renewable-energy sources were exploited at full-scale.

"However, this would also require nearly double the investment volume. By contrast, emissions could be cut back by almost as much, but at no extra cost, if one-third of China's coal-fired power plants were replaced by modern gas-fired units by 2030," according to Siemens needs.

SNAPSHOT | Industry Insight

Does Crude-By-Rail Have A Future Home?

BY **CHRISTINA ALTY** | ASSISTANT EDITOR

Rail is going through a renaissance. The increase in the rail industry can largely be attributed to the shale plays around North America. Crude-by-rail is growing in popularity and seems to be here to stay, at least for now.

“Absolutely, it is predicated on U.S. production growth, which is also predicated on consumptions. We believe it is a more permanent part at least for the foreseeable and investable future ...,” said Evan Calio of Morgan Stanley during his opening keynote speech *The Rail Resurgence* during Hart Energy’s Crude in Motion conference on October 30 in Houston, Texas. “It will be here and it will be very volatile and the forecast in term of flows to volumes is predicated on a whole series of assumptions.”

While crude-by-rail is especially popular in places such as the Bakken where pipeline takeaway capacity simply doesn’t exist in the volumes it is needed, it doesn’t come without complications.

There are a number of differentials and limiting factors that Calio pointed out that effect the future of crude-by-rail in all areas of operation. These differentials make it difficult to predict reliable forecasts when it comes to supply and demand. Without adequate supply and demand the crude-by-rail industry would move to a more dormant state.

Such complications that were explained by Calio included pipelines (both new and planned), refining turnarounds and expansions, transloading capacity, shipping capacity, excess takeaway and more.

However, with several large diameter pipelines coming online in 2014 transportation towards the Cushing hub shouldn’t be a problem.

“The industry and people of this state and people of this country, guess what they did? They made significant investments to solve that 300-mile transportation problem,” he said. “This year with Seaway Twin in the first quarter and [eventually] Keystone XL, you are going to over-solve that problem.”

With more line space than capacity available, rails would not be needed in that area but that is not the case throughout the country.

“As we think about differentials with a lot of these transportation solutions in the near-term by moving that differential further north, we still think that Bakken will have to move via rail,” he said.



Looking Ahead | The Bakken will continue to be a heavy investor in crude-by-rail services, but Canadian producers are likely to convert to pipelines in the future.

The Bakken does not have the pipelines in place nor the refining capacity nearby to accommodate the booming shale thus it must be transported somewhere else.

He pointed out that predicting futures of rail, crude production and other industry numbers are difficult because of all the differentials. He compared the differentials to a frac spread, it can change on a regular basis. If there is an unplanned refinery outage the frac spread will change.

Predictions for 2014 market are similar. Calio spoke of new rail lines opening out of the Bakken on east to west routes as well as a route to Cushing and St. James.

Another factor that could play a huge rule in the future of rail is whether the law is amended to allow U.S. crude exports. In Calio’s opinion that won’t be happening anytime soon. “I have a hard time believing that Congress will be proactive and so my view is that you will have to see a differential blowout or some problem,” to make legal amendments and he doesn’t see that happening for several years.

When it comes to Canada he said, “rail may serve as a bridge but not a permanent solution. Rail can serve as a put option until pipelines are built, but rail is unlikely to be enough to clear total production growth longer term.”

It seems that as long as the Bakken is still producing and new plays are being discovered there will be a need for crude-by-rail but the extent of the need is up in the air.

LEAD STORY | From The Front

Continued from **Page 1** severe seasonal price volatility, BDH unit profitability will likely fluctuate along with spot price and contract prices. The caveat lies in the feedstock as Sawchuk explained: “Sixteen percent of the cracked feed [in the U.S. in 2012] was ethane; 16% propane; and 60% naphtha and others.”

Less than two decades from now in 2032 and considering “all of the seven announced crackers and what they intend to be cracking, and then after cracking for the remaining 13 years, I made the assumption that people aren’t going to just invest into ethane crackers, but that there’s going to be significant economics to investment into E-P mix-flexibility. We basically move from 68% ethane cracked to 79% ethane of the total feedstock demand,” Sawchuk noted.

Honing in on the propylene market long-term, the amount of propylene comprising total olefins output will fall from 15% to 11% at an absolute volume level, versus a U.S. demand-growth forecasts between 3% and 4% during the same time frame. According to Sawchuk, demand growth will outpace current cracker production.

“You’ve got these eight new announced PDH units; this is what’s going to save propylene consumers, because they’re [consumers] at least going to have another source of propylene coming from an alternative place. The economics are there for PDH [units],” he said.

“Butadiene, on the other hand, is a little but scary. There’s one announced on-purpose BDH unit, and I question whether or not it will be viable. The cost of butadiene is sometimes below the cost to make butadiene on-purpose.”

Sawchuk concluded that light naphtha derived from condensates remains a viable option for producers with E-P mix-flexibility crackers to take advantage of a different economics and attain greater margins.

“When you start thinking about the impact shale gas is going to have, it’s really not about ethane anymore; it’s about condensates and other things that come out of the shale plays that are really going to have a long-term effect on the marketplace,” he said.

Most crackers have hot and cold sections—E-P mix-flexibility crackers especially. Crackers can run into a cold constraint, or a point when the cracker can’t extract anymore ethylene from the stream. At



Turnaround | The U.S. petrochemical market is outpacing much of the rest of the world due to the low cost of liquids and resins.

that point, producers begin to examine constrained margins rather than unconstrained margins.

A key advantage of an E-P mix-flexibility cracker involves condensates, since the light naphtha (C5 and C6 streams) derived from a condensate splitter – which produces components such as diesel, jet fuel, heavy naphtha and light naphtha – can be processed by the flexible cracker. At the end of first-quarter, for instance, nearly three times as much natural gas could be processed in a flexible cracker as ethane, Sawchuk told attendees.

“Most of this year, you would’ve rather cracked Eagle Ford condensate at the WTI [West Texas Intermediate] flat price than ethane [as ethane and light naphtha break-even prices were about equal] if you could get the condensate in, the condensate splitter and you weren’t constrained from selling the product. So that means there’s hope,” Sawchuk told attendees.

“If you have flexible cracker and you have access to a refinery that can split off the Eagle Ford light naphtha or other light naphthas from condensates, you have this advantage,” he said. “Then you have the advantage of being in the butadiene market and in the heavier olefins markets.”

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