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New Group Calls For Improved Federal Infrastructure Approval Process

Shale, manufacturing leaders seek to keep domestic advantage in NGLs, petrochemicals

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

Collaboration | While speaking at the launch of the American Shale & Manufacturing Partnership, Rep. Tim Ryan (D-OH) had a fruitful discussion with leaders in the oil and gas and chemical industries. (Courtesy: American Shale & Manufacturing Partnership)

The development of shale plays is leading to a manufacturing renaissance, but there is still more work to be done, especially in regard to infrastructure build-up, according to industry participants. In order to further this development, the American Shale & Manufacturing Partnership (ASMP) was created to bring together a diverse group of organizations and industries focused on increasing the development of shales along with the U.S. manufacturing supply chain and workforce development.

The ASMP is composed of leaders from the American Fuel & Petrochemical Manufacturers; Carnegie Mellon University; the International Association of Bridge, Structural, Ornamental & Reinforcing Iron Workers; the National Association of Manufacturers; the Society of Chemical Manufacturers and Affiliates; and the U.S. Chamber of Commerce's Institute for 21st Century Energy.

In addition, the ASMP's charter members include the Allegheny Conference on Community Development; America's Natural Gas Alliance; Claude Washington Benedum Foundation; the Consumer Energy Alliance; Cynthia and George Mitchell Foundation; NorTech; the Pennsylvania Environmental Council; Rice University; and Texas A&M University.

The partnership will hold a series of national-level discussions while seeking to identify what policies should be considered to help bring manufacturing back to the U.S. If the ASMP's first press conference in Washington, D.C. was any indication this series should be very interesting as it led to a discussion between leadership from the manufacturing, petrochemical, oil and gas sectors and a member of Congress.

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HIGHLIGHTS FROM TODAY'S EDITION

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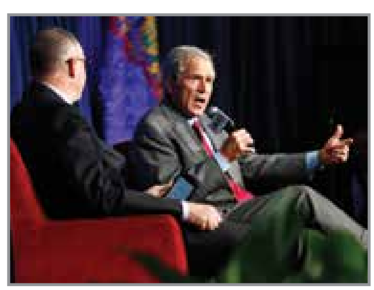

Presidential Observations

Former President George W. Bush gave his insights into politics and world affairs at DUG East.

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Relief Coming

The January start of the southern portion of the Keystone XL will provide Cushing with relief.

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U.S. Capital Advisors' Horwitz said that Marcellus production will double by 2019.

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NGL PRICES & FRAC SPREAD | Week in Review

Ethane Margins Remain Challenged Despite Price Increase

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

Heavy natural gas liquid (NGL) prices showed the greatest movements — both positive and negative — of any NGLs as November ended. Pentanes-plus (C_{5+}) finally caught up with West Texas Intermediate crude oil prices as the month came to a close. For the previous month, crude prices traded at just under $100 per barrel (bbl.), but heavy NGL prices hadn't matched these movements.

While C_{5+} prices rose to their highest levels in more than a month, as they increased to $2.07 per gallon at Conway and $2.13 per gallon at Mont Belvieu, butane and isobutane took downturns at both hubs primarily due to more competition with condensate prices.

CURRENT FRAC SPREAD (CENTS/GAL)				
December 9, 2013	Conway	Change from Start of Week	Mont Belvieu	Last Week
Ethane	18.20		25.92	
Shrink	25.26		25.33	
Margin	-7.06	6.17%	0.59	634.41%
Propane	119.83		119.90	
Shrink	34.90		34.99	
Margin	84.93	1.18%	84.91	0.93%
Normal Butane	136.50		138.73	
Shrink	39.51		39.61	
Margin	96.99	-4.95%	99.12	-4.31%
Isobutane	136.57		142.13	
Shrink	37.95		38.05	
Margin	98.62	-5.88%	104.08	-3.59%
Pentane+	206.63		213.30	
Shrink	42.25		42.36	
Margin	164.38	1.12%	170.94	1.74%
NGL $/Bbl	42.08	-0.88%	43.82	-0.09%
Shrink	13.92		13.95	
Margin	28.16	-0.41%	29.86	0.11%
Gas ($/mmBtu)	3.81	-1.80%	3.82	-0.52%
Gross Bbl Margin (in cents/gal)	64.91	-0.31%	69.22	0.17%
Gross Bbl Margin (in cents/gal)				
Ethane	1.00	0.00%	1.43	1.49%
Propane	4.16	0.29%	4.16	0.50%
Normal Butane	1.47	-4.06%	1.50	-3.26%
Isobutane	0.85	-4.78%	0.88	-2.78%
Pentane+	2.66	0.51%	2.75	1.28%
Total Barrel Value in $/mmbtu	10.15	-0.78%	10.72	0.01%
Margin	6.34	-0.15%	6.90	0.30%

NGL PRICES						
Mont Belvieu	**Eth**	**Pro**	**Norm**	**Iso**	**Pen+**	**NGL Bbl**
Nov. 27 - Dec. 3, '13	25.92	119.90	138.73	142.13	213.30	$43.82
Nov. 20 - 26, '13	25.54	119.30	143.40	146.20	210.60	$43.85
Nov. 13 - 19, '13	24.79	118.98	144.20	147.70	209.50	$43.71
Nov. 6 - 12, '13	24.21	118.50	142.40	145.16	204.28	$43.04
November '13	24.74	118.38	142.70	145.93	207.80	$43.39
October '13	25.45	113.69	147.90	151.30	209.99	$43.50
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
Nov. 28 - Dec. 4, '12	24.58	82.92	169.46	183.28	221.26	$42.46
Conway, Group 140	**Eth**	**Pro**	**Norm**	**Iso**	**Pen+**	**NGL Bbl**
Nov. 27 - Dec. 3, '13	18.20	119.83	136.50	136.57	206.63	$42.08
Nov. 20 - 26, '13	18.20	119.48	142.28	143.43	205.58	$42.45
Nov. 13 - 19, '13	18.00	120.92	143.34	146.10	201.64	$42.45
Nov. 6 - 12, '13	18.90	120.12	141.64	145.28	195.50	$41.98
November '13	18.37	119.53	141.53	143.76	200.04	$42.08
October '13	21.12	110.53	147.71	154.40	201.90	$42.19
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
Nov. 28 - Dec. 4, '12	19.22	74.84	166.00	170.00	210.64	$39.60

(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.

Butane fell 3% to $1.39 per gallon at Mont Belvieu and dropped 4% to $1.37 per gallon at Conway. Both prices were the lowest at the hubs since they were the same level the week of September 25. Isobutane prices decreased at a similar rate as their sister products at both hubs with the Mont Belvieu price also dropping 3% to $1.42 per gallon and the Conway price falling 5% to $1.37 per gallon.

Despite the downturn, both sets of prices are among the highest for the products at both hubs this year as demand remains strong due to increased liquefied petroleum gas (LPG) exports and consistent winter-grade gasoline production.

Although heavy NGLs were a mixed bag at both hubs, light NGL prices held firm. This was a positive for propane as its price levels are at their highest in the past two years, but a negative for

NGL PRICES & FRAC SPREAD | Week in Review

ethane as prices still struggle to get anywhere near truly profitable frac spread margins.

Mont Belvieu propane rose 1% to $1.20 per gallon, its highest level since it was $1.21 per gallon the week of April 11, 2012. The Conway price didn't achieve these same heights as it rose slightly to $1.20 per gallon, the same range it has been at for the past month. Increased propane heating demand should help to make up for the end of the crop drying season.

Ethane prices benefitted from improved gas prices at both hubs, but still remained very low. The Mont Belvieu price rose 1% to $0.26 per gallon, which is the range it has traded at for much of the second-half of 2013. The Conway price was flat at $0.18 per gallon with low volatility as most of the industry is avoiding the hub due to increased transportation options.

The short-term outlook for ethane looks pretty bleak as the improvement in gas prices has kept margins thin. Ethane is in a no-win situation as prices increase when gas prices also do, but they have failed to pick up at such a rate as to turn margins positive. On the other hand, they have also followed gas prices when they have fallen and thus failed to take advantage of potential gains in margin.

This should start to turnaround in March as inventories should begin to fall, which could help prices make notable improvements. En*Vantage is forecasting that Mont Belvieu ethane prices could approach $0.30 per gallon by March, which would provide a positive return under current market conditions.

All told the theoretical NGL bbl. price was down at both hubs as the Conway price dropped 1% to $42.08 per bbl. with a slight decrease in margin to $28.16 per bbl. The Mont Belvieu bbl. price was flat at $43.82 per bbl. with a slight increase in margin to $29.86 per bbl.

The most profitable NGL to make at both hubs was C_{5+} at $1.71 per gallon at Mont Belvieu and $1.64 per gallon at Conway. This was followed, in order, by isobutane at $1.04 per gallon at Mont Belvieu and $0.99 per gallon at Conway; butane at $0.99 per gallon at Mont Belvieu and $0.97 per gallon at Conway; propane at $0.85 per gallon at both hubs; and ethane at $0.01 per gallon at Mont Belvieu and negative $0.07 per gallon at Conway.

The recent cold front in the Northeast caused natural gas storage levels to fall 162 billion cubic feet to 3.614 trillion cubic feet (Tcf) from 3.776 Tcf the previous week. This was 5% below the level of 3.814 Tcf posted last year at the same time and 3% below the five-year average of 3.718 Tcf.

There could be another sizable decrease in storage levels this week as the National Weather Service anticipates a cold front that will extend throughout most of the country with only the West Coast and Florida experiencing normal to slightly warmer temperatures.

KEY NORTH AMERICAN HUB PRICES

2:30 PM CST / December 5, 2013

Gas Hub Name	Current Price
Carthage, TX	3.97
Katy Hub, TX	4.10
Waha Hub, TX	4.30
Henry Hub, LA	3.98
Perryville, LA	3.92
Houston Ship Channel	4.07
Agua Dulce, TX	N/A
Opal Hub, Wyo.	4.46
Blance Hub, NM	4.38
Cheyenne Hub, Wyo.	4.49
Chicago Hub	4.27
Ellisburg NE Hub	3.24
New York Hub	3.80
AECO, Alberta	3.52

Source: Bloomberg

RESIN PRICES – MARKET UPDATE – NOVEMBER 22, 2013

TOTAL OFFERS: 9,608,648 lbs		SPOT		CONTRACT	
Resin	Total lbs	Low	High	Bid	Offer
LDPE - Film	2,254,920	0.68	0.81	0.735	0.775
HDPE - Blow Mold	1,597,748	0.665	0.72	0.665	0.705
HMWPE - Film	1,261,840	0.71	0.76	0.705	0.745
HDPE - Inj	1,170,460	0.66	0.74	0.67	0.71
LLDPE - Film	1,042,460	0.7	0.765	0.655	0.695
LDPE - Inj	983,656	0.75	0.81	0.71	0.75
PP Homopolymer - Inj	833,564	0.72	0.81	0.745	0.785
PP Copolymer - Inj	274,000	0.83	0.86	0.755	0.795
LLDPE - Inj	190,000	0.725	0.725	0.68	0.72

Source: Plastics Exchange – www.theplasticsexchange.com

NGL PRICES & FRAC SPREAD | Week in Review

CURRENT FRAC SPREAD (CENTS/GAL)				
December 2, 2013	**Conway**	**Change from Start of Week**	**Mont Belvieu**	**Last Week**
Ethane	18.20		25.54	
Shrink	25.72		25.46	
Margin	-7.52	-58.71%	0.08	-94.90%
Propane	119.48		119.30	
Shrink	35.54		35.17	
Margin	83.94	-6.21%	84.13	-3.21%
Normal Butane	142.28		143.40	
Shrink	40.24		39.82	
Margin	102.04	-5.31%	103.58	-4.01%
Isobutane	143.43		146.20	
Shrink	38.64		38.25	
Margin	104.79	-6.39%	107.95	-4.33%
Pentane+	205.58		210.60	
Shrink	43.03		42.59	
Margin	162.55	-0.64%	168.01	-1.56%
NGL $/Bbl	42.45	0.01%	43.85	0.33%
Shrink	14.17		14.03	
Margin	28.28	-5.49%	29.83	-3.54%
Gas ($/mmBtu)	3.88	13.12%	3.84	9.71%
Gross Bbl Margin (in cents/gal)	65.12	-5.81%	69.10	-3.64%
Gross Bbl Margin (in cents/gal)				
Ethane	1.00	1.11%	1.41	3.03%
Propane	4.15	-1.19%	4.14	0.27%
Normal Butane	1.54	-0.74%	1.55	-0.55%
Isobutane	0.89	-1.83%	0.91	-1.02%
Pentane+	2.65	1.95%	2.72	0.53%
Total Barrel Value in $/mmbtu	10.23	-0.16%	10.72	0.46%
Margin	6.35	-6.84%	6.88	-4.06%

NGL PRICES						
Mont Belvieu	**Eth**	**Pro**	**Norm**	**Iso**	**Pen+**	**NGL Bbl**
Nov. 20 - 26, '13	25.54	119.30	143.40	146.20	210.60	$43.85
Nov. 13 - 19, '13	24.79	118.98	144.20	147.70	209.50	$43.71
Nov. 6 - 12, '13	24.21	118.50	142.40	145.16	204.28	$43.04
Oct. 30 - Nov. 5, '13	24.65	116.90	141.60	146.96	207.08	$43.12
October '13	25.45	113.69	147.90	151.30	209.99	$43.50
September '13	24.91	110.95	135.38	136.84	218.42	$42.63
3rd Qtr '13	24.87	102.65	132.06	134.86	215.56	$41.21
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4th Qtr '12	26.59	88.74	162.76	181.71	215.67	$42.69
Nov. 21 - 27, '12	26.68	84.57	165.93	183.43	223.17	$42.93
Conway, Group 140	**Eth**	**Pro**	**Norm**	**Iso**	**Pen+**	**NGL Bbl**
Nov. 20 - 26, '13	18.20	119.48	142.28	143.43	205.58	$42.45
Nov. 13 - 19, '13	18.00	120.92	143.34	146.10	201.64	$42.45
Nov. 6 - 12, '13	18.90	120.12	141.64	145.28	195.50	$41.98
Oct. 30 - Nov. 5, '13	19.90	117.16	140.84	142.58	196.02	$41.71
October '13	21.12	110.53	147.71	154.40	201.90	$42.19
September '13	20.59	108.24	132.50	137.44	209.98	$41.14
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
Nov. 21 - 27, '12	20.17	76.50	160.20	163.50	212.25	$39.59

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(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.

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Great Loss | Michael J. Economides, an energy industry economist and long-time friend of Hart Energy, passed away on November 30.

Michael Economides, Energy Economist, Dies At 64

BY **LESLIE HAINES** | HART ENERGY

Michael J. Economides, noted Houston energy economist, professor and petroleum engineer, passed away suddenly November 30 while on a flight from Madrid to Chile during a month-long trip to meet with his consulting clients. He was 64.

A prolific author, Economides wrote several text books about horizontal well completions and reservoir stimulation. He and co-author Ron Oligney in 2000 published *The Color of Oil: The history, the money and the politics of the world's biggest business*. In 2009, he published *Energy: China's Choke Point*. The latter publication is available from Hart Energy.

During his career, Economides held chaired professorships at several universities, wrote more than a dozen books and more than 150 journal papers and articles. He was frequently quoted on CNBC and CNN, and in academic journals. Economides was known for his wit and plain — sometimes blunt — speaking on geopolitical issues, as well as his expertise in engineering and hydraulic fracturing. He was a featured speaker at several Hart Energy events, most recently in February 2013.

A native of Cyprus, he came to the U.S. in 1969 as a Fulbright scholar and received his doctorate in petroleum engineering at Stanford. At the time of his death, he was a professor of chemical engineering and biomolecular engineering at the Cullen College of Engineering at the University of Houston. He was also a consultant to Fortune 500 companies, China National Offshore Oil Co. (CNOOC), ENI and other global oil companies. He was editor-in-chief of Energy Tribune and the peer-reviewed Journal of Natural Gas Science and Engineering.

He is survived by his wife Christine, a well-known petroleum engineering expert at Texas A&M University, and two children.

TransCanada To Start Keystone South Deliveries

BLOOMBERG

TransCanada Corp. expects to begin delivering oil to Texas January 3 on the southern portion of its Keystone XL pipeline, allowing more crude to leave a key delivery hub in Oklahoma.

TransCanada's Gulf Coast pipeline can carry 700,000 barrels (bbl.) of crude a day to Port Arthur, Texas, from Cushing, Oklahoma. The Calgary-based company disclosed its plan to start service in a December 3 filing with the U.S. Federal Energy Regulatory Commission. That adds to the capacity of the Seaway pipeline owned by Enterprise Products Partners LP and Enbridge Inc., which now carries 400,000 bbl. a day to Houston from Cushing.The operators have said they expect Seaway's capacity to reach 850,000 bbl. per day in the first half of 2014.

In TransCanada's filing, the company proposes uncommitted pipeline tariffs of $10.20 per bbl. for light crude and $11.34 per bbl. for heavy crude to Port Arthur, Texas, from the U.S.-Canada border near Haskett, Manitoba.

Uncommitted per-barrel rates to Cushing from the border are $6.82 for light and $7.28 for heavy.

Valero Energy Partners LP Commences IPO

Valero Energy Partners LP has commenced an initial public offering of 15 million common units representing limited partner interests pursuant to a registration statement on Form S-1 previously filed with the U.S. Securities and Exchange Commission . The underwriters are expected to be granted a 30-day option to purchase up to an additional 2.25 million common units from Valero Energy Partners. The common units are expected to trade on the New York Stock Exchange under the ticker symbol "VLP."

CB&I Announces Contract For U.S. Ethylene Plant

CB&I has been awarded a contract valued at approximately $1 billion by Ingleside Ethylene LLC, a joint venture between Occidental Chemical Corp. (OxyChem), a subsidiary of Occidental Petroleum Corp. and Mexichem, S.A.B. de C.V. for the engineering, procurement and construction of an ethane cracker and associated utilities and offsites to be located at OxyChem's complex in Ingleside, Texas. The cracker will have the capacity to produce approximately 1.2 billion pounds per year of ethylene.

Feedstock for the cracker is anticipated to be ethane derived from domestic shale gas. As previously announced, CB&I provided the technology license and basic engineering for the ethylene technology, five short residence time (SRT) cracking heaters and the front end engineering and design (FEED) services.

Societe Generale: Oil And Gas Industry Makes Up 1% Of U.S. Economy

BY **LESLIE HAINES** | HART ENERGY

Unbelievably, in some quarters there is still debate over the extent of the impact of the shale revolution on the U.S. economy. The evidence can be murky, but common sense says the impact is quite large.

"The oil and gas industry is about 1% of the U.S. economy today, and that is something that stops my oil and gas colleagues," said Stephen Gallagher, managing director and head of research for Societe Generale in the Americas.

"By region, by company, by sector, the numbers can be quite large, in the billions of dollars, but in aggregate it's a small percentage of U.S. GDP," he said, speaking at the Houston Energy Finance Group recently.

"But the U.S. economy would be in a lot worse shape if not for higher oil and gas prices encouraging new supplies to come online," he said. "While we are looking at tens of billions of dollars from drilling, production, new pipelines and so on, some of this economic impact is substitution for losses elsewhere in the economy, and not a net gain — like replacing the coal producers …," he said.

So, how much does the oil and gas industrycontribute to GDP (gross domestic product)? Production growth adds about 0.1% to GDP growth, while added consumer purchasing power thanks to low gasoline and low electricity prices, adds 0.1 to 0.2% to GDP. Infrastructure gains and "onshoring" of manufacturing, and more U.S. exports, each adds another 0.1%.

Growing Stronger | The oil and gas industry is providing a sturdier link in the economic chain due to the shale revolution.

Still, 0.1% of GDP is $15 billion to $20 billion of GDP gains per year in the U.S. economy, and $330 billion over 10 years, if the oil and gas industry were to add 0.2%.

"These are measurable benefits," Gallagher said, adding that he thinks we are at the beginning of transforming the macro economy.

He likened it to the effects of the Internet and the percent of GDP that it added to the economy 20 years ago. At first the Internet added only a few percentage points per year to GDP, but today, the cumulative effect is big.

"I think oil and gas will have a similar effect, but not as large as the Internet has, adding maybe three-tenths of a percent to GDP because it is not so much that it is adding something new, as it is a substitution [for declines in other industries]."

But, the compounding effect of a few basis points over time is a strong story, he said.

"What's going on in natural gas is transformational," he said, citing pending LNG exports, the decline in energy consumption, conservation and enhanced efficiencies in energy use. "We are still adjusting to higher commodity prices."

Just recently, the Multi-State Shale Research Collaborative indicated that the jobs aspect of the shale boom has been overstated. Lou D'Amico, president of the Pennsylvania Independent Oil & Gas Association, took offense.

"Well over 1,100 jobs have been saved at refineries in Philadelphia and Marcus Hook, thanks to natural gas being produced in counties in the Commonwealth," he said in a statement. "Williamsport was recently recognized as the country's seventh-fastest growing regional economy, with more than 85 new businesses opening in the area in a span of 18 months. The per capita personal income in Washington County increased from $29,138 in 2001, to $46,237 in 2011, an amount almost 10% higher than the state average."

Look For A Double In Marcellus Gas Production By 2019

BY **RICHARD MASON** | HART ENERGY

You only need three reasons to understand why rising U.S. gas production is going to keep natural gas prices low for years to come.

Those reasons are Susquehanna, Greene and Washington counties in Pennsylvania. Like the real estate mantra that bleats location, location, location as a key to success, these three counties, plus Wyoming and Bradford in northeastern Pennsylvania, are the main drivers in rising onshore natural gas production.

And more is on the way. In fact, the Pennsylvanian Marcellus shale as a whole should peak at 20 billion (Bcf) cubic feet per day in natural gas production by 2019, roughly double over current levels in fewer than six years.

Those three Pennsylvanian counties sit atop sweet spots in the Marcellus shale. Sweet spot drilling accounts for 20% of Pennsylvania's horizontal wells, according to Cameron Horwitz, director of E&P Research at Houston-based U.S. Capital Advisors. However, Horwitz discovered sweet spot drilling has a disproportionate impact on gas supply after a 2,000 well regional study. He presented the results to attendees at Hart Energy's DUG East 2013 conference in Pittsburgh in November.

Pennsylvanian sweet spots -—sort of the Hershey kisses of the Marcellus shale — include one example in which production from just 50 dry gas wells in Susquehanna County is on track to generate estimated ultimate recoveries (EURs) of 14 billion cubic feet per well.

"These sweet spot areas we've identified … will be the driver of (future) U.S. gas supply," Horwitz told DUG East delegates. "Even at $4 gas, we still have a lot of work to do here, likely over two decades, so it's just a very bright future to look forward to."

The size of the sweet spot prize is staggering in an industry where gas production continues to rise despite wholesale cutbacks in rig count. The Pennsylvanian Marcellus, for example, has seen a 50% reduction in gas-directed drilling since March 2012. Despite that, Marcellus production continues to rise with just two counties in Pennsylvania, Susquehanna and Bradford, producing a combined 4 billion cubic feet per day, or more than the entire U.S. Gulf of Mexico, according to Horwitz.

In fact, those two counties generate about 80% of the gas produced daily in the legendary Barnett shale. But those two counties in northeastern Pennsylvania are just one element in a larger theme.

Long Life Ahead | The Marcellus shale's sweet spot contains about 20 years of production even at $4 gas, according to U.S. Capital Advisors' Cameron Horwitz. (Courtesy: Hart Energy)

"We see about 200 trillion cubic feet of gas equivalent in the Pennsylvania Marcellus shale that is still viable at a $4 gas price, or less," Horwitz said. "That's about 30,000 remaining drilling locations. If you think about the 85 rigs still running in the play and 1,500 wells drilled each year, that is roughly 20 years left of gas, even if gas prices stay sub-$4 throughout that whole time."

Take note conventional gas drillers and dry-gas oriented E&P firms in the Rockies, Midcontinent and Texas: In Susquehanna County, one Cabot Oil and Gas Corp. well produced 7 billion cubic feet (Bcf) of gas in 13 months. At an average 20 million cubic feet per day for a year, it is the best producing Marcellus well to date. According to Horwitz, Cabot's Susquehanna County wells are generating EURs that average 13.8 Bcf per well, followed by Chief Oil & Gas LLC at 10.7 Bcf. Decline curves on one Cabot well are on track to produce 40 Bcf over the life of the well. On average, a $10 million dry gas well in Susquehanna County produces a 110% internal rate of return under present pricing and breaks even at $1.95 gas.

Horwitz defined the Marcellus gas sweet spots as areas that produce an EUR of 8 Bcf or greater with wells economic at $3 gas. Using these criteria, Pennsylvania has two emerging sweet spots at opposite corners of the state. In the dry gas northeastern Pennsylvania sweet spot, Wyoming County leads the way with average EURs north of 11 Bcf. Most of the activity is in the northern half of the county.

Neighboring Susquehanna County is second with average EURs of 9 Bcf.

The second sweet spot, in the wet gas area of southwestern Pennsylvania, is led by Greene County with EURs per well averaging 8.1 Bcf. Within the Greene County dry gas core, operators have drilled multiple wells that have generated decline curves suggesting EURs of 12 Bcf, roughly double the "average" Marcellus well. Operators with the best well results in Greene County include Rice Energy, which is generating average EURs of 12.3 Bcf, and EQT with a per well EUR average of 11.8 Bcf. At a $7 million well cost, Greene County dry gas wells produce an IRR of 95% at $4 gas and break even at $2.05 gas.

The gas play grades into a wet gas zone in neighboring Washington County. Here, wells produce a stream that is 40% liquids before NGL processing. Range Resources Corp. is the largest operator in the wet gas zone, though privately held Rice Energy is reporting leading Washington County EURs of 10.3 Bcf per well while EQT is second with an average 9.1 Bcf. A $7 million Washington County well produces a 77% IRR at $4 gas and an aggregate $40 NGL barrel. The break even for a well in the wet gas portion of the Marcellus sweet spot is $0.40.

"Gas is essentially being subsidized by the liquids," Horwitz said. "Gas is almost insensitive to gas price in this part of the play."

Horwitz pegged current production out of the Pennsylvanian Marcellus at 10 Bcfof gas per day.

"Pretty amazing when you consider that three years ago production was less than 1 billion cubic feet per day. That's a compound average growth rate of over 125% each year — pretty incredible," Horwitz said.

Horwitz's Pennsylvanian scorecard shows 12,000 horizontal wells permitted and 6,000 horizontal wells drilled during the last six years. Operators were permitting 200 to 300 wells per month at the peak in 2011-2012.

"We've subsequently seen a slowdown in some of that activity to 100 to 200 wells per month on average, and we've seen a pretty significant high-grading as to where that permitting activity is taking place," Horwitz said. "Counties such as Bradford, Susquehanna, Greene, Lycoming and Washington have taken a disproportionate share of that activity."

Marcellus rig count has been range bound between 80 and 100 wells since August 2012 and is currently slightly above the midpoint in that range. "This will probably hold true for the next couple years," Horwitz said.

Also holding true is the rising flow of Marcellus gas, an event that has national implications for future domestic gas production and for natural gas pricing.

Russia To End Gazprom Monopoly On LNG Exports

Russian lawmakers voted to end state-controlled OAO Gazprom's monopoly on exports of liquefied natural gas (LNG) as competitors plan to build plants to produce the chilled fuel.

> "To remain competitive [with] global gas markets, Russia needs to add an LNG component to its export strategy."
>
> —Ildar Davletshin, analyst, Renaissance Capital

The bill was passed in the last two of three readings by lawmakers in the lower house of parliament on November 22. Once signed into law, it will allow OAO Novatek and OAO Rosneft to ship tankers of the fuel to foreign markets as Russia seeks to double its share of the global LNG market by 2020.

President Vladimir Putin in June called for the gas export laws to be eased to take advantage of a window in the Asia-Pacific market before supplies begin from Africa, Australia and the U.S. Since Putin granted Gazprom the exclusive legal right to ship gas abroad in 2006 to avoid undermining export prices, the monopoly hasn't built any LNG capacity.

"To remain competitive [with] global gas markets, Russia needs to add an LNG component to its export strategy," Ildar Davletshin, an analyst at Renaissance Capital in Moscow, told *Bloomberg*. "If you look at the project pipeline in Australia and East Africa, Russia risks losing out."

The draft law will grant access to LNG exports to those companies developing fields with licenses that stipulate the gas is intended for LNG as well as state companies producing from offshore blocks, and could take effect as soon as December 1, according to a copy on the website of parliament's lower house, the State Duma.

Yamal LNG

After the president signs the law, Novatek will have control over exports from the $20-billion Yamal LNG project that it's developing with Total S.A. and China National Petroleum Corp.

The gas producer — controlled by billionaires Gennady Timchenko and Leonid Mikhelson — plans to send its first commercial shipments in the first half of 2017, Yamal LNG marketing and shipping director Gabriel Brecque said in Paris on November 20.

State-controlled Rosneft and ExxonMobil Corp. plan to establish an LNG plant with a capacity of 5 million metric tons on Sakhalin Island in the Pacific by the end of the decade.

Russia aims to produce at least 40 million metric tons per year, or more than 11% of the world's LNG, by 2020 – up from about 5% now, deputy Energy Minister Kirill Molodtsov said at a September conference on Sakhalin, where Gazprom bought into the country's only plant for the fuel in 2006. The plant launched production in 2009.

Sinopec Personnel Detained After Deadly Pipeline Blast

BLOOMBERG

Chinese authorities detained people from China Petroleum & Chemical Corp. (386), the nation's biggest refiner, after at least 55 died in a pipeline blast.

The personnel from Sinopec, and two from an economic development zone in China's eastern Qingdao city were detained by police, the city's Huangdao district government said yesterday on its official microblog.

The explosion and crude oil leak on November 22, the deadliest since at least 2005, adds to a growing toll from industrial accidents that's building pressure for better safety standards. It shines a spotlight on management of state-owned energy companies after the government pledged this month to allow more private investment as part of the biggest reforms since the 1990s.

"Someone has to be accountable for what has happened," said Laban Yu, a Hong Kong-based analyst at Jefferies Group LLC. "Sinopec executives can only escape with minor punishment if an investigation concludes that local government was at least equally responsible for the accident."

Three calls made to the office and mobile phone of Lv Dapeng, Sinopec's Beijing-based spokesman, weren't answered. There was no reply to a text message sent to Lv's mobile phone requesting comment. Brunswick Group, which consults on public relations for Sinopec, could not immediately comment.

Detained Officials

A woman who answered the phone at the personnel department of Qingdao Economic and Technological Development Zone, who declined to give her name or title, said she had no further information on the two detained officials.

Last week's blast in a section of pipe running under city streets in Qingdao exposed severe problems of human error and a "very serious dereliction of duty," the official Xinhua News Agency reported, citing Yang Dongliang, head of the team investigating the accident. President Xi Jinping said the probe should be fast-tracked and responsibility established, China Central Television reported November 24.

Management Changes

The biggest risk for Sinopec would be a management reshuffle and the resulting uncertainty if the company was found to be at fault following the investigation, UBS AG said in an e-mailed note.

Fatal accidents in the past decade at PetroChina Co., the nation's biggest energy company, and parent China National Petroleum Corp. led to management changes at those companies. The Qingdao accident is the deadliest in the petrochemicals industry since at least 2005, according to a chart of 11 accidents compiled by Xinhua and published on November 22.

The 249-kilometer (155-mile) pipeline began leaking oil at about 3 a.m. and emergency crews were dispatched to conduct repairs when the fire started in Qingdao's development zone, according to a Xinhua report on November 22. Xinhua also reported the death toll. Some of those killed were Sinopec employees working to fix the leak, the company said on its website.

Flying Sidewalk

The incident interrupted electricity and water supplies in nearby areas, with about 18,000 people evacuated, the Qingdao government said. Cleaning and fishing vessels and dispersant were being used to clean up the oil leak, which spread across 3,000 square meters in Jiaozhou Bay and the Yellow Sea, the Qingdao Municipal

People's Government Information Office said on its microblog on November 22.

In Qingdao the explosion sent chunks of sidewalk flying, crushing the roofs of trucks and public buses, tearing down branches of trees and felling power poles. A local police post was destroyed and rescue workers scrambled to secure combustible materials while residents queued for food as household gas supplies for cooking were disrupted.

It's the latest fatal industrial accident as China seeks to improve workplace safety. More than 27,700 people were killed or went missing at workplaces in the first half of this year, according to the State Administration of Work Safety. In June, a fire at a poultry plant in the northeastern province of Jilin killed 120 people in the nation's deadliest blaze in 13 years. Authorities detained executives from the plant after the fire, according to Xinhua.

LaFleur Named Acting FERC Chair

In Charge | Cheryl LaFleur was with FERC for more than three years prior to being named acting chair of the commission. (Courtesy: Federal Energy Regulatory Commission)

President Barack Obama named Cheryl A. LaFleur as acting chair of the Federal Energy Regulatory Commission (FERC).

"I would like to thank President Obama for this opportunity," LaFleur said. "I am honored to lead the Commission at a time when the nation is making substantial changes in its energy supply and infrastructure to meet environmental challenges and improve reliability and security. The Commission also has important work ahead in implementing Order No. 1000, setting transmission rates, and ensuring competitive markets work fairly and effectively for consumers. I look forward to working with my colleagues and the wonderful team at FERC to take our work forward."

Since joining the Commission in July 2010, LaFleur has focused attention on strengthening reliability and grid security, promoting regional transmission planning, and supporting a clean and diverse power supply. She serves as the FERC liaison to the Department of Energy's electricity advisory committee, is a member of the National Association of Regulatory Utility Commissioners' Committees on Electricity and Critical Infrastructure and co-chaired the FERC/NARUC Forum on Reliability and the Environment.

Exmar Prepares MLP Filing Submission

EXMAR NV announces that it expects to submit to the United States Securities and Exchange Commission (SEC) the first draft registration statement for Exmar Energy Partners LP (the MLP). The initial public offering of the MLP's common units is expected to commence after the SEC completes its review process. Upon completion of the offering, the MLP is expected to own a 50% equity interest in joint ventures that own and operate four liquefied natural gas (LNG) regasification vessels and one LNG carrier.

EXMAR is specialized in activities relating to the transport of gas, and in particular the transport of liquefied gases, such as LNG , LPG (Liquefied Petroleum Gas) and ammonia (NH). EXMAR Offshore focuses on selective projects where it can bring added value, such as the provision of goods and services to the offshore oil and gas industry.

Apart from shipping and offshore activities, EXMAR provides specialized services. EXMAR Ship management is committed to providing high-quality ship management and—ancillary services to owners of gas carriers, oil tankers, bulk carriers, chemical carriers as well as floating units (storage & accommodation).

For Bush, Life Goes On After The White House

BY **MIKE MADERE** | HART ENERGY

For George W. Bush, life after the presidency suits him just fine. He says he doesn't miss Washington and doesn't miss being president. However, "It was inconvenient to stop at the stoplights coming in today," he quipped while addressing delegates at Hart Energy's DUG East conference recently.

Bush recounted tales — dashed with a snappy sense of humor — from his eight years in the Oval Office. While he can easily live without the pressure-packed days in the White House, he said that he does miss being commander in chief.

"This is a remarkable country that produces men and women who volunteer in the face of danger. Being able to salute those men and women was a huge honor. I miss that aspect of the presidency, and I really think it's important for our country to strongly support our vets. I remember when the Vietnam era vets came home and were treated poorly by the country. The mood has changed significantly now. Whether or not you agree with the decision to put the soldiers in combat like I had to do, the country is unified in making sure the vets are well supported and well received, and I'm very grateful for that," he said.

The decision to send troops into combat should be seriously weighed, he said, adding that all options should be exhausted. "But once you're in it, you should offer your support."

Delivering one of several one-liners, Bush said, "If you really want to understand the decision-making process of war, buy my book. It's a little bit of a shock to people that I can write much less read."

Regarding the situation of seemingly endless unrest in the Middle East, the 43rd president said, "People want to be free. They're tired of governments that don't listen to them. And the classic case is Egypt. Kids came to Tahrir Square and said 'we want to be heard.' I'm hopeful that this is the beginning of democracy in which human rights and different religions are respected."

Washington may be awash with division these days: Blue vs. Red, Democrat vs. Republican, liberal vs. conservative. Bush, however, made it clear that he no longer wants to be part of that routine. "I have no intention whatsoever to second guess the current president of the United States. I think it's bad for the country if former presidents are out there undermining the current president."

Insightful | Former president George W. Bush discussed his life and times both today and in the White House while at Hart Energy's DUG East conference. (Courtesy: Hart Energy)

Bush talked about the current Washington logjam and why comprise in Congress is almost impossible. "It takes a desire by leaders in Washington to set aside party and focus on the common good, that's what it takes. Look, I understand this Congress can't lead. Congress is basically made up of risk-adverse people who have a two-year time license. Most Congressmen don't face general elections. They're only worried about their primaries because congressional districts are safe," he said.

Regarding gerrymandered districts, Bush commented, "Most Congressmen lobby their state reps to make their district safer, not more competitive. And therefore you only have to worry about your primary. You worry about the left flank if you're a Democrat and the right flank if you're a Republican, which tends to polarize the debate."

Until there's a "more sane method for redistricting," cooperation is unlikely, he added.

During his administration, Bush unsuccessfully pushed for immigration reform. He spoke passionately about the subject during his talk to oil and gas employees.

"The system's broken and it needs to be fixed, and if you want to kill it, politically scream amnesty. That scares people — amnesty. Nobody's for amnesty in the reform process. But those who are against immigration reform scream amnesty. I'm really not surprised. Populism can really make the issue difficult. There are a lot of outlets in the media and on the Internet trying to get your attention. Sometimes people say outrageous things in order to get market share.

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LEAD STORY | From The Front

Continued from Page 1

Rep. Tim Ryan (D-OH), co-chair of the Congressional Manufacturing Caucus, attended the event and asked membership how Congress could help these industries achieve their goals and sustain their global lead in shale production and continue to take advantage of these to the benefit of the domestic economy.

After several members of the partnership mentioned that it would be beneficial for "government to get out of the way," Ryan said: "What can we do to help streamline these processes? If it's a bipartisan issue, what can we do to begin a process to solve this problem and get bipartisan support?"

Jay Timmons, president and chief executive of the National Association of Manufacturers, said that it was important to support necessary infrastructure, not just transportation, but communications as well. "We don't have the infrastructure we need and it is a competitive disadvantage for this country. We haven't invested in the last several decades and Congress needs to get its act together. It's not just roads and bridges, but also ports, our electrical grid and broadband access. All of this is intractable for a growing economy."

Karen Harbert, president and chief executive of the Institute for 21st Century Energy, U.S. Chamber of Commerce, added that much of this infrastructure is unnecessarily delayed in getting built due to overbearing regulation and approval processes.

"There are huge opportunities in many industries, but we can't get a lot of things built right now because we need a 21st century permitting process in this country to get infrastructure built. Capital will go elsewhere if we don't get things built. Congress has looked at this, but we really need to hold the regulators and permitting agencies accountable for a reasonable timeframe. When it takes five-and-a-half years to get a pipeline permit in the U.S. and it takes five-and-a-half weeks in another country, that's a 'not open for business' sign," she said.

Both Timmons and Harbert said that for the most part, state permitting agencies have been "getting it right," but that federal agencies have placed various repetitive and burdensome practices in place in their processes.

"A lot of people would like to put a political spin on this situation by blaming one party or another for the situation, but the fact is this has been an issue for 30 years no matter the party," Timmons said.

One of the problems for the chemical industry has been overregulation, according to Lawrence Sloan, president and chief executive of the Society of Chemical Manufacturers and Affiliates. He stated that after any sort of accident or incident involving chemical manufacturers, the kneejerk reaction of regulators has been to create more regulations on top of existing regulations. In some cases, this has led to a single piece of equipment being impacted by up to 10 different regulations.

"We need to have a commission that analyzes these regulations and highlight the ones that aren't warranted any longer because they conflict or compete with other regulations. There hasn't been a lot of movement on President Obama's mandate to create a smart regulation policy. It's not just the big regulations that have a large financial impact of $100 million or more, it's the little ones too and those are being overlooked," Sloan said.

Rep. Tom Reed (R-NY), who is the other co-chair of the Congressional Manufacturing Caucus, also spoke at the event and discussed the positive impacts that development of the Marcellus shale has had on his district, the 23rd in southwest New York. While development of the play in New York has been slow compared to Pennsylvania and West Virginia, the state has still experienced economic benefits that have spilled over from Pennsylvania.

"Our shops are busy, our hotels are full, and pipelines are being constructed. This involves real jobs, real growth and real money being spent," he said while adding that he would work through the Congressional Manufacturing Caucus to make sure "we get the policy right out of Washington."

It must be heartening for members of the oil and gas industry to hear that both members of Congress in attendance seemed eager to help expedite the approval process for liquefied natural gas (LNG) exports.

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