

**In This Week's Edition of Midstream Monitor**

**FEATURE**

Armstrong: Permitting Issues are the Biggest Obstacle for Midstream Operators..... 1

**INSIDE LOOK AT PROCESSING**

NGL Storage at Processing Plants Fell Across the Board in December Due to Increased Demand..... 1

February 2011 Frac Spread: Lower Gas Prices Help Drive Margins Higher ..... 2  
BB&T Adds Energy Lending Team..... 4

**NEWS & TRENDS**

Swift Energy Announces South Texas Midstream Service Agreements ..... 5  
Plains All American Pipeline, L.P. Prices Public Offering of Common Units ..... 6  
GPA Annual Convention Highlights New Role.. 6

**PIPELINES & TECHNOLOGY**

Southcross Energy Agrees to Construct Major Natural Gas Pipeline Extension in South Texas..... 7  
Area Drilling, Boring Expertise a Vital Resource to Marcellus Gas Pipeline Contractors ..... 7  
Kongsberg Completes World's Longest Multi-Sensor AUV Pipeline Inspection..... 8

**NGL PRICES**

NGL Markets Balance as Effects of Mont Belvieu Explosion Subside..... 9

**FRACTIONATION SPREAD**

Conway Ethane, Mont Belvieu C<sub>2+</sub> Only NGLs to Experience Significant Increase in Margin.... 10

**SNAPSHOT**

Marcellus Shale Production Expected to Exceed 2 Bcf/d by Year-end 2011..... 11

**Armstrong: Permitting Issues are the Biggest Obstacle for Midstream Operators**

It's been a busy few years for Alan Armstrong, the new CEO of Williams Co., a position he assumed at the start of this year, after serving as president of the company's midstream business where he was responsible for Williams' midstream activities in the United States and Canada. Last year, Williams dropped down most of its midstream and interstate gas pipeline assets to its master limited partnership, Williams Partners L.P. in a \$12 billion restructuring. In addition, he is in the midst of finishing his term as president of the Gas Processors Association (GPA), where he presided over that organization's own restructuring as it has grown to represent the midstream as a whole rather than just focusing on gas processors.

"The transfer of the midstream assets to Williams Partners hasn't been that big of a deal since about 25-30% of our



midstream assets were already in there and we have a common operating strategy," Armstrong told Midstream Monitor. "What has changed at the Partnership is that the scale of the business gives us tremendous access to capital and enabled us to raise about \$1 billion in capital in the fourth quarter alone."

He added that the Partnership has benefited from the predictable and steady cash flows generated by the inclusion of

*(continued on page 3)*

**INSIDE LOOK AT PROCESSING**

**NGL Storage at Processing Plants Fell Across the Board in December Due to Increased Demand**

In December 2010 natural gas liquids (NGL) prices continued to improve due to increased demand, which was evident in the decreased inventory levels at natural gas processing plants for each NGL in the month.

This data is the most recent available from the Energy Information Administration (EIA) and shows that storage levels were down across the board as demand rose due to an improved economy backed by holiday spending, as well as greater usage from crackers in place of naphtha due to the low price for ethane.

In the month of December, there was record levels of consumption which greatly surpassed the forecasts of many companies and industry analysts. "We

saw instantaneous consumption of ethane reach historic levels and the industry's ability to consume ethane even outpaced the growth in ethane production, " Jim Teague, Enterprise Products Partners' executive vice president and chief commercial officer, said during the company's recent conference call to discuss Q4 2010 earnings. "Last quarter, I said that we expected ethane consumption to top a million barrels a day by 2015. The industry topped that shortly before Christmas. Frankly, that jump in consumption exceeded our optimistic view at that time. However, remember what we continued said last quarter: never underestimate the U.S. chemical industry's ability to consume more ethane."

*(continued on page 5)*

KEY NORTH AMERICAN HUB PRICES	
2:20 PM CST / March 10, 2011	
GAS HUB	CURRENT \$
Carthage, TX	3.77
Katy Hub, TX	3.80
Waha Hub, TX	3.72
Henry Hub, LA	3.87
Perryville, LA	3.80
Houston Ship Channel	3.79
Agua Dulce, TX	3.76
Opal Hub, WY	3.65
Blance Hub, NM	3.68
Cheyenne Hub, WY	3.68
Chicago Hub, IL	3.96
Ellisburg NE Hub	4.02
New York Hub, NY	4.15
AECO, Alberta	3.67

Source: Bloomberg

## February 2011 Frac Spread: Lower Gas Prices Help Drive Margins Higher

The month of February 2011 proved to be a profitable month for natural gas liquids (NGL) producers as NGL prices continued to improve while natural gas feedstock prices dropped at both Conway and Mont Belvieu.

Natural gas prices at both hubs were just 1¢ apart with the Conway price falling 18% to \$3.86 per million Btu (/MMBtu) from the start of the month and the Mont Belvieu price dropping 11% to \$3.87/MMBtu.

These prices helped to increase the frac spread margins at both hubs with ethane margins benefiting the most. The Conway margin for ethane rose 82% and firmly increased the natural gas liquid's (NGL) profitability at the hub. The Mont Belvieu margin improved 60% and was valued at two times the rate of its Conway counterpart.

The second largest improvement in margin at either hub was for Conway C<sub>5+</sub>, which improved by 28% due to its steady increase in price caused by the surge in crude prices. Propane had the second largest margin improvement at Mont Belvieu as it was up 19% on the back of improved pricing at the close of the month caused by shortages at the LDH hub at Mont Belvieu.

These shortages were due to less throughput capacity from Enterprise Products Partners' Western Storage facility caused by the February 8 explosion at

the facility. This resulted in propane prices reaching their highest levels at the hub in more than two years.

Although the heavy NGLs remained the strongest at both hubs, two of them had the smallest margin improvements at both hubs with Conway isobutane showing a 10% improvement and Mont Belvieu butane improving by 14%.

Overall the theoretical NGL barrel for the month had strong price increases at both hubs with the Conway price growing by 9% to \$54.91 per barrel (/bbl) with a margin improvement of 23% to \$40.81/bbl and the Mont Belvieu price increasing 12% to \$59.25/bbl with a 21% improvement in margin to \$45.11/bbl.

The most profitable NGL to make at both Conway and Mont Belvieu during the month of February was C<sub>5+</sub> at \$2.10 per gallon (/gal) at Conway and \$1.97/gal at Mont Belvieu. This was followed, in order, by isobutane at \$1.50/gal at Conway and \$1.59/gal at Mont Belvieu; butane at \$1.30/gal at Conway and \$1.43/gal at Mont Belvieu; propane at \$1.00/gal at Conway and \$1.13/gal at Mont Belvieu; and ethane at 21¢/gal at Conway and 42¢/gal at Mont Belvieu.

— Frank Nieto

### Current Frac Spread (Cents/Gal)

(Note: This is not this week's Frac Spread)

FEBRUARY 2011	Conway	Change from Start of Month	Mont Belvieu	Start of Month
Ethane	46.38		67.80	
Shrink	25.59		25.66	
Margin	20.79	82.27%	42.14	60.18%
Propane	135.77		148.30	
Shrink	35.36		35.45	
Margin	100.41	19.20%	112.85	19.35%
Normal Butane	170.00		183.00	
Shrink	40.03		40.13	
Margin	129.97	14.95%	142.87	13.94%
Iso-Butane	188.50		197.33	
Shrink	38.45		38.55	
Margin	150.05	10.10%	158.78	16.60%
Pentane+	253.25		239.95	
Shrink	42.81		42.92	
Margin	210.44	27.55%	197.03	14.98%
NGL \$/Bbl	54.91	9.36%	59.25	11.51%
Shrink	14.10		14.14	
Margin	40.81	23.38%	45.11	21.13%
Gas (\$/mmBtu)	3.86	-17.70%	3.87	-11.03%
Gross Bbl Margin (in cents/gal)	93.47	23.55%	105.29	21.49%
NGL Value in \$/mmBtu				
Ethane	2.55	9.13%	3.73	22.94%
Propane	4.71	6.74%	5.15	10.34%
Normal Butane	1.84	5.13%	1.98	7.33%
Iso-Butane	1.17	3.01%	1.23	9.93%
Pentane+	3.27	16.71%	3.09	9.27%
Total Barrel Value in \$/mmBtu	13.54	8.86%	15.18	12.51%
Margin	9.68	24.94%	11.31	23.71%

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. | Source: Frank Nieto

**Armstrong... (continued from page 1)**

its pipeline assets, which have helped to dampen a lot of the volatility that comes with being in the processing business.

These pipelines also present tremendous growth opportunities for the company. Williams was able to enter the Marcellus shale earlier than others because of its pipeline infrastructure in place in the region. The company's Transco pipeline system had the Leidy lateral in the region. Although it wasn't moving Marcellus gas, it was moving gas in and out of storage in Western Pennsylvania which gave it a foothold.

"We entered into that basin early on before it became quite so popular and started working on a transaction with Atlas Pipeline Partners after looking at all the leaseholds up there. We really liked their position – they were one of the few that had a gathering system up there that was a standalone, non-regulated system," Armstrong says.

The two companies formed a joint-venture called Laurel Mountain Midstream that owns and operates all of Atlas Pipeline's assets in northern Appalachia with Williams Partners holding a 51% stake in the company and Atlas Pipeline holding the remaining 49%.

Since the creation of Laurel Mountain, Williams has sought to increase its gathering assets in the play, Armstrong says. "We are developing the Springville lateral in the northeast part of Pennsylvania because we saw the Tennessee system rapidly filling up and needed another outlet."

The Springville lateral will ship gas from Susquehanna County down to the Transco line with Cabot Oil & Gas serving as the project's anchor. "Our strategy is to continue to add value to producers by giving them access to

premium markets with big infrastructure. Our goal is to aggregate enough supplies to warrant the installation of large infrastructure," he says.

Williams is also expanding Transco into the Marcellus with the Northeast Supply Link project as well as seeking to develop the Keystone Connector that would transport gas from the Rockies Express as well as the Marcellus to East Coast markets.

While the company's activities in the Marcellus are getting a lot of attention, Armstrong says that Williams is very active in other regions. "One of the least known areas is in the Canadian oil sands and what we do up there is take the off-gas from the big oil sands upgraders. That gas has a lot of liquids and olefins in it, which we strip out along with the NGLs. It's a very important business for us both in terms of current profitability as well as growth."

There is large room for growth as the company is currently only capturing about 20% of the available liquids in the region. These opportunities will not just increase due to improving technology, but also because of the opportunity it represents for producers to reduce their CO<sub>2</sub> emissions.

"We reduce CO<sub>2</sub> emissions from a full-scale operation like Suncor's by about 20% by taking this gas with a lot of impurities and products that don't burn very well and replace that with clean natural gas so they wind up burning the natural gas after we strip out the liquids," Armstrong says.

Williams also continues to eye expansion in the Rockies, where it has doubled its capacity in the Wamsutter Basin; the Piceance, where it is making additional investments to support its

E&P business; and in the Gulf of Mexico, where it hopes permitting begins to take off again.

Armstrong thinks that the natural gas industry will return to strength during the coming years if the regulatory environment doesn't stand in the way. "Our point of view is that the cost of producing natural gas can't continue to come down and the U.S. is in a tremendous position if we will get out of our own way from a regulatory standpoint. People are going to stop drilling for gas if they can't get their gas moved to market because they can't get air permits for compressors."

This very issue has been a focal point of Armstrong's term as president of GPA. Throughout the course of the past year, GPA has been in the midst of extensive discussions with the Environmental Protection Agency (EPA) about air permitting issues.

"The EPA has been very, very aggressive towards the midstream business in terms of new emissions regulations. So we've had to be very effective at a federal level to take that on," he says.

Since negotiations for a comprehensive energy bill from the U.S. Congress that would seek to reduce carbon emissions began to dissolve last spring, EPA officials have begun to state they would seek to regulate carbon emissions on their own.

"There are a lot of discussions about whether the EPA is making the law up as they go along and overstepping their bounds as a regulator. Certainly the House of Representatives has made it clear they think the EPA should get in line with the idea of regulating existing laws rather than creating new laws," Armstrong says.

He added that even should the natural gas industry comply with any new EPA regulations for air permits, the current wording of these proposals is very ambiguous and would make it impossible to comply with them.

"There's a lot of time and effort and technical work that needs to go into establishing new emissions rules and we don't think adequate time has been spent getting the EPA to understand that," he says.

GPA filed suit against the EPA over air permits and was instructed by the courts to try to negotiate a settlement, the discussions of which are still ongoing. He also noted that GPA is active in Texas where the state and the EPA are in the midst of a feud over state permitting rights.

Last year, the EPA informed the state of Texas that it did not approve the Qualified Facilities exemption rule that the Texas Commission on Environmental Quality (TCEQ) submitted for inclusion in its federally approved

State Implementation Plan. This disagreement has put producers and midstream operators in the middle and caused holdups in getting air permits in the state.

"Texas is somewhat a test of wills and the guys just trying to get the work done are getting caught in the middle," Armstrong says. He also noted that there is a similar situation in Pennsylvania as far as halting air permits.

"The Pennsylvania state agencies are sort of overwhelmed right now. They're trying hard to get new policies, but the state hasn't been in the position of permitting a lot of gas compressors for a long time so all of a sudden there's a new slew of permit applications," Armstrong says.

Additionally, he says that the EPA is clouding the issue in Pennsylvania by trying to impose an aggregation rule that would treat a gathering system with a number of compressors on it as one large compressor station. "The problem with that is it's never ending.

On a big system you're always adding and taking away compression and you're constantly in an open permit situation with that sort of policy."

These permitting issues may eventually result in higher gas prices, but for the wrong reason as it could result in producers halting drilling, he says. "If things continue along the path they're on now we're going to have a lot of our natural resources unable to flow because projects can't move forward without the proper permits. Most GPA members are perfectly happy to do their part by using the latest technologies in terms of keeping the air clean. I don't think companies are trying to buck doing the right thing, but when the right thing isn't even made clear or can't be agreed upon by multiple agencies, then you just get into a roadblock situation and that's where we are right now in many parts of the country."

— Frank Nieto

## BB&T Uniquely Positioned To Become A Premier Energy Lender

BB&T has hired a six-member energy lending team based in Houston, Texas, to focus on oil and gas production and midstream companies.

"The addition of this team to BB&T Capital Markets' energy platform is part of a long-term strategy to expand our presence in the oil and gas sector and represents a significant growth opportunity for us. We are committed to this strategy of helping our clients access capital from a trusted and proven financial partner," said Rufus Yates, president and CEO of BB&T Capital Markets.

"The new energy lending team, led by Jeff Forbis, has extensive knowl-

edge of the oil and gas sector. Their experience -- paired with BB&T's resources as one of the nation's largest and most sound financial institutions, uniquely positions BB&T to become a premier energy lender," Yates added.

"BB&T's strong commitment to energy lending makes it the perfect partner for exploration and production as well as midstream companies, which typically have capital-intensive growth plans," said Jeff Forbis, Energy Group team leader for BB&T Capital Markets Corporate Banking.

BB&T currently has extensive energy risk management capabilities

in Houston through its team of insurance industry specialists at McGriff, Seibels and Williams, an insurance subsidiary of BB&T. In addition, BB&T Capital Markets added a team of equity research analysts dedicated to the energy sector in 2010.

BB&T Corporation made its entrance into the Texas market with the Colonial Bank acquisition in 2010 and is well positioned to support the energy sector as one of the best capitalized banks in the U.S.



**NEWS & TRENDS**

**Swift Energy Announces South Texas Midstream Service Agreements**

Swift Energy Company reported that it has entered into a long-term agreement for natural gas gathering, processing and transportation services in South Texas with Southcross Energy GP LLC and its affiliates. This agreement will involve the construction of a new pipeline to the Company's AWP operating area in McMullen County,

TX. Swift Energy will have up to 90 million cubic feet of gas per day of firm capacity for those services. The Company currently expects the new pipeline to be in service mid-2011.

Swift Energy has also executed a long term sales contract with Southcross Marketing Ltd for the natural gas liquids extracted during the processing

of the gas and a portion of the residue gas that is indexed to market.

Swift Energy Company, founded in 1979 and headquartered in Houston, engages in developing, exploring, acquiring and operating oil and gas properties, with a focus on oil and natural gas reserves onshore in Texas and Louisiana and in the inland waters of Louisiana.

**NGL Storage at Processing Plants (continued from page 1)**

This record level of consumption caused ethane storage levels to fall 19% to 956,000 barrels (bbls) in December from November levels of 1.2 million bbls. The December storage level also represented a 61% decrease from the level reported by the EIA six months earlier, when it was 2.4 million bbls in

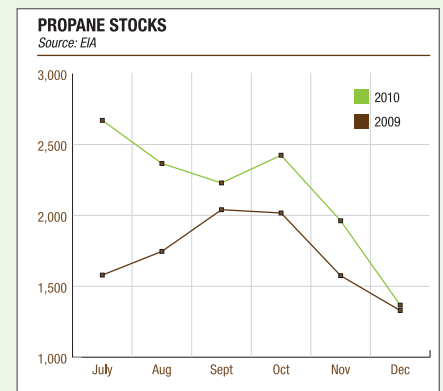
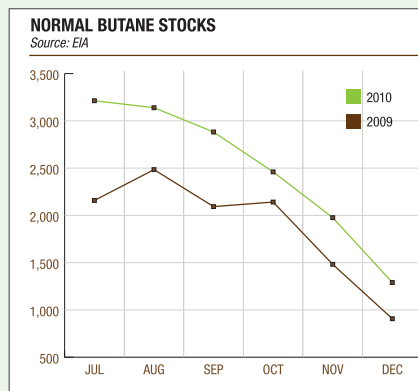
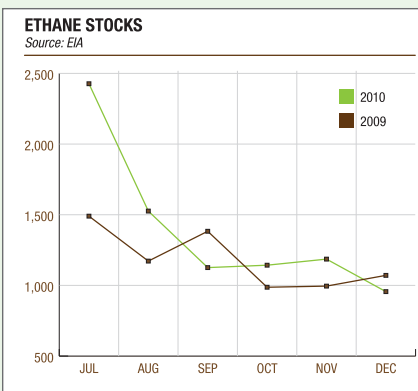
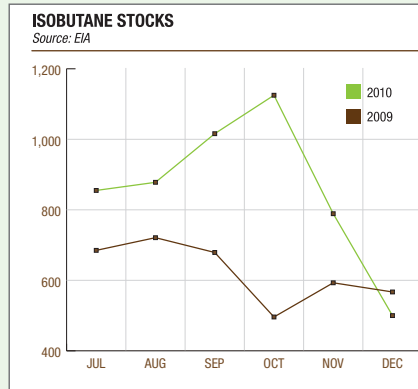
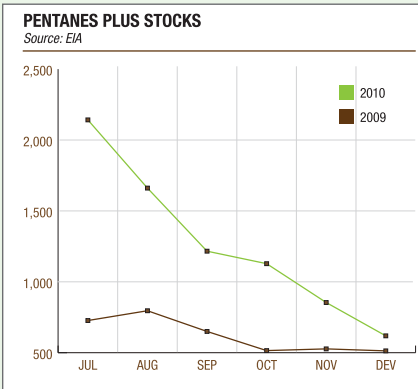
July and an 11% decrease from the storage level of 1.1 million bbls reported in December 2009.

An increase in heating demand for the winter season helped to increase demand for propane, causing December storage levels to fall to a level just slightly above the storage level the

same time in 2009 despite lacking the extreme cold weather of the winter of 2009-2010.

Propane storage levels at processing plants fell 30% to 1.4 million bbls in December 2010 from storage levels of 2.0 million bbls reported by the EIA in November 2010. This increased demand also helped to improve propane prices at both Conway and Mont Belvieu to their highest levels since February 2010.

The December storage levels for propane also represented a 49% decrease from the 2.7 million bbls level reported by the EIA in July 2010. However, it was up 3% from the December 2009 storage level due to winter arriving later in 2010.



Source: EIA

While butane storage levels at natural gas processing plants fell in December 2010 due to improved prices for heavy liquids, they remained higher than storage levels reported by the EIA in same month in 2009.

Butane storage levels were down 35% to 1.3 million bbls in December 2010 from the November 2010 storage levels of 2.0 million bbls. However, this was 42% greater than the December 2009 storage level of 907,000 bbls.

Although there was theoretically greater demand from refiners for butane to make winter-grade gasoline, this demand was lessened due to refiners producing more of their own butane by operating at higher rates, which lessened the need for them to import butane.

Isobutane also benefitted from increased demand for winter-grade gasoline. However, because this increase in demand saw storage levels at gas processing plants fall 67,000 bbls in December 2010 compared to the same time in 2009 since refiners still had to import the product rather than producing their own.

The storage level of 500,000 bbls in December 2010 represented a 37% drop from the November 2010 storage level of 789,000 bbls. This also represented a 12% decrease from the December 2009 storage level of 567,000 bbls. It is likely that isobutane storage levels continued to fall in the spring of 2011 since it is used by refiners to create alkylate in summer-grade gasoline.

The NGL that benefitted the most from the run-up in heavier liquids prices was pentanes-plus (C<sub>5+</sub>) due to its strong relationship with crude oil. The EIA reported that C<sub>5+</sub> storage levels at gas processing plants in December 2010 fell 28% to 619,000 bbls from 854,000 bbls in November 2010.

Although this was 21% greater than the storage level of 513,000 bbls reported by the EIA in December 2009, it was still amongst the smallest levels reported in the month of December dating back to 1993. It was the fifth-lowest level reported by the agency in that timeframe.

## Plains All American Pipeline, L.P. Prices Public Offering Of Common Units

Plains All American Pipeline, L.P. has reported that it has priced an underwritten public offering of 6,900,000 of its common units representing limited partner interests at \$64.00 per common unit. The offering is expected to close on March 11, 2011. The Partnership has also granted the underwriters a 30-day option to purchase up to

1,035,000 additional common units to cover over-allotments, if any.

The Partnership intends to use the net proceeds from the offering, including potential additional proceeds from any exercise of the over-allotment option, to reduce outstanding borrowings under its credit facilities and for general partnership purposes. Amounts

repaid under the Partnership's credit facilities may be reborrowed to fund its ongoing capital program, potential future acquisitions, or for general partnership purposes.

Citi, BofA Merrill Lynch, J.P. Morgan, Morgan Stanley, UBS Investment Bank and Wells Fargo Securities are joint book-running managers of the offering.

## GPA Annual Convention Highlights New Role, Bright Future

The 90th Annual [Gas Processors Association](#) (GPA) Convention, which will be held in San Antonio, Texas, from April 3-6, is fast approaching. This year's theme is "High Definition at 90: Advancing the Midstream Vision" and will focus on the association's new role as a midstream association along with its bright and clear future.

Hart Energy has been endorsed by GPA to publish three daily newspa-

pers showcasing the event. *GPA 2011 Convention News* will contain feature stories previewing the conference; a full conference program; a diagram of the layout of meeting facilities at the Marriott Rivercenter; a summary of major new developments and industry trends from 2010, written by the editors of *Gas Processors Report*; other news, events and opinions of interest to GPA convention attendees and

members; and abstracts of papers that will be presented at the convention.

Sponsorship, advertising and editorial contributions are being accepted now for *GPA 2011 Convention News*. For more information, contact Lesley Hart at [lhart@hartenergy.com](mailto:lhart@hartenergy.com) or 713-260-6462.

## PIPELINES & TECHNOLOGY

### Southcross Energy Agrees To Construct Major Natural Gas Pipeline Extension In South Texas

Southcross Energy has reported that the company has entered into a long-term agreement with Swift Energy Company (NYSE: SFY) to provide natural gas gathering, transportation and processing services for production from Swift Energy's acreage in McMullen County, Texas. Southcross will construct a 25-mile, 20-inch natural gas pipeline with related lateral gathering lines and convert an existing dry pipeline system to rich gas service in

order to gather the Swift Energy gas for processing.

The McMullen extension will have an initial, expandable capacity of 120 million cubic feet of natural gas per day. The system, which is expected to be in service in mid-2011, will originate in McMullen County, Texas and extend to Southcross' CCNG Transmission pipeline for gas delivery to and processing at Southcross' processing plant near Gregory, Texas.

"This pipeline will be an additional extension for Southcross into the Eagle Ford Shale play, an important step in accomplishing our growth strategy. We are delighted to establish this relationship with Swift Energy and provide the important services Swift Energy requires in South Texas," said David W. Biegler, Southcross Chairman and Chief Executive Officer.

### Area Drilling, Boring Expertise a Vital Resource to Marcellus Gas Pipeline Contractors

Area drilling and boring specialists can make it easier for pipeline contractors to deal with geological unknowns and agency requirements that could lead to problems resulting in wasted time, misspent budgets and lost revenues.

The promise of the Marcellus gas "gold rush" may be vast, but the payoff won't actually occur until the gas is distributed. And that requires the timely and safe completion of the natural gas collection and transmission pipeline network.

Pipeline construction contractors who want to build that distribution system are coming to Marcellus Shale fields from across the U.S. and Canada. In many instances, those contractors are unfamiliar with the geology of the 60-million-acre Marcellus regions in Pennsylvania and other areas in the Appalachian Basin.

That unfamiliarity can lead to problems. Although the majority of the pipelines will be laid in open trenching, there are crossings that must be installed under obstructions such as roadways, waterways and environmentally sensitive areas. Unfamiliarity with the local geology and regulatory

requirements could lead to problems that result in wasted time, misspent budgets and loss of revenues.

There are a number of groups with vested interests in the Marcellus gas picture. From their point of view, completion of pipelines, as with wells, is an urgent matter. These investors include property owners, developers, extractors, gas companies, state and local governments, and local economies. Everyone who is involved in this natural gas "gold rush" wants to see it pay off as soon as possible.

Unforeseen construction difficulties or snafus with the documentation required by local governing regulatory bodies can hamper pipeline construction progress. Such delays will perturb investors at every level, essentially impeding returns on investments and also the infusion of revenue into communities where people are more than ready for this economic windfall.

#### Handling the "rush"

At the same time, it is likely that the natural gas "gold rush" that is taking place in the Marcellus fields will put a high demand on specialists and sub-

contractors who have the experience, equipment, engineering staff and familiarity with local agency requirements to perform the more demanding services required by pipeline crossings that require directional drilling, rock boring and other methods of trenchless technology.

During 2010, for example, some areas of the country experienced a spike in infrastructure and other construction work due to the federal government's stimulus package. As a result, even large contractors with diverse capabilities have turned to directional drilling and boring specialists as subcontractors to help them expedite projects.

Henkels & McCoy, one of the nation's largest privately-held engineering, network development and construction firms, hired Aaron Enterprises to install a 260-foot span of 42-inch casings under wetlands. In another instance the firm employed Aaron to do a 24-inch rock-bore under a Pennsylvania highway. Both types of projects are likely to occur frequently throughout the Marcellus fields.

### A portfolio of capabilities needed

For a subcontractor to undertake specialty pipeline construction projects, such as obstructed pipeline rights-of-way, at river crossings, a portfolio of equipment, expertise, experience and geological knowledge is required. A combination of rock boring, tunneling, pipe jacking, directional drilling and other horizontal drilling methods may be required for some situations.

You can't always anticipate what you are going to run into. In some instances, dealing with a combination of geological formations that will require the use of multiple technologies. Even pipeline construction contractors who have the necessary equipment may not want to get bogged down with this kind of work.

In the case of Aaron Enterprises, the firm has found it necessary to have its own shop to service and repair equipment, so that downtime doesn't cause unnecessary delays. The firm even employs engineers and equipment fabrication staff so that in cases where unique, specialized tools are required, they can be designed and fabricated quickly.

### Value-added services

Value-added services, such as consulting on documentation to meet the requirements of local officials, is another way the local subcontractor specialist can help the pipeline contractors move construction along on schedule.

The pipeline contractors need the ability to work with local officials, such as the department of transportation officials, and also must have the ability to produce documentation. These gas pipeline jobs often require detailed plans to be submitted prior to undertaking the pipeline construction. They have to show that they know what they're doing, and often times they go through a submittal process whereby the pipeline contractors are required to submit detailed plans that spell out how they'd deal with environmental issues such as water runoff and drilling fluid disposal.

A local, supporting contractor with engineering services can enable the pipeline contractor to handle that process and satisfy the documentation requirements in an accurate and timely manner.

## Kongsberg Completes World's Longest Multi-Sensor AUV Pipeline Inspection

Kongsberg has completed the world's longest multi-sensor AUV pipeline survey using one of its cutting-edge HUGIN 1000 Autonomous Underwater Vehicles (AUV). The pipeline inspection took place February 9th - 11th 2011, in the Hjelte fjord near Bergen, Norway and the HUGIN 1000 was operated from the Royal Norwegian Navy vessel HNoMS Maloy.

The subject of the inspection was two subsea pipelines going to the Mongstad oil refinery. The HUGIN 1000 AUV was equipped with an ad-

vanced suite of KONGSBERG imaging equipment including the HISAS 1030 synthetic aperture sonar, EM3002 multibeam echo sounder and an optical camera with LED lighting. The instruments were used to inspect around 30 km of subsea pipeline in an 8-hour, two-pass mission.

In the first pass, side-scan data from the HISAS 1030 sonar was used to detect and track the pipelines in real-time, using PipeTracker software for pipeline detection and tracking extracted pipe-like features in the sonar

Safety is another important issue that should not be overlooked. "Safety is always the number one priority," says Merrill Anders, Director of Gas and Water, Eastern Region at Henkels & McCoy. "Any subcontractor who works with us must adhere to our stringent safety standards. For example, when Aaron Enterprises has worked on our projects, they represent us. They already have an excellent safety program, so we joined it to our own."

### All about time

In the end, it's all about time. The pipeline contractors like to keep moving. They often lay 30 miles of pipeline in 30 days or less. It's the job of drilling and boring specialists to help them keep that pace . . . which also helps keep them profitable and their investors satisfied.

– Vince Rice, President and CEO of Aaron Enterprises (York, PA). *For more information, contact Aaron Enterprises, Inc. at 2104 Pennsylvania Ave., York, PA 17404; Phone: (717) 854-2641; Fax: (717) 854-2310; E-mail office@aaronerprises.com; or visit the web site [www.aaronenterprises.com](http://www.aaronenterprises.com).*

images, with a high degree of robustness towards false detections.

The PipeTracker software, which was developed in a collaborative effort with the Norwegian Defence Research Establishment (FFI) in a project funded by the Norwegian Research Council, runs as a plug-in module in the standard HUGIN payload system. The HUGIN 1000 control system in turn uses the identified pipeline tracks to position the vehicle at an optimal range for HISAS imaging. The whole process is fully automated



inside the AUV and requires no operator intervention.

In the second pass, HUGIN followed the pipeline tracks identified in the first pass at low altitude and inspected the pipelines using the EM 3002 multibeam and the optical camera. After the mission, the recorded HISAS 1030 data was post-processed into high-resolution (4x4 cm) sonar images and bathymetry maps of the pipeline. Together with the optical images and the multi-beam data recorded in the second pass, this gave a detailed view of the pipeline surroundings and the pipeline itself. The complete procedure was repeated the next day over the second pipeline in a new 8-hour, two-pass mission.

Both pipelines were surveyed at a constant speed of 4 knots and at 4-25m altitude, depending on the sensor in use. Water depth was 180-560m. The greater speed of the HUGIN 1000 compared to that of a ROV meant that 60km of pipeline could be inspected in a little over 16 hours during the two passes. Furthermore, the stability of the HUGIN platform and the ability to simultaneously operate both at high speed and at low altitude resulted in an efficient survey with crystal clear images from the onboard optical camera.

Kongsberg Maritime and subsidiary Hydroid offer 'Full Picture' HUGIN and REMUS AUV solutions, where the vehicles themselves and required in-

struments can be supplied by Kongsberg Maritime, ensuring users have a single company to co-operate with for any kind of survey. The company is aligning the two product lines, providing users operational synergies and a strengthened technology base, suitable for all underwater survey applications. The PipeTracker software module has been developed in a collaborative effort with the Norwegian Defence Research Establishment (FFI) in project funded by the Norwegian Research Council (the FORNY-program).

## NGL PRICES

### NGL Markets Balance as Effects of Mont Belvieu Explosion Subside

The effects of the February 8 explosion at Enterprise Products Partners' Western Storage facility in Mont Belvieu seem to have subsided as natural gas liquid (NGL) prices trended downward this week after having a somewhat artificial uptick from the incident.

While prices were generally down at both Mont Belvieu and Conway, the outlook remains positive for the NGL market. "The fundamentals still look good for NGLs provided there is not another recession. Gas-to-crude ratios are near record low levels, petrochemical demand is strong and the US petrochemical industry's competitive position continues to improve relative to petrochemical producers in the Middle East," according to En\*Vantage's Weekly Energy Report.

Although Mont Belvieu propane prices closed the week of March 2 at \$1.40, their second-highest price in over two years, they suffered a 4% drop from last week's price of \$1.47 as supply shortages at the LDH hub at Mont Belvieu have lessened. The Conway propane price was also down 4% from last week, as it hit \$1.30 due to weaker heating demand.

Data Provided by Intercontinental Exchange.  
Individual product prices in cents per gallon. NGL barrel in \$/42 gallons

NGL PRICES						
(Note: This is the section formerly called "Box Score" in Gas Processors Report)						
Mont Belvieu	Eth	Pro	Norm	Iso	Pen+	NGL Bbl
March 2 - 8, '11	66.55	140.06	176.04	181.52	250.38	\$58.00
Feb. 23 - March 1, '11	68.53	147.35	182.46	194.13	241.68	\$59.25
Feb. 16 - 22, '11	66.99	138.48	178.48	195.03	221.97	\$56.43
Feb. 9 - 15, '11	64.13	133.66	169.64	184.28	220	\$54.54
February '11	61.86	137.14	173.64	187.12	224.73	\$55.21
January '11	59.41	134.69	168.71	178.54	214.96	\$53.39
4th Qtr '10	59.07	126.07	162.01	168.24	198.89	\$50.59
3rd Qtr '10	44.99	106.98	138.23	143.25	171.45	\$42.37
2nd Qtr '10	50.97	108.43	145.01	157.23	178.04	\$44.64
1st Qtr '10	70.8	123.84	151.72	165.09	183.29	\$50.45
March 3 - 9, '10	69.19	118.16	148.25	162.56	183.53	\$49.29
Conway, Group 140	Eth	Pro	Norm	Iso	Pen+	NGL Bbl
March 2 - 8, '11	49.5	129.78	166.7	188.5	252.95	\$54.52
Feb. 23 - March 1, '11	47.06	135.85	172	189.5	253.83	\$55.20
Feb. 16 - 22, '11	47.3	123.6	168.18	204	224.58	\$51.99
Feb. 9 - 15, '11	45.02	124.1	158.9	189.88	219.2	\$50.44
February '11	44.36	126.61	161.11	191.61	224.17	\$51.13
January '11	44.01	128.53	162.52	174.39	207.59	\$49.79
4th Qtr '10	47.01	120.8	157.16	161.69	193.86	\$47.80
3rd Qtr '10	31.16	101.46	132.39	141.93	163.91	\$39.04
2nd Qtr '10	31.56	103.03	130.96	145.2	172.55	\$39.90
1st Qtr '10	59.82	123.81	143.58	160.7	181.55	\$48.69
March 3 - 9, '10	57.04	113.32	137.1	152.83	181.2	\$46.41

Once again isobutane prices had the largest drop of any NGL despite being a key component in creating alkylate in summer-grade gasoline. While this should increase demand, refiners haven't yet fully switched over to this blending process yet. As a result, Mont Belvieu isobutane prices fell 6% to \$1.82, which was the lowest price at the hub in a month. The Conway price was down slightly to \$1.89, as it appears to have found balance following its large price drop the week of February 16.

Butane prices fell 3% at both hubs the week of March 2 as demand for winter-grade gasoline has flattened. The Mont Belvieu price of \$1.76 and the Conway price of \$1.67 were the lowest prices at each hub since the week of February 9.

The lone heavy NGL to experience price growth this week was C<sub>5+</sub>, which benefitted from its close relationship to crude prices. Its Mont Belvieu price improved 3% to \$2.50, its highest price since it was the same price the week of August 27, 2008. The Conway price remained stronger than its Mont Bel-

vieu counterpart despite a slight drop in price to \$2.53. However, this is the second highest price in the Mid-Continent since the week of July 30, 2008 when the price was \$2.67.

Ethane prices were a mixed bag this week as the Mont Belvieu price experienced a 2% drop to 67¢, its lowest price in a month, while the Conway price improved by 3% to 50¢, its highest price since the first week of the year when it was 51¢. – Frank Nieto

## FRACTIONATION SPREAD

### Conway Ethane, Mont Belvieu C<sub>5+</sub> Only NGLs to Experience Significant Increase in Margin

Frac spread margins were a bit of a mishmash the week of March 2, at both Conway and Mont Belvieu with only Conway ethane and Mont Belvieu C<sub>5+</sub> experiencing any real improvement while the other natural gas liquid (NGL) margins were down.

The most improved margin at either hub by far was Conway ethane, which experienced a 15% improvement due to a 3% price improvement as well as a 3% drop in natural gas feedstock prices at the hub. Mont Belvieu C<sub>5+</sub> also rode a 3% price improvement along with a 2% natural gas feedstock price drop at the hub to a 5% margin improvement.

The biggest drop in margin at either hub the week of March 2 was for Mont Belvieu isobutane, which fell 8% due to two con-

secutive weeks of price drops. However, the Conway margin remained firm due to its price experiencing a marginal decrease.

For the week of March 2, the theoretical NGL barrel at Conway was down 1% to \$54.52 per barrel (/bbl) with the margin also falling 1% to \$40.78/bbl. The Mont Belvieu theoretical barrel price was down 2% to \$58.00/bbl with the margin falling 2% to \$44.19/bbl.

The most profitable NGL to make at both Conway and Mont Belvieu was C<sub>5+</sub> at \$2.11 per gallon (/gal) at Conway and \$2.09/gal at Mont Belvieu. This was followed, in order, by isobutane at \$1.51/gal at Conway and \$1.44/gal at Mont Belvieu; butane at \$1.28/gal at Conway

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. | Source: Frank Nieto

Current Frac Spread (Cents/Gal)				
MARCH 11 2011	Conway	Change from Last Week	Mont Belvieu	Last Week
Ethane	49.50		66.55	
Shrink	24.93		25.06	
Margin	24.57	14.45%	41.49	-3.23%
Propane	129.78		140.06	
Shrink	34.44		34.62	
Margin	95.34	-5.13%	105.44	-5.78%
Normal Butane	166.70		176.04	
Shrink	38.99		39.20	
Margin	127.71	-3.23%	136.84	-3.85%
Iso-Butane	188.50		181.52	
Shrink	37.45		37.65	
Margin	151.05	0.00%	143.87	-7.53%
Pentane+	252.95		250.38	
Shrink	41.70		41.92	
Margin	211.25	0.11%	208.46	4.88%
NGL \$/Bbl	54.52	-1.24%	58.00	-2.12%
Shrink	13.74		13.81	
Margin	40.78	-0.78%	44.19	-2.05%
Gas (\$/mmBtu)	3.76	-2.59%	3.78	-2.33%
Gross Bbl Margin (in cents/gal)	93.16	-1.01%	102.73	-2.39%
NGL Value in \$/mmBtu				
Ethane	2.73	5.18%	3.66	-2.89%
Propane	4.51	-4.47%	4.86	-4.95%
Normal Butane	1.80	-3.08%	1.90	-3.52%
Iso-Butane	1.17	-0.53%	1.13	-6.50%
Pentane+	3.26	-0.35%	3.23	3.60%
Total Barrel Value in \$/mmbtu	13.47	-1.11%	14.79	-2.62%
Margin	9.71	-0.52%	11.01	-2.72%

and \$1.37/gal at Mont Belvieu; propane at 95¢/gal at Conway and \$1.05/gal at Mont Belvieu; and ethane at 25¢/gal at Conway and 42¢/gal at Mont Belvieu.

Natural gas in storage for the week of March 4, the most recent data available from the Energy Information Administration, continued to fall due to winter heating demand. The storage level was down 71 billion cubic feet to 1.674 trillion cubic feet (Tcf) from

1.745 Tcf the previous week. The storage figure for the week of March 4 was 2% greater than the 1.642 Tcf storage figure reported at the same time last year and 1% greater than the five-year average of 1.653 Tcf.

Heating demand should be lower the week of March 15, as the National Weather Service's forecast includes warmer than normal weather across the United States. This warm front is

expected to extend from the Southwest, through the Gulf Coast and into the Southeast in the South all way up to the Rockies and into the Tri-State area. The Carolinas, Georgia and Florida are expected to experience normal late winter weather on the East Coast while most of California can also expect normal temperatures for this time of year. – Frank Nieto

**SNAPSHOT**

**Marcellus Shale Production Expected to Exceed 2 Bcf/d by Year-end 2011**

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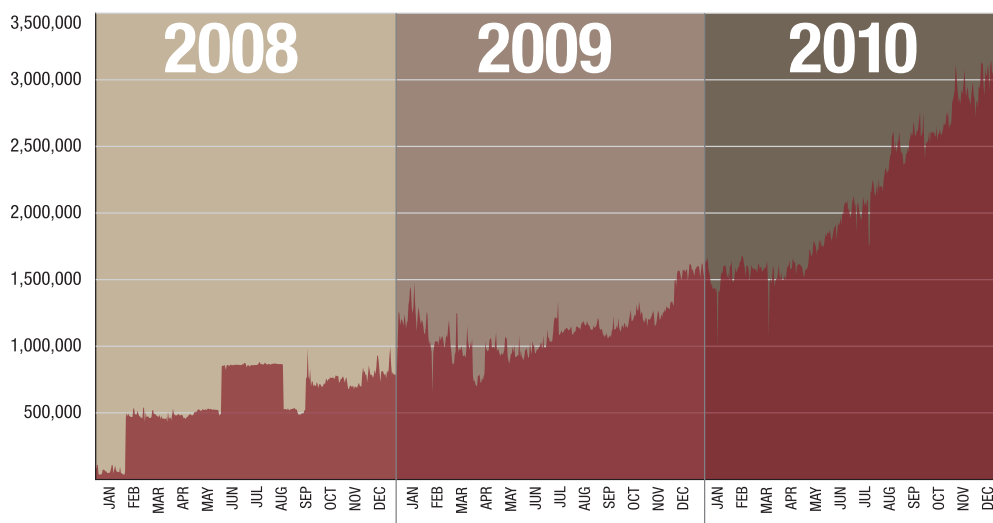
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**SCHEDULED CAPACITY IN THE MARCELLUS AREA (MCF/D)**



Source: Hart Energy Mapping and Data

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