The PIOGA Press

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Denise Brinley of the state Department of Community and Economic Development addresses the M2M conference.

Marcellus to Manufacturing report

Using Marcellus gas in area becomes a priority

By Rick Stouffer
Kallanish Energy

More and more people are recognizing the potential Marcellus and Utica shale natural gas could have if the gas and associated natural gas liquids were used in Pennsylvania, rather than being exported to other areas of the U.S.—and internationally.

PIOGA, the Pennsylvania Independent Oil and Gas Association, a 100-year-old trade group originally founded to represent conventional drillers, recognizes its members must expand their outlook past drilling and producing.

On November 9, PIOGA hosted "Marcellus to Manufacturing," a day-long program in Pittsburgh which

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Comment period ending for EPA's proposal to reconsider key parts of methane rule

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In 2016, the U.S. Environmental Protection Agency finalized a rule that established first-time federal standards for methane emissions from new, modified, and reconstructed sources in the oil and gas industry. The so-called new source performance standards (NSPS) at 40 C.F.R. 60, Subpart OOOOa (Subpart OOOOa), have since become the subject of considerable debate and litigation. Consistent with the Trump administration's other deregulatory efforts, EPA published a proposal in the *Federal Register* in October

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M2M conference recap *Continued from page 1*

brought current and potential natural gas-related companies together to hear how firms are and can capitalize on gas, and how Pennsylvania's state government can help make investment a reality.

Lovin' in-ground gas

Mike Storms, a member of a panel discussing downstream opportunities and managing risk in the energy market, expressed the attitude of the day-long program in just seven words:

"We love that the gas is here," said the director of operations, engineered products, at the Elliott Group, a 100-plus-year-old company that designs, manufactures and services turbomachinery.

Elliott certainly is a beneficiary of abundant Marcellus Shale gas. Among the oil and gas-related projects it's involved with is Shell's now-under-construction ethane cracker in Beaver County, Pennsylvania.

The Jeannette, Pennsylvania-based company sold millions of dollars of equipment for the cracker, including monstrous compressors and steam turbines, Kallanish Energy finds.

Turnaround in where plants built

One of the primary reasons Shell selected the western Pennsylvania site for the first cracker built in the Appalachian Basin in decades was abundant, inexpensive gas.

"We're seeing facilities being built now, that if they had been built 10 years ago, would never have been built here," according to Andy Huenefeld, price risk manager, for Kinect Energy Group. "They would have built elsewhere for low labor costs. Now, they are building here for low energy prices."

Brownfield sites garner attention

With more companies looking for property to build facilities and take advantage of low and abundant natural gas, brownfield sites, former industrial or commercial sites where future use is affected by real or perceived environmental contamination, are getting a closer look.

One of the drawbacks of western Pennsylvania and West Virginia is a dearth of flat land. Brownfield sites, some of which may date back to the early 20th century, are flat, located near a river, and often offer rail and road availability.

"For this next generation of brownfields, potential users must determine what they want to do with a property—not what is available in terms of a property, said Mary Guinee, vice president with Civil and Environmental Consultants.

It's likely the remaining brownfield sites that a potential manufacturer may be looking at has not have been mass marketed, but they offer the same advantages that led to their initial development: flat land, rail, river and road access, and proximity to an urban core.

Brownfield sites offer benefits

Should a manufacturer find a brownfield site that fits its needs, including access to natural gas, Pennsylvania has a plethora of programs to help make a deal a reality, according to Denise Brinley.

Senior energy advisor in the Pennsylvania Department of Community & Economic Development, Brinley told her audience of roughly 100 there indeed are numerous state programs with loan and even grants available to make projects move forward.

One acreage re-use program Pennsylvania is pushing big-time is what Brinley called "the next and best use for coal-fired power plant sites" around the state.

Long the home to coal-fired power plants, the number of said facilities continues to fall as operators find the huge behemoths cannot compete with natural gas-first plants and even with facilities utilizing subsidized wind and solar.

Brinley said "we," including industry and government, must think outside a two- to four-year range when rethinking uses for coal-fired sites. ■

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Left: Networking time at the spacious Energy Innovation Center. Below: Ron McGlade of Douglas Pipeline Company (left) leads a panel discussion addressing "The Transparency of the Deal."

Energy, infrastructure and demand go hand in hand

By Joyce Turkaly
Director, Pipeline and Natural Gas Market Development

In order to attract investment, the region needs to be competitive and pursue a growth agenda while keeping the red tape to a minimum, said Kathryn Klaber, President of the Klaber Group, at the TriState Infrastructure Council Summit. Representing a team of a dozen companies that hope to gain business leads and support in the region, the TriState Infrastructure Council's efforts are complementary to that of PIOGA's Pipeline and Natural Gas Market Development (PGMD) Committee's work in the downstream sectors.

It was a coincidence that both the PIOGA Marcellus to Manufacturing conference and the TriState Infrastructure Council's conference were held within weeks of each other, because it allowed the conversations and the networking to continue. Familiar faces attended both and it was good to see representatives of utilities, economic development partners, engineering firms, and infrastructure subject matter experts in the areas of rail, bridges and workforce discussing next steps for the region.

Our PGMD Committee began building on the concept that with affordable, abundant, reliable energy, manufacturing and innovation would occur. Just as the Pennsylvania Department of Community and Economic Development soon discovered, you cannot simply request expensive taps off pipelines with the hope of "build it and they will come."

All of our ethane is being exported through Marcus Hook and we are in an oversupply situation with propane. Propane constraints are a real issue; we cannot burn all we have here in the U.S. Northeast. Most of our produced propane is being sent to either Conway or the Gulf coast. The cost is approximately $0.25/g. to send by rail. With competition in the Permian, we need to look at building propane dehydrogenation (PDH) units here locally if we wish to see economics improve. The

Transportation built into the Shell Polymers PA business case

Logistics and infrastructure are very important if the Appalachian region wishes to gain a leg up on the Gulf Coast. Companies looking to invest in the region want to know and uncover any unforeseen disruptions to their business plans prior to any FID. To further Shell Polymer's business case in Monaca, Beaver County, O. Chris Jackson, Production Unit Logistics Manager, commented at the TriState Infrastructure Council conference that Shell's customer-centric attitude revolves around providing options to their customers. When speaking to assurances on the supply chain to move product within their 700-mile distribution radius from Monaca, having significantly decreased shipment time from four weeks via rail to now 1½ days by truck was a huge factor in locating in SW PA.

Approximately 85 percent of Shell's products move by rail from the Gulf currently; it's simply too expensive to deliver polyethene that distance by truck. The logistical advantage in our region is huge because we are sitting in the center of the converter's locations, the demand center for the consumer end products and the energy needed to make these products.

To prepare the site for construction, Shell moved the road and improved the I-376 interchange; benefits to widening the road accommodated the increased traffic and they delivered 90 percent of their construction modules over rail, so they would not have to truck in oversized equipment. Barges have been delivering modules and construction kits on the Ohio River to the site for unloading at one of two docks that were built specifically for this reason. All these decisions were made with consideration for minimal disruption for the local residents and for business partners to gain better access both in and out of the facility.

While summarizing the main geographic and economic decisions to build in the region, Shell's Jackson emphasized *location to feedstock and delivery to polyethylene converters within this 700-mile radius*—"that is huge."

Mariner East 2 will help decouple the region from the Permian. It is estimated that somewhere between 50 to 60 percent of our propane will be exported and in the next two to three years the number is projected to go as high as 75 percent. Exported propane is likely being used for heating in countries like India and in Asia.

Collectively, "we" cannot slow down products that need to get to a market, even if that market is an export one. Unifying our approach to the region's transportation and infrastructure is critical for future investment tied to future growth. Rail, for example, is seeing growth in the Appalachian footprint. ($150 million in infrastructure)

Programs in Pennsylvania and Ohio have been predictable and consistent for rail projects. Recognizing the importance of great rail, companies representing short lines said that Ohio and Pennsylvania have been their biggest advocates, touting successful DOT and PennDOT grants.

Former Pennsylvania Governor Tom Corbett spoke openly about the tristate competition to win the final FID in Pennsylvania against the Gulf Coast. Speaking to the competitiveness of the region, he mentioned the Shell Polymers state-of-the-art facility, commenting that refurbishing costs a lot more than building new. Stating that just like any real estate deal, it's about location, he further explained that the tax credit was contingent upon bringing benefit in the region: "We always understood it was going to affect our region." Speaking to the state's voting demographic, he said, "the politics of natural gas is very difficult" It's two states when it comes to voting, referring to the "blues" to the east and noting that we have one million more registered Democrats than Republicans within Pennsylvania's 67 counties.

So, next steps, you may ask? Three studies have been commissioned by various entities within this umbrella group. Along with the statistics that show great promise, the common recommendation of all three studies suggests we must get urgent and step up the pace. While many of the service companies and engineering companies have moved from the oil and gas sector to chase other sectors showing more promise, the core people at the PIOGA PGMD Committee remain. What is starting to change is the "look" of the participants, and this simply demonstrates that other people are starting to align goals to make things happen collectively and this is good news. The people in charge of decisions around transportation and infrastructure priorities are thinking holistically rather than each element having its own business case. **This unification is important to note.** ■

Perry, DOE tout Appalachian ethane hub

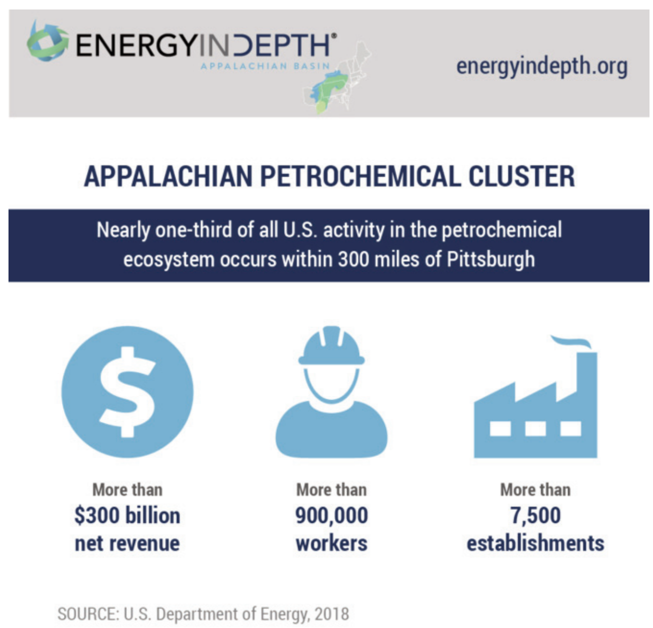
By Dan Alfaro
Energy In Depth

Building a new ethane storage and petrochemical hub in Appalachia presents a "once in a lifetime opportunity for this country," Energy Secretary Rick Perry told the National Petroleum Council on December 4.

The secretary's remarks coincide with the Department of Energy's release of a report to Congress highlighting the potential of a new hub atop the natural gas and natural gas liquids-rich Marcellus and Utica shale formations of Pennsylvania, Ohio and West Virginia. Among the DOE's conclusions: "Appalachia's abundant resources coupled with extensive downstream industrial activity may offer a competitive advantage that could enable it to displace marginal producers and help the U.S. gain global market share in the petrochemical industry."

The new report follows DOE's June primer, and further bolsters the findings of a recent IHS Markit study conducted on behalf of the economic development initiative Shale Crescent USA.

As the International Energy Agency conveyed in its annual World Energy Outlook, the petrochemical sector will drive oil and natural gas development worldwide. While the Gulf Coast will continue to be a center for petrochemical manufacturing, remaining economically



competitive in the global market calls for the expansion of petrochemical infrastructure.

Development of the Marcellus and Utica-Point Pleasant shales in Appalachia has produced prolific amounts of natural gas liquids (NGLs), specifically high volumes of ethane—the "building block" of petrochemical feedstock and plastics manufacturing. The DOE report, based on the latest data from Energy Information Administration, projects a remarkable increase in the volume of ethane from the Eastern Region, which includes the Appalachian Basin. The increased ethane supply provides the best reason to locate the new hub in Appalachia.

In addition to producing ample supply to meet growing demand, the Appalachian Basin's location—its transportation access and proximity to the market—strengthens the region's viability.

Furthering the attractiveness for investment, the recent IHS Markit study identified the region—through the combination of its location, proven reserves, and production levels—as the most profitable location for petrochemical development in the United States.

The Gulf Coast serves as the U.S. petrochemical hub, but with growing worldwide demand, a second hub would provide the ability to increase competitiveness in the global marketplace, as Secretary Perry told the NPC audience earlier this month.

The addition of a hub in Appalachia would not result in internal competition for investment between the two regions, but complement each other as the United States looks to expand its petrochemical manufacturing capacity. As the DOE report explains, a new hub in Appalachia would "enhance the geographic diversity of the vital U.S. petrochemical industrial sector, supporting U.S. economic security."

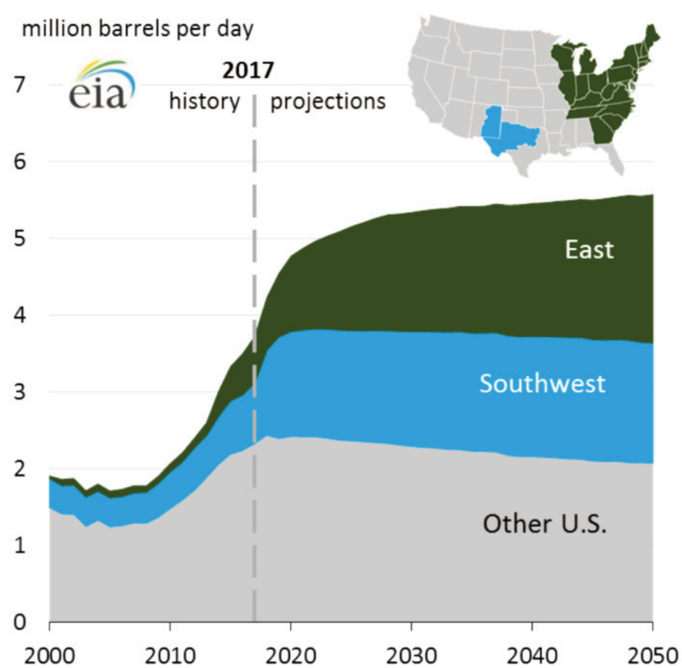
This diversification also provides stability in the industry in the case of disruption from natural disasters such as Hurricane Harvey, which "paralyzed" the Gulf Coast.

Perry, a former governor of Texas, noted the severity of the impact these events can have on the nation's economy during his speech:

"The present-day geographic concentration along the Gulf Coast of petrochemical infrastructure and supply may pose a strategic risk, where severe weather events limit the availability of key feedstocks.

"Don't think for a second that I'm about pitting one section of the country against the other, we need it all and just like in the electricity sector, resiliency matters to the marketplace."

U.S.natural gas liquids production by region



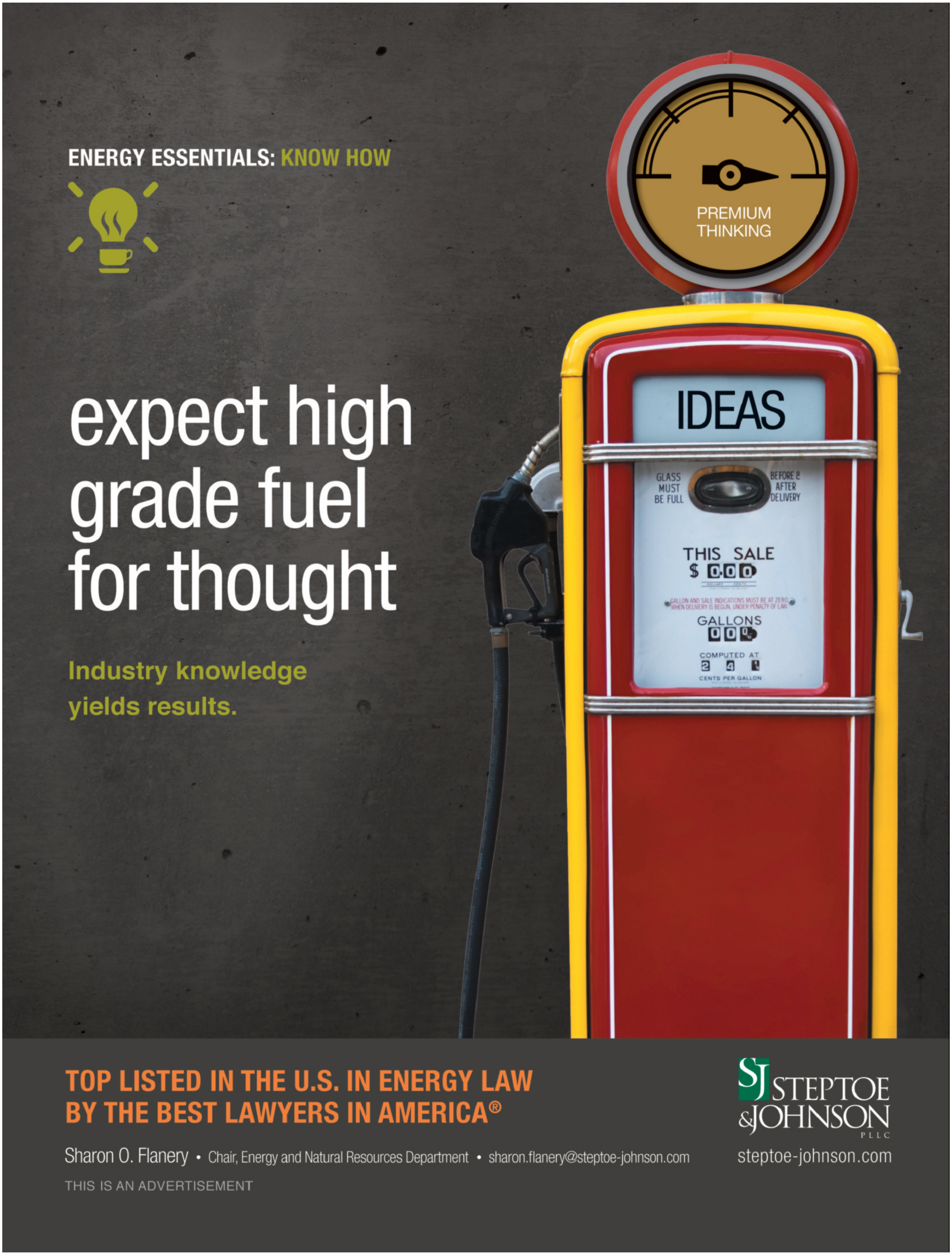
Conclusion

Massive investments from the petrochemical industry including the multibillion-dollar Shell ethane cracker in Beaver County, Pennsylvania, and the proposed PTT Global Chemical complex in Belmont, Ohio, mark the first big steps toward creating the new Appalachian hub.

These projects are bringing thousands of jobs, billions of dollars in investment, and generating new revenue streams for local governments. With the DOE amplifying the region's viability, a new wave of economic growth gained from the development of our oil and natural gas resources looks to be more inevitable than before.

The supply is here, the demand is here, and as the DOE report shows, Appalachia checks all the boxes to make the region a viable location to house the next American energy hub. ■

Have industry colleagues or vendors you think should be PIOGA members? Encourage them to click on "Join PIOGA" at the top of our homepage, www.pioga.org. Or, let us know and we'll contact them. We can accomplish far more together than we can individually!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PIOGA's annual tax and accounting seminar a great educational session

On November 15, more than 30 people attended the Annual Oil And Gas Tax and Accounting Seminar sponsored by PIOGA's Tax Committee and member company Arnett Carbis Toothman, PLLC (ACT).

This year's seminar covered not only the changes in various federal, state and local taxes, but also provided a detailed overview of the industry so those in attendance could learn how to maximize tax and economic benefits and how planning ahead for current and future opportunities and challenges will be important.

The day was kicked off by the lead presenter and chair of PIOGA's Tax Committee, Don Nestor, who provided an introduction to oil and gas operations and planning for upcoming changes in the energy sector. All of the ACT presenters utilized their years of experience in the oil and gas industry to help explain key tax benefits such as the Marginal Well Credit and standard tax issues that everyone in the industry should be aware of and plan for.

Participants left equipped with a wide range of resources that provided easy access to data including general industry information such as a detailed glossary of industry terms and a listing of geological formations where gas and oil are produced, along with other useful industry material. For those who needed professional development credits, they were able to earn CPE or CLE credits.

PIOGA extends a sincere thank-you to the team from Arnett Carbis Toothman, PLLC, for all their efforts to stage this annual seminar and to provide this valuable educational opportunity to PIOGA members and guests. Special thanks go to Don Nestor, CPA; Charlene Tenney, Business Outsourcing Services Supervisor; Ryan Nestor, CPA, CGMA; J. Marlin Witt, CPA, CFP, CGMA; Bill Phillips, CPA; and Scott Stone, Chief Information Officer. And lastly, we thank our sponsor, Avatar Software, for supporting the seminar. ■

Ryan Nestor reviews due diligence at the Tax and Accounting Seminar.

Seminar attendees give their attention to a presentation.

***New members of PIOGA's Board of Directors** got together last month at the association's office in Wexford for an orientation session. Taking part were (from left) Teresa Irvin McCurdy of TD Connections, Inc.; Chris Veazey, EnerVest Operating; Brook Bertig-Coll, Fisher Associates; and David Marks, Dominion Energy Field Services. Missing are Clifford Simmons of Stream-Flo USA LLC and Rico Biasetti withNG Advantage, LLC. Chris Veazey takes over for **Todd Tetrick** as EnerVest's representative on the board. We thank Todd for his involvement and service to the association.*

Become a PIOGA Partner for 2019

Building off the success of this year's program, we are pleased to announce the 2019 PIOGA Partners. The program was launched in 2018 in response to member requests for a "one stop" yearlong event sponsorship option for budgetary purposes. The program also offers unique opportunities—like the Committee Partner—to both support the association and make your company stand out. We also continue to offer traditional event-by-event sponsorships.

The various Partner levels are described below. If you have questions or are ready to sign on now for 2019, contact Debbie Oyler at debbie@pioga.org or 724-933-7306 ext. 22.

Keystone Partner, $10,000, Your company's logo will be recognized as an official PIOGA Partner at all events, in the monthly *PIOGA Press,* PIOGA eWeekly and on the rotating slides on PIOGA's homepage. Plus, you receive two tickets to all PIOGA events (Spring Meeting, PIOGATechs, networking events, golf outings, sporting clay outings and the Summer Meeting). In addition, you will be eligible to submit an article highlighting your company in *The PIOGA Press* and receive a 30 percent discount off advertising rates in *The PIOGA Press* and eWeekly for one year. Over 10,000 monthly impressions.

Executive Partner, $7,500. Your logo will be recognized as an official PIOGA Partner at events, in *The PIOGA Press,* PIOGA eWeekly and on the rotating slides on PIOGA homepage. Plus, two tickets to select PIOGA events (Spring Meeting, networking events and Summer Meeting). In addition, you will be eligible to submit an article highlighting your company in *The PIOGA Press* and receive a 20 percent discount off advertising rates in *The PIOGA Press* and eWeekly for one year. Up to 8,000 monthly impressions.

Meetings Partner, $5,000. Your logo will be recognized as an official PIOGA Partner at events, in *The PIOGA Press,* PIOGA eWeekly and on the rotating slides on PIOGA's homepage. Plus, four tickets to the two major PIOGA events (Spring Meeting and Summer Meeting). In addition, you will be eligible to submit an article highlighting your company in *The PIOGA Press* and

A final thank-you to our 2018 Partners

Centennial Partners:

Meeting Partners:

Golf Partner:

Committee Partner:

Engineer Level Partner:

Find out how to become a 2019 PIOGA Partner: www.pioga.org/publication_file/2019-PIOGA-Partners.pdf also receive a 10 percent discount off advertising rates in *The PIOGA Press* and eWeekly for one year. Up to 7,000 monthly impressions.

Golf Partner, $4,000. Your logo will be recognized as an official PIOGA Partner at golf events, in *The PIOGA Press* and the PIOGA eWeekly. Plus, four entries at all three PIOGA golf events (Ted Cranmer Memorial, Divot Diggers and Summer Meeting outing) and a tee & green sign at each event. Up to 6,000 monthly impressions.

Committee Partner, $3,000. Your logo will be recognized as an official PIOGA Partner at committee meetings, in *The PIOGA Press,* PIOGA eWeekly and all PIOGA-initiated committee correspondence. Up to 6,250-7,500 monthly impressions.

Engineer Level, $2,500. Your logo will be recognized as an official PIOGA Partner at the Spring and Summer Meetings, in *The PIOGA Press* and PIOGA eWeekly. Over 5,000 monthly impressions.

Driller Level, $1,500. Your logo will be recognized as an official PIOGA Partner at the Spring and Summer Meetings and in *The PIOGA Press.* Over 2,000 monthly impressions. ■

PIOGA cares: Staff donate to local outreach organization

As we enter the holiday season and this very joyous time of the year, the staff of PIOGA partnered with our member company and print company for The PIOGA Press, Print King, to collect toys for our area's children whose families are experiencing hardships. The PIOGA staff were proud to partner with Print King and The Lighthouse Foundation to reach over 300 families in need and to put a smile on a child's face this holiday season.

"Even though we have a small staff here at the association, our employees' donation efforts were impressive and I appreciate their support to families in need," said Dan Weaver, president and executive director. "This is our effort to give a little back to our community at this time of the year."

The Lighthouse Foundation is a Christian outreach organization meeting the needs of impoverished individuals and families in northern Allegheny and Butler counties. To learn more, go to www.thelighthousepa.org. ■

PIOGA staff members (from left) Danielle Boston, Deana McMahan and Debbie Oyler along with Print King's Tim Graff show off some of the toys donated by PIOGA to go to needy families in northern Allegheny and Butler counties this Christmas season.

PIOGA Centennial commemorative Case knife

As part of PIOGA's celebration of 100 years of working together on behalf of Pennsylvania's oil and natural gas industry, we have commissioned a commemorative knife from W.R. Case & Sons Cutlery Company in Bradford. The limited edition, collector-quality knife and wooden display box feature PIOGA's 100th Anniversary logo.

To learn how to get yours before they're gone, visit the Members Only section of the PIOGA website or email deana@pioga.org.

OSHA's most-cited safety violations

Safety Committee Corner

By Carol C. Delfino, CIH, CSP
SE Technologies, LLC

In 2015 OSHA began compiling a list of most-often-violated standards within the agency's fiscal year, October 1 through September 30. Eight of the most-violated standards on this year's list were also on the 2016-2017 list. Below are the four that have been on the list since 2015.

1. Fall Protection (1925.501), 7,270 violations. Falls are the leading cause of U.S. construction site deaths. The standard covers construction and other industries and includes general regulations for fall protection. Employers must provide fall protection systems and protection for employees working at a height of six feet or more. Violations have been as high as $134, 000.

2. Hazard Communication (1910.1200), 4,552 violations. While the handling of many chemicals stands out as an obvious risk to employees, there are materials that are not as obvious as being hazardous. Many industries have updated SDS's on file to guide employees in the proper handling and storage of chemicals at their facilities, but some fail to properly train their employees on these hazards. One company recently was fined $28,455 for failing to train its employees, among other Hazard Communication standard violations.

3. Scaffolds (1926.451) 3,336 violations. Scaffolding wrapped around buildings under construction is a common site. Are these scaffolds safe for employees? OSHA's standard for scaffolding includes the need for fall protection and fall arrest systems to ensure the safety of employees working on scaffolding at 10 feet above the lower level. There are also specific regulations for scaffolding systems, including suspension, ladder jack, top plate and roof bracket requirements.

OSHA proposed fines to a roofing contractor of $120,320 for violations related to fall protection, including failure to train employees about fall hazards and not using the required ladder jack scaffold components.

4. Respiratory Protection (1910.134) 3,118 violations. A proposed fine of $329,548 was issued after OSHA determined a contactor did not take adequate measure to protect employees while they were working on a mercury boiler. The respiratory standard requires employers to provide workers with the proper respiratory protection, training on how to don a respirator, conduct a fit test to assure that it is on correctly, proper cleaning and storage of the respirator, and a schedule to change the cartridges. All of these components are required.

For greater detail of other most-cited violations, refer to this article: www.constructiondive.com/news/which-hazards-top-oshas-10-most-cited-safety-violations-list/541853. ■

State Supreme Court agrees to hear rule of capture appeal

The Pennsylvania Supreme Court on November 20 agreed to hear the appeal of the Superior Court's decision in *Briggs v. Southwestern Energy Production,* which called into question application of the longstanding principle of rule of capture to hydraulic fracturing. PIOGA is encouraged not only that the Supreme Court has agreed to consider this important appeal but also by the way the court has framed the question that it will decide.

In *Briggs,* a Susquehanna County family alleged that from an adjoining leased property Southwestern Energy unlawfully extracted natural gas beneath their unleased 11-acre parcel. A common pleas court judge granted summary judgment to Southwestern based on Pennsylvania law, but a two-judge Superior Court panel reversed the decision and remanded the case to the lower court to determine if the company committed trespass by producing natural gas after hydraulically fracturing its shale wells. While Southwestern's defense relied on the well-established rule of capture—essentially, that by bringing the gas to the surface, the owner of a tract of land acquires title to the oil and gas produced from wells drilled on that land, including any oil and gas that may migrate from adjoining lands—a two-judge Superior Court panel held in an April 2 decision that the rule was inapplicable to gas obtained as a result of hydraulic fracturing.

Southwestern requested that the full Superior Court rehear the case. The petition was denied on June 8, and Southwestern subsequently asked the Supreme Court to hear its appeal. In granting Southwestern's request, the Supreme Court rephrased the issue as:

> Does the rule of capture apply to oil and gas produced from wells that were completed using hydraulic fracturing and preclude trespass liability for allegedly draining oil or gas from under nearby property, where the well is drilled solely on and beneath the driller's own property and the hydraulic fracturing fluids are injected solely on or beneath the driller's own property?

PIOGA believes the court stated the question on appeal in a way that is factually favorable to industry's position.

"PIOGA is pleased that our Supreme Court has decided to hear Southwestern Energy's appeal of the two-judge Superior Court decision that refused to apply Pennsylvania precedent to resolve this dispute," commented Kevin Moody, PIOGA General Counsel. "We look forward to participating in the appeal to help try to convince the Court that the Superior Court erred in putting Pennsylvania law at odds with most other states by relying upon dissenting positions in other states' court decisions"

The association participated as an amicus during the Superior Court's consideration of the case and will continue to do so as the case is before the Supreme Court.

For more background on the case, please refer to the April and July 2018 issues of *The PIOGA Press.* ■

Supreme Court quashes appeal in MSC v. DEP

The Pennsylvania Supreme Court issued an order on November 28 quashing the Notice of Appeal filed by the Department of Environmental Protection in *Marcellus Shale Coalition v. Department of Environmental Protection and Environmental Quality Board*, 573 M.D. 2016. Citing *United States Orgs. For Bank. Alts., Inc. v. Dep't of Banking*, 26 A.3d 474 (Pa. 2011), the court nullified the appeal without prejudice to DEP to raise its claims on appeal from "a final order" of the Commonwealth Court. The order that was the subject of the current appeal had granted MSC partial summary relief regarding Count I; there are six other counts remaining in the matter pending before the Commonwealth Court.

On August 23, the Commonwealth Court had issued its unanimous opinion and order regarding Count I, invalidating several provisions in 25 Pa. Code Section 78a.15, and associated definitions, related to "public resources." The Commonwealth Court concluded that DEP and the

Environmental Quality Board exceeded their statutory authority when they promulgated the regulation, which was published in October 2016. The order from the Supreme Court leaves in place the Commonwealth Court decision as described in the September 2018 issue of *The PIOGA Press*.

On October 17, the Commonwealth Court heard oral arguments *en banc* on cross motions for summary relief related to the remaining six counts. As noted in September's *PIOGA Press,* on June 1 the Supreme Court had affirmed injunctions related to area of review and centralized impoundments. DEP is enjoined from enforcing those provisions pending final resolution on the merits. A decision from the Commonwealth Court regarding summary relief on the remaining counts is expected in the first half of 2019. ■

Allegheny Institute Policy Brief: Time to tighten Act 13 reporting

By Colin McNickle
Allegheny Institute for Public Policy

In February 2012, Act 13 was adopted not only to establish an impact fee for drillers in Pennsylvania's shale formations, but also to set up rules governing both the allocation of the fee revenue to local and state government as well as to specify how the money can be used by the municipalities and counties receiving the funds. All are required to report to the Pennsylvania Public Utility Commission (PUC) how Act 13 proceeds have been spent. However, not all municipalities are diligent in meeting those reporting requirements.

From 2011 to 2016, municipalities in the seven-county Pittsburgh Metropolitan Statistical Area (MSA)—Allegheny, Armstrong, Beaver, Butler, Fayette, Washington and Westmoreland counties—received $104,623,116 from the impact fee collections. While "fracking" has received plenty of attention, little attention has been paid to local accountability regarding Act 13 revenue usage. This brief will look at municipalities in the Pittsburgh MSA.

Municipalities receiving impact fee revenue must submit annually paperwork to the PUC demonstrating how the payments have been used in the 13 legislatively designated categories. They are:

1) Construction, reconstruction, maintenance, and repair of roadways, bridges and public infrastructure;

2) Water, stormwater and sewer systems.

3) Emergency preparedness and public safety, including law enforcement and fire services, as well as hazardous material response, 911 and equipment.

4) Environmental programs, including trails, parks and recreation, open space, flood plain management, conservation districts, and agricultural preservation.

5) Preservation and reclamation of surface and subsurface waters and water supplies.

6) Tax reductions, including homestead exclusions.

7) Housing projects to increase safe and affordable housing.

8) Records management, geographic information systems and information technology.

9) Social services.

10) Judicial services.

11) Career and technical centers for training of oil and gas industry workers.

12) Local or regional planning initiatives under the Pennsylvania Municipalities Planning Code.

13) Placed in the municipality's capital reserve fund that can later be used in the aforementioned categories.

It's important to note that municipalities are not obligated to spend Act 13 funds in the year they are received. The municipality's capital reserve fund can act as a savings account for the assets to be used at a later date.

Within the Pittsburgh MSA the most popular categories for municipal fund use have been capital reserve fund and public infrastructure/construction. Municipalities in Allegheny County that did report placed 39 percent of their Act 13 revenue in their capital reserve funds from 2011 to 2016. Over the same period, Allegheny County municipalities spent 30 percent of their impact fee allocation on public infrastructure and construction.

Act 13 mandates municipalities submit a yearly report to the PUC disclosing expenditures. This basic form requires the municipality to indicate the dollar amount spent or allocated for future use within the 13 categories. Yet many municipalities have failed to meet the reporting requirement. Under Act 13 regulations if a municipality fails to submit the annual Municipal Approved Budget Report, the municipality will be limited to a maximum of $500,000 in annual future distributions from the Unconventional Gas Well fund. But within the Pittsburgh MSA, a penalty has never been assessed because none of the municipalities failing to report ever received more than $500,000 a year from Act 13 fees and, presumably, never expected to get as much as $500,000.

In 2016, 45 municipalities out of a total of 130 in Allegheny County failed to report their Act 13 details to the PUC. This has improved since 2012, when 95 municipalities failed to do so. The best year for reporting was 2015, when just 31 municipalities did not report.

For example, since the impact fee was established, the City of Pittsburgh has disclosed the use of its shale dollars one time, in 2013. Brentwood Borough, McKeesport City, Pleasant Hills Borough and Sewickley Borough have never reported how their impact money was used.

Meanwhile, municipalities in other counties had lower rates of reporting noncompliance. In 2016, four municipalities out of 57 in Butler; Washington, five municipalities out of 66; Armstrong, eight municipalities out of 45; Fayette, nine municipalities out of 43; and Westmoreland, 18 municipalities out of 65.

Since Act 13 passed, the mandate that municipalities report annually how they spend their impact fee allocations has been obeyed by the vast majority of municipalities in the seven counties of the Pittsburgh MSA. Overall, municipalities within the MSA have improved their reporting from 2011 to 2016.

Allegheny County municipalities received a total of $2,797,742 from 2011 to 2016 compared to Washington County's municipalities' $55,412,444. Clearly, municipalities in Washington County have a substantial amount of fees to lose if they fail to comply with reporting and thus are more motivated to report fund usage than municipalities in Allegheny County. Washington County's municipalities have received the largest amount of fees in the MSA, followed by those in Butler, Fayette, Westmoreland, Armstrong, Allegheny and Beaver counties.

However, municipal accountability should not be contingent upon the dollar amount received but upon the principle of financial accountability and transparency. Governments must be responsible for all actions including accounting for where all revenues are spent. Municipalities receiving Act 13 funds, regardless of the amount, are required to report the use and should do so. It's not a municipal choice but an obligation.

The Legislature should revisit Act 13 and amend it to penalize municipalities that fail to report how impact fee revenues are used by withholding all future allocations regardless of the amount they would have received until they are in compliance by submitting reports for all past years when no reports were filed. Failure to correct this loophole leaves open too much opportunity for funds to be used as municipalities wish as opposed to the uses designated by law.

PIOGA comment

PIOGA General Counsel Kevin Moody provided this comment: "While Chapter 23 of Act 13 vests the PUC with an array of remedial and enforcement powers with respect to producers' reporting and payment obligations, the PUC is correct that Chapter 23 does not provide corresponding powers concerning the reporting obligation of counties and municipalities. However, Section 2309(a) states that '[t]he commission may issue an order as necessary to enforce this chapter.' So while the PUC does not have the power to audit the reports filed by counties and municipalities, Section 2309(a) certainly appears to give the PUC the power to enforce the reporting requirement." ■

DEP ePermitting update

By Paul Kanouff
Civil & Environmental Consultants, Inc.

Permit applications for the Department of Environmental Protection's Erosion and Sedimentation Control General Permit (ESCGP-3), Drill and Operate a Well Permit, and Chapter 105 General Permits can now be submitted electronically through DEP's ePermitting system.

Well drilling permits previously were completed through DEP's eWell application. Currently, paper submittals are being accepted for all three permit types. Only the ESCGP-3 has a transition date (December 29), which is subject to change and applies only to non-transmission projects. Submission of ESCGP-3 applications to county conservation districts and DEP regional Waterways and Wetlands for FERC-regulated transmission projects will continue to be done on paper. Additionally, at some point the eWell application will be disabled and all unconventional well permit applications will be submitted through ePermitting.

All users must have a GreenPort account to use the ePermitting system. Access to ePermitting is slightly different for operators and consultants. The instructions below assume a GreenPort account has already been created.

For operators: Each operator must designate someone to act as the Electronic Filing Administrator (EFA). This person coordinates permitting activities and controls access rights for consultants and other users. Those who were a registered EFA in the eWell system should have been automatically granted EFA access to ePermitting and able to access ESCGP-3 and well drilling permits. However, to be an EFA for multiple DEP program areas, it is necessary to register with each program area. This requires completion of an Electronic Filing Administrator Application and Security Agreement form. This form is completed and then submitted to each individual DEP program area. Once the form is processed, the EFA must then log into their GreenPort account and enroll in ePermitting for the individual program area using the unique operator license number assigned to their company.

For consultants: To gain access to ePermitting, consultants must request access from the assigned EFAs for each operator. This requires completion of a User's Registration and Security Agreement for e-Permitting form. This form is submitted to the EFA. Consultants must then request access from the EFA through GreenPort. This is done by enrolling in ePermitting under the individual DEP program area using the unique access ID number assigned to each operator. The EFA will receive notification of the request and can choose to allow or deny access.

For more information on ePermitting for the ESCGP-3 and well drilling permits, including webinars, guides and forms, visit: www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/Pages/ePermitting.aspx.

For more information on ePermitting for Chapter 105 General Permits, including webinars, guides and forms, visit: www.dep.pa.gov/Business/Water/Waterways/Pages/ePermitting.aspx. ■

Recruit a new member, get rewarded!

Don't forget about PIOGA's incentive program intended to promote membership growth while rewarding active members for helping with that goal. Here are the guidelines:

- Recruiting a new member earns a credit equal to 10 percent of the amount of the first year dues of the newly recruited member.
- Credits must be applied toward reduction of PIOGA dues, PIOGA event fees, PIOGA sponsorships, PIOGA advertising (PIOGA Press and eWeekly only) or PIOGA donations.
- To claim any credits, your membership must be current and in good standing.
- You must inform the PIOGA Membership Committee of your member(s) recruited.
- There is no limitation on how many new members can be recruited per year.
- Credits will not be issued in the form of cash or legal tender.
- Credits cannot be claimed for renewing members who have been in default less than two years.
- Credits must be applied/used within the calendar year of being credited to your PIOGA account or will automatically be applied to your next year's dues.
- You may apply credits toward partial or progressive prepayments to your PIOGA account.

Questions? Want to participate? Contact Bob Beatty, chairman of PIOGA's Membership Committee, at rhbeatty@gmail.com or 814-590-4498, or Debbie Oyler, Director of Member Services, at debbie@pioga.org or 724-933-7306 ext. 22.

Northeast Pricing: Year in review

By Joe Baran and Lara Zewe
Bertison-George, LLC

Bertison-George's monthly Northeast Pricing Report *(see page 25)* typically discusses future pricing, whether it be the forward month pricing or pricing through 2023. At this time of year, we thought it would be interesting to see where values stand in relation to the previous three years for the five trading points we include in the monthly report.

Commodity

Front month term

December's pricing is at the top of each trading point's percentiles. For Algonquin, Dominion South and Transco Leidy, December's price is between the 90th and 100th percentile. TETCO M3 and Transco Z6 are trading between the 80th and 90th percentile. A few interesting points to note:

• Dominion South and Transco Leidy have been depressed for more than the past three years. However, it looks like the current market is expecting high demand for the rest of the winter season.

• There is potential to see a similar trading pattern as last year's for Algonquin, based on its current position.

• Transco Z6 (New York) is not to be as bad off as Algonquin (New England).

Front Month	Percentile									
Basis	10	20	30	40	50	60	70	80	90	Current
Algonquin	(0.28)	(0.17)	(0.06)	0.16	0.44	0.61	1.50	2.00	5.14	5.84
Dominion South #	(1.45)	(1.19)	(0.88)	(0.78)	(0.72)	(0.65)	(0.59)	(0.53)	(0.44)	(0.40)
TETCO M3 *	(1.36)	(0.98)	(0.66)	(0.57)	(0.51)	(0.42)	(0.33)	(0.19)	1.00	0.95
Transco Z6	(0.64)	(0.49)	(0.39)	(0.29)	(0.20)	(0.10)	0.19	0.47	2.21	1.98
Transco Leidy	(1.56)	(1.38)	(1.20)	(0.98)	(0.84)	(0.81)	(0.67)	(0.60)	(0.52)	(0.32)

Current Market

Rolling one-year term

The one-year trading term tells a slightly different picture. Algonquin, TETCO M3 and Transco Leidy all are trading at or above the 90th percentile. Dominion South is not far off in the 80th percentile. Transco Z6, however, is in the best position going into winter trading between the 20th and 30th percentile. Overall, the short-term pricing trend continues for all locations. The market is expecting higher demand at all trading points except for New York.

Rolling 1-Year Term

Trading Point	Percentile	Current Price
Algonquin	90-100	2.17
Dominion South #	80	(0.51)
TETCO M3 *	90-100	0.44
Transco Z6	20-30	0.70
Transco Leidy	90	(0.51)

Full trading term

Algonquin (New England) and TETCO M3 (Philadelphia) continue to trade at all-time highs. Transco Leidy is trading in the 70th percentile. Several natural gas-fired generation stations have been built in the area, which is impacting long-term pricing. Transco Z6 (New York) is relatively comfortable in the 40th to 50th percentile. Dominion South will be in an extended oversupply situation, as it is trading in the 10th to 20th percentile.

Full Trading Term

Trading Point	Percentile	Current Price
Algonquin	90-100	2.10
Dominion South #	10-20	(0.67)
TETCO M3 *	90-100	0.07
Transco Z6	40-50	0.78
Transco Leidy	70	(0.70)

Transportation

Front month term

What does that all mean for transportation values? All values for transportation routes based on front month pricing are between the 80th and 90th percentile. Winter is definitely impacting short-term transportation values.

Front Month

Transportation	Percentile												
Route	10	20	30	40	50	60	70	80	90	Current	Min	Max	Median
Dom - M3	0.07	0.09	0.09	0.11	0.12	0.22	0.27	0.42	1.42	1.35	0.04	5.46	0.12
Dom - Alg	0.41	0.49	1.00	1.20	1.37	1.50	2.27	3.01	5.86	6.24	0.25	10.46	1.37
Leidy - M3	0.14	0.15	0.18	0.23	0.28	0.33	0.48	0.80	1.36	1.27	0.04	5.56	0.28
Leidy - Z6	0.31	0.36	0.44	0.59	0.74	1.17	1.27	1.49	2.70	2.30	0.15	8.62	0.74
Leidy - Alg	0.52	0.64	0.97	1.31	1.48	1.61	2.36	3.21	6.04	6.16	0.39	10.56	1.48
M3 - Z6	0.13	0.19	0.24	0.34	0.45	0.68	0.84	0.97	1.28	1.03	0.06	3.27	0.45

Current Market

Rolling one-year term

Transportation values based on the rolling one-year trading period are seeing some of the same trends as the commodity prices. Transportation values to the New England and Philadelphia areas are trading in the upper percentiles; however, transportation to New York is trading at three-year lows.

Rolling 1-Year Term

Trading Point	Percentile	Current Price
Dom - M3	90-100	0.95
Dom - Alg	80-90	2.68
Leidy - M3	80	0.95
Leidy - Z6	0-10	1.21
Leidy - Alg	80-90	2.68
M3 - Z6	0-10	0.26

Full trading term

The transportation values based on the full trading term follow the values based on the rolling one-year term. Transportation values to Philadelphia and New England are trading in the upper percentiles. However, transportation value to New York, is soft.

Full Trading Term

Trading Point	Percentile	Current Price
Dom - M3	90-100	0.74
Dom - Alg	90-100	2.77
Leidy - M3	80	0.77
Leidy - Z6	40-50	1.48
Leidy - Alg	90-100	2.80
M3 - Z6	20-30	0.71

Conclusions

Simply put, more pipelines are needed to serve Philadelphia and New England. Skyrocketing prices are likely to be repeated in these markets, especially in New England. The policies of New York limit New England's access to a fuel source that would:

- Eliminate the need for Russian LNG.
- Lower carbon emissions compared to other fuels.
- Eliminate the bottleneck that restricts low cost natural gas supply.

Investment in pipeline infrastructure has grown considerably over the past three years. That investment has helped many markets lower their energy costs. The information provided in our monthly report and summarized in this article show that more investment is needed and, more importantly, New York policies need to change. ■

Joe Baran is Principle of Bertison-George, LLC. Lara Zewe is BG's Managing Director of Analytics, Data, and GIS.

Corrosion management and integrity management of onshore pipelines and facilities: Why are they important?

Provided by Wood

Some pipelines and onshore facilities deteriorate slowly during their operation, and in certain cases pipeline and the onshore installation life have been reliable for more than the lifetime estimated. Other pipelines have been built which have exhausted their useful life after two or five years of operation. Apart from the quality of the construction, coatings, cathodic protection (CP) systems and others, the factors which affect pipeline and onshore facilities life include the appropriate design for specific conditions, nature of the product or fluid, the external environment, operating conditions, material selected for the facility and quality of maintenance.

Many different surveys and studies have been conducted to evaluate the extent of damage on pipelines due to corrosion, either internal or external. Corrosion has been responsible for a high percentage of the significant incidents (both onshore and offshore) on pipelines transporting gas and crude oil. As a result of this deterioration process, pipeline sections often must be taken out of service and replaced. NACE (National Association of Corrosion Engineers) and other institutions have performed studies to identify the cost due to corrosion on pipelines and facilities. The amount and effort involved is in most of the cases accounted once the problem has already occurred. But was the effort accounted for prevention?

Corrosion failures can be either leaks or ruptures. Leaks from gas pipelines generally do not cause property damage, because the escaping gas disperses into the atmosphere. However, leaks from a liquid line can contaminate the soil, groundwater or surface water. Conversely, ruptures in a gas pipeline are more likely to cause an explosion and fire, thus resulting in more fatalities and injuries on average.

However, despite the current level of industry knowledge, pipelines continue to experience certain level of failures due to corrosion. The reasons vary because of multiple factors, but it will depend on the identification of the cause in order to prepare a plan to control and minimize recurrence of the corrosion failure. Among others:

- The soil and environment surrounding a buried pipeline or other installations are not adequately understood.
- Variations in the oxygen content, moisture content and chemical composition of the soil along the pipe length and from top to bottom of the pipe can act as concentration cells that promote corrosion.
- Moisture content and contaminants may change with time.
- Coating degradation due to UV exposures, bacteria or other microorganism present in the soil, girth welds, moisture in the soil, H2S presence and others
- Coatings sometimes become disbonded from the pipe surface, allowing groundwater to contact the steel but shielding the steel from cathodic-protection currents.
- If there are corrosive agents in the fluid, it is not easy to determine that internal corrosion is occurring. It requires installation of corrosion monitoring and is not always considered during the design phase.
- Other contaminates present in the fluid may promote solid accumulation (black powder in gas flow) and other deposits that affect the flow rate and hence the production levels designed for specific installation.
- Bacteria corrosion may be occurring but sampling is complicated and detecting the type of bacteria requires specific procedure not always available during field inspection.
- Visual inspection of the outside of the pipe and the coating require excavation.
- Stray currents from direct current (DC) or alternating current (AC) sources may affect the condition of the pipeline, promoting external corrosion.

What are the risks due to corrosion?

Corrosion is one of the most prevalent causes of pipeline spills or failures. It can result in the gradual reduction of the wall thickness of the pipe, resulting in loss of its strength. This loss of the asset strength could then result in leakage or rupture of the pipeline due to internal pressure stresses unless the corrosion is repaired, the affected section is replaced or the operating pressure is reduced.

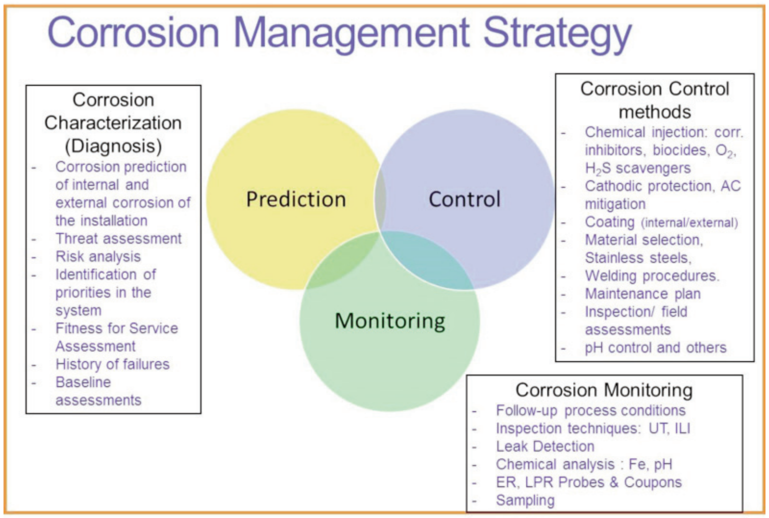
Pipeline corrosion creates weaknesses at points in the pipe, which in turn makes the pipe more susceptible to third-party damage, overpressure events, etc. (i.e., corrosion doesn't necessarily need to cause the leak or rupture itself to increase risk).

It is important that engineers design pipelines considering the corrosion control methods for internal and external protection. The issues due to corrosion may end in more costs associated with failures, adjustment of the design to install corrosion control methods once the system is in operations, incurring later in additional replacement and repairs. All that can be in many ways avoided or at least minimized if a corrosion management plan is considered from the beginning of the project.

Internal corrosion generally cannot occur in a pipeline unless there is an electrolyte to complete the corrosion cell. Water or other aqueous materials (such as glycols from dehydration processes) are needed to form the electrolyte. Also, other chemicals usually must be present: for example, carbon dioxide (CO2) for the formation of dilute organic and inorganic acids or sulfur for the formation of acid or growth of bacteria. Once introduced, the corrosive materials may continue to damage the pipeline until they are removed, or until they are consumed in corrosion reaction.

Gas pipelines. Typically, sales-quality dry gas will not corrode pipeline interior surfaces. However, natural gas as it comes from the well may contain small amounts of contaminants such as water, carbon dioxide and hydrogen sulfide. If the water condenses, it can react with the carbon dioxide or hydrogen sulfide to form an acid that might collect in a low spot and cause internal corrosion.

Liquid pipelines. Similarly, internal corrosion can occur in pipelines carrying corrosive liquids or liquids containing corrosive contaminants. Liquid pipelines can experience internal corrosion anywhere along their length where electrolytes or solids drop out and wet the surface or provide a place for electrolytes to collect.



Many of the corrosion mechanisms are location dependent (e.g., the local soil resistivity and chemistry along the pipeline's route; the transported fluid's molecular composition; the operating pressure and temperature; metallurgical material selections; reservoir dependencies; aerobic and anaerobic bacteria dependencies; etc.). Therefore, CP systems and AC mitigation plans should be part of any newly built below-grade pipeline design. Besides, internal corrosion control methods (chemical injection, material selection, etc.) should be considered on the design basis if corrosive conditions are present.

The importance of a corrosion management plan

Proactive management is one of the key elements of an effective corrosion and integrity management program because it promotes early identification of potential threats and outcomes and thereby enables problems to be resolved at the earliest possible stage. Mitigation becomes necessary when corrosion threats are such to impact the integrity of the pipeline's systems and associated facilities.

The operating history and other data relative to each system should be reviewed and analyzed to identify existing and possible future threats. These threats may be system specific. Threats to be analyzed include corrosion, natural forces, excavation damage, other outside force damage, material or weld failure, equipment malfunction and inappropriate operation. The evaluation should include internal corrosion, external corrosion, environmentally influenced stress corrosion cracking, bacteria corrosion (MIC), AC-induced corrosion, selected seam corrosion, corrosion at the welds, etc. Effective corrosion control programs may go beyond the minimum requirements to anticipate where and when problems may arise and to proactively apply appropriate preventive and mitigative measures.

The corrosion management plan should be considered from the design phase of any pipeline or onshore facilities project and its implementation beginning when the pipeline is in construction phase. The plan will be successful if implemented considering three key phases:

Phase 1: Diagnosis—Prediction, risk and threat assessments. Corrosion management begins by understanding the corrosion threats for a pipeline system. Assessing risk is the product of evaluating the probability of the threat and the possible consequence. Risk factors for pipeline systems include environmental factors, material factors, consequence factors, operations factors and practical factors. Prioritizing the risk is the process of rating the threats as it affects a system in relation to the threats affecting the other systems. Prioritization is used as a guideline for establishing assessment schedules. Assessing and prioritizing risks are continual processes. Risk assessments should be conducted periodically and when conditions change that warrant a reassessment.

At this phase, records research and data collection need to be executed to identify the threats of the asset and what operating conditions may cause internal or external corrosion. This phase is commonly executed by assembling databases for operating condition, history of the pipeline operation, maintenance data, material and history of failures, leaks (if any) to run corrosion models, risk analysis. Performing a resource inventory of existing pipeline system data is a good start of this phase to then continue with a risk assessment. The amount and type of data to support risk assessment will vary depending on the threat being assessed. Planning for collection and maintaining data is required.

Phase 2: Corrosion control—implementing actions to control corrosion. Once the threats are identified, a corrosion control plan needs to be implemented. Methods to control external corrosion may include cathodic protection or coating for external corrosion, while chemical injection (corrosion inhibitors, biocides, scavengers), corrosion resistant alloys or other non-metal materials and internal coatings are methods for internal corrosion control.

Phase 3: Corrosion monitoring—follow-up strategy. A complete strategy for corrosion monitoring is developed to have on-line real-time data acquisition of corrosion rates in strategic points related to higher predicted corrosion rates or locations where corrosion control with chemical injection is used. Corrosion sensors used in on-line monitoring can be in critical equipment/piping sections where inspection methods cannot have access. They can provide real-time information on corrosion activity (and corrosion upsets with operating conditions) and allow proactive implementation of corrective action, before corrosion failures have occurred.

The accompanying figure shows the three phases of a corrosion management plan. More details can be included on each phase depending on the corrosion threats and/or the methods to control and prevent leaks or corrosion failures.

Corrosion management and pipeline integrity management plan

A corrosion management plan should be written to be proactive and not reactive. It must consider different steps in the process in order to prevent at the early stage corrosion by an efficient corrosion monitoring plan. That will avoid sudden and unexpected failures that will increase costs of repairs and replacement and hence the costs for operations. The plan will need to consider inspection, monitoring and maintenance plans as part of the activities. Regular inspections to assess the rate of change in physical condition give a more accurate idea of how much longer a pipeline can be expected to operate safely and productively and can also be used to plan for remedial action if this predicted life is below requirement.

Besides the corrosion management plan, it is very important for pipeline operators to comply with the specific regulations for safety standards. The specific details of an integrity management program will be unique to each onshore pipeline and its facilities. Operator commitment to proactive planning and the effective allocation of resources are integral to the success of a corrosion integrity management program. As in any company program, accountability, responsibility and ownership of the entire corrosion process are key ingredients for success.

Specifically for pipelines, the integrity management program (IMP) is an all-encompassing plan for maintaining pipelines that transport and store gas and liquid hydrocarbons, chemicals, gas and other products. The pipeline integrity program is regulated by the U.S. Department of Transportation. Its specific regulations (49 CFR Part 192 for natural gas and 49 CFR Part 195 for hazardous liquids) are particularly focused on high consequence areas with heavy population and require operators to implement IMP practices to address any potential pipeline integrity issues.

At a minimum, a written integrity management program must contain the following elements:

- A process for identifying which pipeline segments are in a High Consequence Area (HCA).
- A baseline assessment plan. Acceptable methods of assessment include:
  a) use of an internal inspection tool capable of detecting corrosion;
  b) hydrostatic testing;
  c) direct assessment; or
  d) other technology that the operator demonstrates can provide an equivalent understanding of the condition of the pipe.
- An analysis that integrates all available information about the integrity of the pipeline and the consequences of a failure.
- Criteria for remedial actions to address integrity issues raised by the assessment methods and information analysis.
- A continual process of assessment and evaluation to maintain the integrity of the pipeline.
- Identification of preventive and mitigative measures to protect HCAs
- Methods to measure the effectiveness of the program.
- A process for review of integrity assessment results and information analysis by a person qualified to evaluate the results and information.

An IMP should be continually reviewed and modified to reflect lessons learned from operator experience, conclusions drawn from results of the integrity assessments, and data obtained from other maintenance and surveillance efforts, and must include evaluation of the consequences of a failure within each HCA.

By implementing the requirements of the regulations and through responsible maintenance programs, pipeline operators continuously inspect their pipelines for corrosion damage and potential susceptibility. Before developing a pipeline Integrity management plan for pipelines and onshore facilities, the pipeline integrity management group must begin a systematic process that includes the evaluation of the threats and risks following with a thorough analysis and assessment that evaluates options based on cost and risk. Then the team will execute the necessary tools and procedures for anomaly detection and mitigation.

This is a continuous process and it needs to be implemented along with a corrosion management strategy. It is important to take into a count that the corrosion management strategy or plan is a different document than the pipeline integrity management plan. However, they both can be implemented together or refer each other when necessary. ■

Wood—a sponsor of PIOGA's Marcellus to Manufacturing Conference—is a global leader in the delivery of project, engineering and technical services to energy and industrial markets. If you have questions about the topics discussed in this article or how they may impact your operations, contact Marta Castillo, Onshore Asset Integrity Manager, at marta.castillo@woodplc.com or Pat Pontoriero, Vice President, at 412-417-7819 or pat.pontoriero@woodplc.com.

RFF launches new shale research clearinghouse

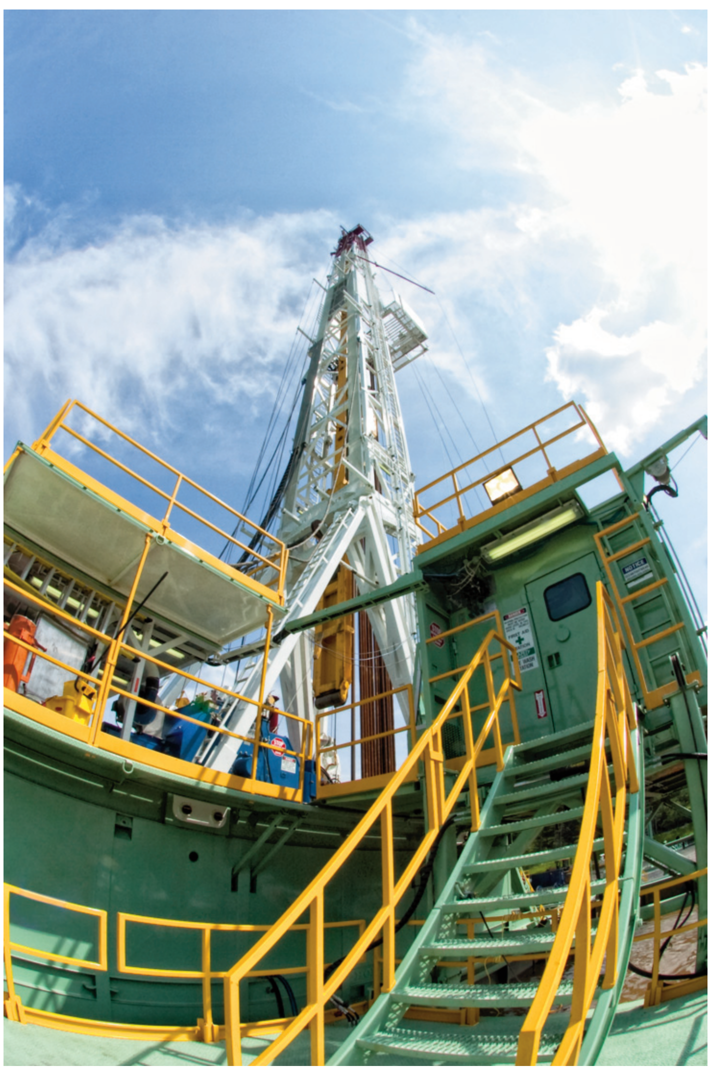
Independent research institute Resources for the Future (RFF) has unveiled a website called the Shale Research Clearinghouse, or SHARC, designed to provide a one-stop-shop for comprehensive, rigorous, and up-to-date information on the environmental, socioeconomic and other impacts of oil and gas development.

Through an intuitive web interface, users will be able to quickly access summaries of peer-reviewed research on the impacts of oil and gas development on human health, climate change, local economies, groundwater and more.

The site can be found at www.rff.org/sharc.

In this initial phase, SHARC offers two key tools: two-page issue briefs and longer literature reviews describing the state of the science on various topics, and a searchable bibliography that provides access to the underlying peer-reviewed research. Over the coming months, RFF researchers will expand the breadth and depth of the tool, incorporating analyses of new topics and adding new studies as they are released.

SHARC was developed in response to the needs of regulators and others seeking to keep pace with the proliferation of research on the impacts of increased oil and gas development in the United States. It has been developed by RFF's Daniel Raimi and Alan Krupnick, with expert reviewers from government, business, NGOs, academia, and elsewhere to be as simple and powerful as possible. Going forward, RFF hopes to make SHARC the "go-to" repository for information on the positive and negative effects of oil and gas development.



Resources for the Future (RFF) is an independent, nonprofit research institution in Washington, D.C. Its mission is to improve environmental, energy and natural resource decisions through impartial economic research and policy engagement. RFF is committed to being the most widely trusted source of research insights and policy solutions leading to a healthy environment and a thriving economy.

Here's more information from a report about SHARC by StateImpact PA:

> "If you're a regulator and you wanted to know what the latest studies were on the risk of earthquakes from wastewater disposal, it was very difficult to get that information quickly," said Raimi. "What we've tried to do with this tool is provide a repository to get that information."
>
> Users can sort the research by topic. SHARC covers three main areas: environmental and public health issues, government regulations, and the socioeconomic impacts of shale development.
>
> "This tool has been designed primarily for regulators," said Raimi. "But we also think it will be useful for the general public, and we want the public's feedback."
>
> Although many of the journal articles remain behind paywalls, access to the summaries is free.
>
> Raimi tackled many of the thorniest questions around the shale boom in his 2017 book, *The Fracking Debate: The Risks, Benefits, and Uncertainties of the Shale Revolution.*
>
> After years of studying the issue and sifting through data, he believes the good usually outweighs the bad for people who live near shale development.
>
> "For the broader public and U.S. citizens as a whole–every one of us is paying lower prices for energy today than we otherwise would, because of shale development. That's a clear economic benefit for consumers," he said. "The flip side of that: when energy costs less, people use more. Therefore, emissions such as carbon dioxide and methane increase, and you have the climate damage, which is very important to study and evaluate." ■

Downstream matters

New manufacturing apprenticeships in Northwestern Pennsylvania

Building on his commitment to expand job training, Governor Tom Wolf recently announced two new apprenticeships for tool and die makers and plastic process technicians in Northwestern Pennsylvania. In partnership with the private sector, the apprenticeships will prepare workers for new jobs in the plastics and petrochemical industries in the region.

"Every Pennsylvanian deserves a chance to build a rewarding career and earn a good wage," said Wolf. "These apprenticeships give students and workers hands-on experience for growing careers while earning a paycheck. It also strengthens the pipeline of talented workers that businesses need."

Apprenticeships are part of the PAsmart initiative to invest in apprenticeships, job training and science and technology education. In Erie, a tool and die makers apprenticeship with Executool Precision Tooling was approved by the Department of Labor and Industry's Apprenticeship and Training Office (ATO). The Erie Institute will provide the related technical instruction.

"With our state-registered Apprenticeship Program, we are investing in our workers' future," said Alicia Mayes, Human Resources Manager for Executool Precision Tooling. "We welcome all interested applicants to come see us at Executool today to explore apprenticeship opportunities."

In Oil City, a plastic process technician apprenticeship with Keystone Community Education Council was recently registered with the department. Twelve regional plastics manufactures collaborated on the program. With nearly 200 plastic businesses in Northwest Pennsylvania there is a need for up to 400 new plastic process technicians.

"The local plastics industry has been asking for a program like this for years," said Lance Hummer, Executive Director of the Keystone Community Education Council. "This combination of hands-on experience and classroom learning is tailored to the exact needs of our region's injection molders."

"Pennsylvania is becoming a major player in the petrochemical industry. Between Pennsylvania, Ohio and West Virginia, we are now the second largest producer of natural gas in the world. Plastics is a major component of the petrochemical industry and there is an incredible opportunity for growth over the next decade," added Hummer.

The ATO was created in 2016. It has registered 119 new sponsors and 166 new apprenticeship programs or occupations. Pennsylvania now has 16,286 registered apprentices statewide.

"The ATO is creating more apprenticeship opportunities in Pennsylvania, and with new PAsmart investments providing an additional $7 million to develop and expand registered apprenticeship programs, we are working to double the number of registered apprentices in the state by 2025," said L&I Secretary Jerry Oleksiak. "If you are looking for a job, are thinking about a career change, or are a business that can't seem to find enough skilled workers, I urge you to consider apprenticeships."

For more information about pursuing an education and career in Pennsylvania at any stage of life, visit PAsmart at www.pa.gov/guides/working-training-pa.

Visit ATO (www.dli.pa.gov/Individuals/Workforce-Development/apprenticeship/Pages/default.aspx) for more information about apprenticeship programs and the Apprenticeship and Training Office. ■

David Hoffman, Executive Director of the American Injection Molding Institute, is shown with (from left) John Beaumont, Founder and Executive Director of the AIM Institute, and Lance Hummer, Executive Director of Keystone Community Education Council. The AIM Institute recently teamed up with Clarion University and the Keystone Community Education Council to create a Plastics Process Technician Apprenticeship Program.

PIOGA Member News

Greylock adds industry veteran as new vice president of land

Greylock Energy announces that Scott Hodges has joined the company as its new Vice President of Land. Hodges has more than 20 years' experience in the energy industry in Appalachia. As vice president of land, he is responsible for managing Greylock's land team, negotiating for and acquiring mineral and surface rights, and maintaining relationships with landowners.

Greylock CEO Kyle Mork said, “We are thrilled to have Scott join the Greylock Team. He brings a wealth of experience, long-time relationships and deep knowledge of the region that will be invaluable to us as we continue to grow and develop our upstream and midstream businesses throughout Appalachia.”

Hodges is a second generation landman who began his land career with Consol Energy. He joins Greylock after serving eight years as Senior Vice President, Land & Business Development at Rex Energy.

Greylock Energy is headquartered in Charleston, West Virginia, with offices throughout West Virginia and Pennsylvania and operations across the nation. The vast majority of the company’s assets are located in the Appalachian Basin, which comprises more than 900,000 acres, about 4,400 wells and 2,600 miles of pipeline.

Applegath joins HHEX as SVP and Chief Operating Officer

John Applegath has joined Huntley & Huntley Energy Exploration, LLC (HHEX) as Senior Vice President and Chief Operating Officer responsible for HHEX's operational and technical activities.

"We are thrilled to add John and his deep Appalachian experience to the HHEX team. As we move into development, John's proven track record of driving operational excellence in this basin will be invaluable," said M. Chris Doyle, HHEX President and CEO. "HHEX's initial delineation wells have outperformed expectations, and industry success in the deep Utica play is immediately adjacent to our position. John's entrepreneurial spirit, operational and technical expertise, and deep knowledge of this asset will help us build upon that foundation."

Applegath joins HHEX after recently retiring from Range Resources, where he served as Senior Vice President of Operations from 2014 to 2018, leading both the Marcellus Shale Division and more recentl, the North Louisiana Division. He joined Range Resources in 2008, helping establish Range's Marcellus operations and serving as Vice President of Operations from 2009 to 2014 for southwestern Pennsylvania assets. Applegath's career spans over 40 years and includes experience at Anadarko Petroleum, Union Pacific Resources and ExxonMobil Corporation.

He joins Morrow Evans as the most recent additions to HHEX's leadership team. Evans, former Senior Vice President and Chief Financial Officer of Lime Rock Resources, joined HHEX in April as Senior Vice President and Chief Financial Officer.

HHEX is a privately-held energy company that specializes in upstream and midstream development of natural gas resources in the Appalachian Basin. The company has a significant asset position in southwestern Pennsylvania, having assembled over 100,000 largely contiguous and operated acres within the core Marcellus, Utica and Upper Devonian fairways. ■

Methane regulations *Continued from page 1*

that aims to reduce the Subpart OOOOa regulatory burden for industry.

EPA estimates that the proposed improvements to the rule could save industry tens of millions of dollars in compliance costs each year. EPA held a public hearing in November and is accepting stakeholder comments through December 17.

Significant changes to applicable requirements

The 52-page rulemaking notice describes several proposed amendments to Subpart OOOOa. EPA is addressing certain issues that were presented to the agency in formal petitions for reconsideration, as well as “other implementation issues and technical corrections” brought to the agency’s attention after Subpart OOOOa was promulgated. For example, it is proposing significant changes to the requirements for fugitive emissions components, including revised leak monitoring frequencies. Whereas the current regulation subjects well sites to semiannual leak monitoring, the revised Subpart OOOOa would require monitoring every other year for low production well sites and annually for all other well sites. The required frequency of compressor station monitoring would be reduced from quarterly to either semiannual or annual. (The proposal includes distinct monitoring requirements for well sites and compressor stations on the Alaska North Slope.) EPA also is proposing to reduce the schedule for repairing leaks from 30 to 60 days. Finally, EPA proposes to no longer require monitoring surveys at well sites once all major production and processing equipment is removed.

These are just a few of the many technical issues for which the agency is seeking public input. Operators should review the rulemaking notice and evaluate how the proposed changes could impact day-to-day operations.

Proposed rule attempts to address potentially overlapping federal and state requirements

While EPA may be inclined to relax regulatory obligations at the federal level, states could continue to impose more stringent requirements. For example, Pennsylvania’s Department of Environmental Protection finalized an air permitting package earlier this year that requires quarterly leak detection and repair (LDAR) monitoring for well sites subject to the new general permit known as GP-5A. As proposed, the revised Subpart OOOOa would require only annual or in some cases biennial monitoring at well sites. In general, where federal and state standards are in conflict, operators will need to comply with the most stringent requirement that applies.

EPA’s rulemaking proposal includes provisions that attempt to address potential overlap in federal and state requirements. The proposed rule would allow operators to meet certain existing state requirements as an alternative means of complying with Subpart OOOOa. Pennsylvania is one of six states where the proposed rule would allow operators to elect to comply with the state requirements in lieu of certain federal requirements.

Public comment period and hearing

EPA will accept public comments on the proposed revisions to Subpart OOOOa until December 17. The rulemaking notice indicates that the agency is seeking comment only on the specific issues identified in the notice. The agency is "not opening for reconsideration any other provisions of the NSPS at this time." EPA's related fact sheet indicates that it is still evaluating broad policy issues—such as the regulation of greenhouse gases—associated with Subpart OOOOa. According to the agency, such issues will be addressed separately at a later date.

On November 14, EPA held a public hearing at its Region 8 office in Denver, Colorado. The online docket for EPA's proposed rule states that more than 48,000 comments have been received, although many of these comments appear to be form letters opposing the proposed rule. In addition, a group of shareholders for large publicly traded oil and gas companies reportedly sent a letter to these companies on December 5, urging the companies to oppose EPA's proposed rule and supporting the regulation of methane emissions by EPA. As the public comment period ends, other parties will share their views on this important rulemaking. ■

Editor's note: PIOGA's Environmental Committee is actively engaged in the Subpart OOOOa issue and the association is part of an oil and gas industry coalition working to ensure commonsense methane regulations.

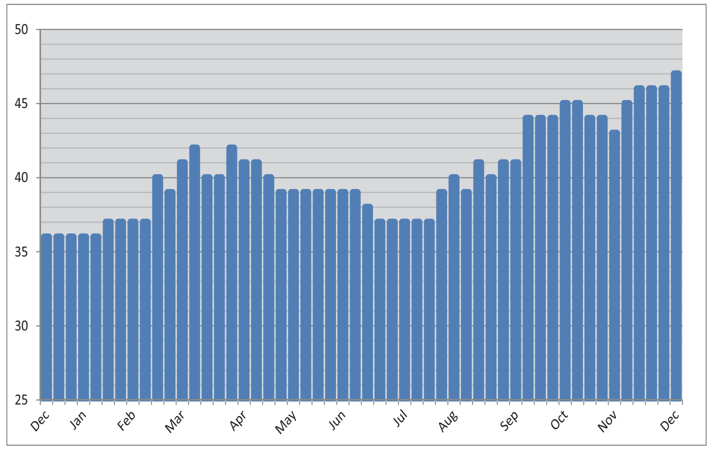
Babst Calland actively monitors federal and state air program developments affecting the oil and gas industry. If you have any questions about the proposed changes to Subpart OOOOa or air quality issues in general, contact Michael H. Winek at 412- 394-6538 or mwinek@babstcalland.com; Meredith Odato Graham; 412-773-8712 or mgraham@babstcalland.com; or Gary E. Steinbauer, 412-394-6590 or gsteinbauer@babstcalland.com.

New PIOGA member — *welcome!*

Hunt Valley Environmental, LLC
632 Hunt Valley Circle, New Kensington, PA 15068
724-594-0805 • hvenv.com
Professional firm—engineering, environmental permitting and design

Oil & Gas Dashboard

Pennsylvania Rig Count



Penn Grade Crude Oil Prices

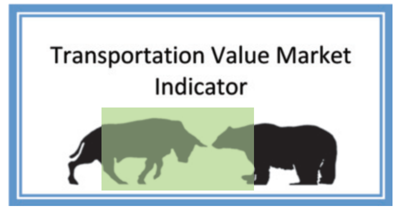
Natural Gas Futures Closing Prices

Month	Price
January 2019	$4.504
February	4.391
March	4.162
April	2.990
May	2.875
June	2.889
July	2.914
August	2.904
September	2.882
October	2.902
November	2.938
December	3.090

Prices as of December 7

Sources
American Refining Group: www.amref.com/Crude-Prices-New.aspx
Ergon Oil Purchasing: www.ergon.com/prices.php
Gas futures: quotes.ino.com/exchanges/?r=NYMEX_NG
Baker Hughes rig count: phx.corporate-ir.net/phoenix.zhtml?c=79687&p=irol-reportsother
NYMEX strip chart: Emkey Energy LLC, emkeyenergy.com

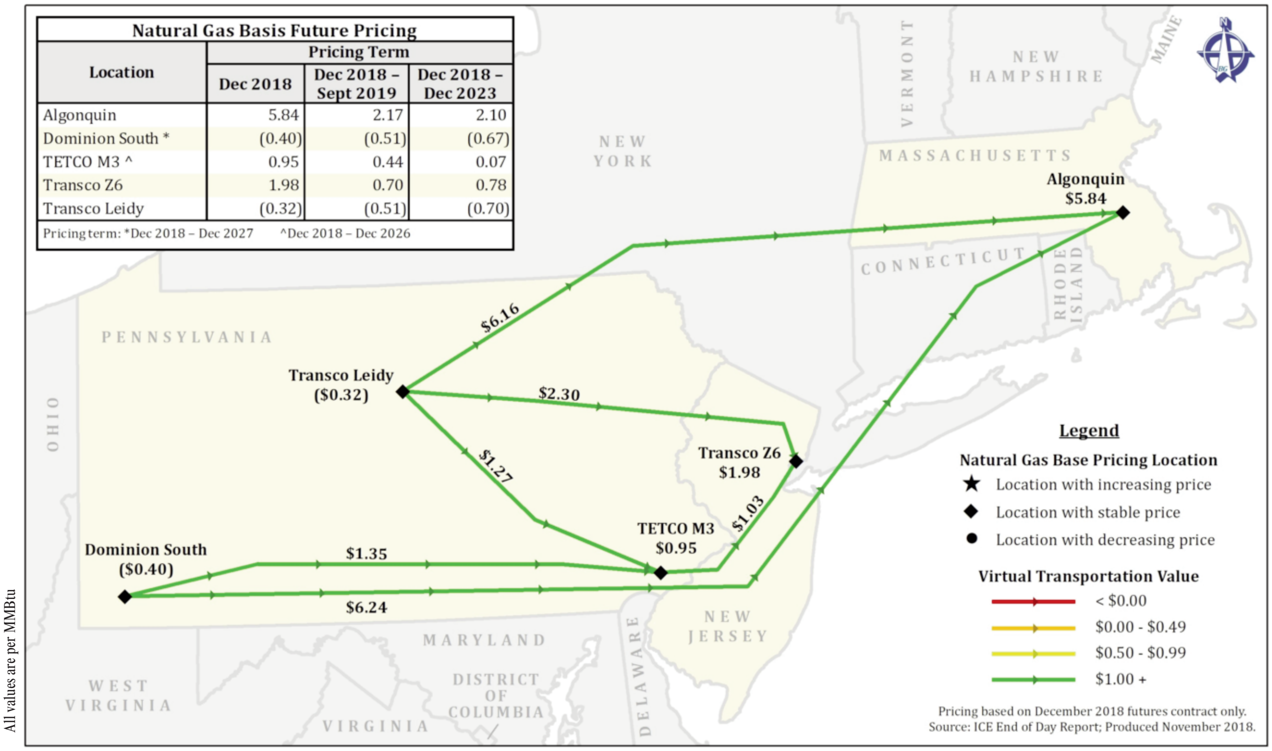
Northeast Pricing Report — December 2018



Provided by Bertison-George, LLC
www.bertison-george.com

There has been a significant pricing increase in New York and New England. Algonquin shot up to $5.84 per MMBtu while Transco Z6 climbed to $1.98 per MMBtu. That's a $5.34 and $1.97 per MMBtu increase from the previous month. TETCO M3 wasn't far behind with a $1.12 per MMBtu increase. Dominion South and Transco Leidy were relatively flat. For the 1-year term; Algonquin and TETCO M3 increased while Transco Leidy and Dominion South were slightly down. The one outlier from the front month trading trend was Transco Z6, which decreased $0.34 per MMBtu. Trading for the full-term trading period was relatively flat across the board. Algonquin increased the largest amount by $0.13 per MMBtu, while Transco Leidy decreasing the largest amount at $0.04 per MMBtu.

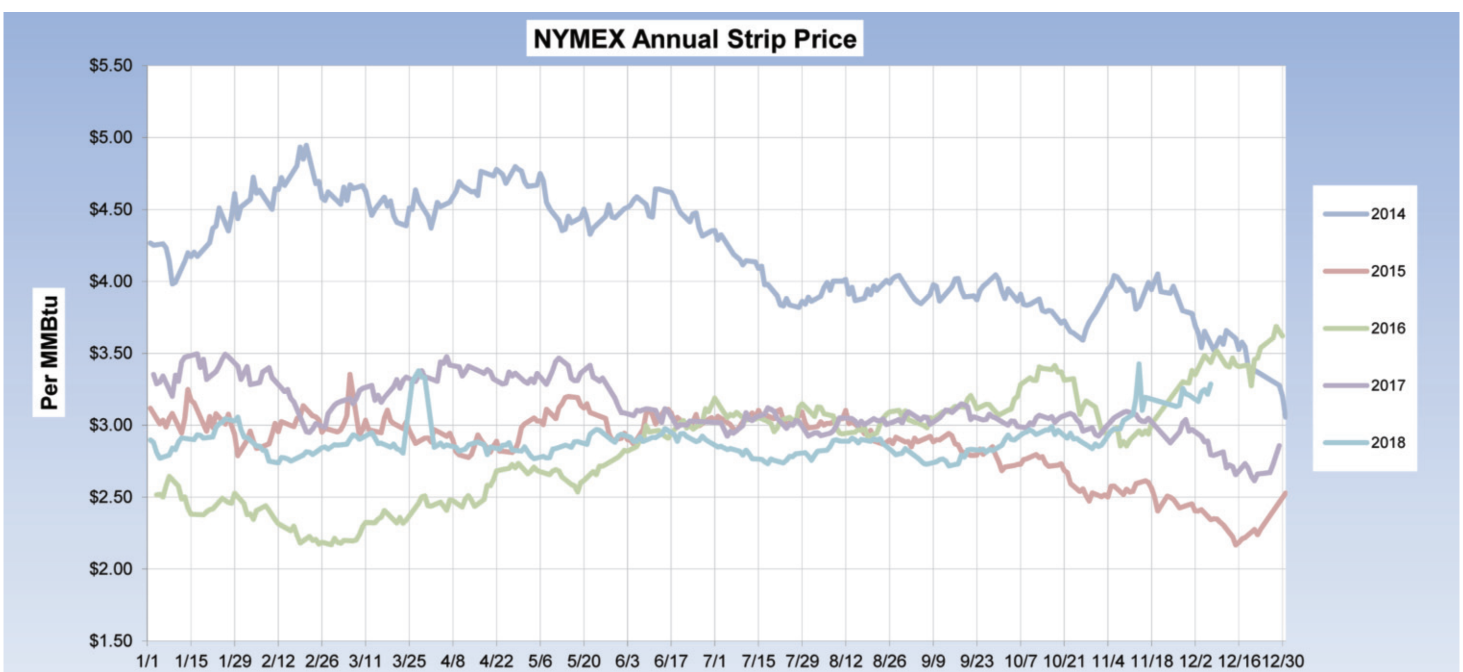
Transportation values were up consistently. Dominion South and Transco Leidy to Algonquin increased nearly the identical amounts of $5.34 and $5.35 per MMBtu respectively. All other routes increased nearly a dollar or more as well. TETCO M3 to Transco Z6 increased the lowest amount of $0.85 per MMBtu. Transco Leidy to Transco Z6 increased $1.98 per MMBtu.



Natural Gas Basis Future Pricing

Location	Pricing Term: Dec 2018	Dec 2018 – Sept 2019	Dec 2018 – Dec 2023
Algonquin	5.84	2.17	2.10
Dominion South *	(0.40)	(0.51)	(0.67)
TETCO M3 ^	0.95	0.44	0.07
Transco Z6	1.98	0.70	0.78
Transco Leidy	(0.32)	(0.51)	(0.70)

Pricing term: *Dec 2018 – Dec 2027 ^Dec 2018 – Dec 2026



Spud Report: November 2018

The data show below comes from the Department of Environmental Protection. A variety of interactive reports are available at www.dep.pa.gov/DataandTools/Reports/Oil and Gas Reports.

The table is sorted by operator and lists the total wells reported as drilled last month. **Spud** is the date drilling began at a well site. The **API number** is the drilling permit number issued to the well operator. An asterisk (*) after the API number indicates a conventional well.

OPERATOR	WELLS	SPUD	API #	COUNTY	MUNICIPALITY
Bearcat Oil Co LLC	1	11/23/18	123-48174*	Warren	Mead Twp
Blackhawk Energy LLC	2	11/12/18	083-57091*	McKean	Hamilton Twp
		11/15/18	083-57090*	McKean	Hamilton Twp
Cabot Oil & Gas Corp	26	11/23/18	115-22520	Susquehanna	Gibson Twp
		11/23/18	115-22521	Susquehanna	Gibson Twp
		11/23/18	115-22522	Susquehanna	Gibson Twp
		11/23/18	115-22523	Susquehanna	Gibson Twp
		11/6/18	115-22413	Susquehanna	Harford Twp
		11/6/18	115-22414	Susquehanna	Harford Twp
		11/6/18	115-22415	Susquehanna	Harford Twp
		11/6/18	115-22416	Susquehanna	Harford Twp
		11/6/18	115-22417	Susquehanna	Harford Twp
		11/6/18	115-22418	Susquehanna	Harford Twp
		11/3/18	115-22576	Susquehanna	Lathrop Twp
		11/3/18	115-22575	Susquehanna	Lathrop Twp
		11/3/18	115-22577	Susquehanna	Lathrop Twp
		11/3/18	115-22578	Susquehanna	Lathrop Twp
		11/9/18	115-22429	Susquehanna	Lenox Twp
		11/9/18	115-22430	Susquehanna	Lenox Twp
		11/9/18	115-22431	Susquehanna	Lenox Twp
		11/9/18	115-22432	Susquehanna	Lenox Twp
		11/9/18	115-22433	Susquehanna	Lenox Twp
		11/9/18	115-22434	Susquehanna	Lenox Twp
		11/9/18	115-22435	Susquehanna	Lenox Twp
		11/9/18	115-22436	Susquehanna	Lenox Twp
		11/9/18	115-22437	Susquehanna	Lenox Twp
		11/9/18	115-22438	Susquehanna	Lenox Twp
		11/8/18	115-22564	Susquehanna	Springville Twp
		11/8/18	115-22565	Susquehanna	Springville Twp
Cameron Energy Co	1	11/13/18	123-48190*	Warren	Sheffield Twp
Chesapeake Appalachia LLC	3	11/13/18	113-20410	Sullivan	Cherry Twp
		11/14/18	113-20411	Sullivan	Cherry Twp
		11/10/18	115-22579	Susquehanna	Auburn Twp
CNX Gas Co LLC	8	11/26/18	059-27739	Greene	Richhill Twp
		11/26/18	059-27738	Greene	Richhill Twp
		11/26/18	059-27748	Greene	Richhill Twp
		11/26/18	059-27749	Greene	Richhill Twp
		11/1/18	125-28534	Washington	East Finley Twp
		11/1/18	125-28536	Washington	East Finley Twp
		11/1/18	125-28537	Washington	East Finley Twp
		11/1/18	125-28538	Washington	East Finley Twp
EQT Production Co	6	11/7/18	125-28605	Washington	W Bethlehem Twp
		11/7/18	125-28606	Washington	W Bethlehem Twp
		11/7/18	125-28607	Washington	W Bethlehem Twp
		11/7/18	125-28609	Washington	W Bethlehem Twp
		11/7/18	125-28610	Washington	W Bethlehem Twp
		11/7/18	125-28608	Washington	W Bethlehem Twp
Gas & Oil Mgmt Assoc Inc	3	11/5/18	123-48148*	Warren	Pleasant Twp
		11/15/18	123-48149*	Warren	Pleasant Twp
		11/28/18	123-48171*	Warren	Pleasant Twp
Daniel P Hornburg	1	11/9/18	123-48147*	Warren	Sheffield Twp
Inflection Energy (PA) LLC	4	11/2/18	081-21752	Lycoming	Gamble Twp
		11/4/18	081-21748	Lycoming	Gamble Twp
		11/10/18	081-21281	Lycoming	Gamble Twp
		11/10/18	081-21282	Lycoming	Gamble Twp
PA Gen Energy Co LLC	7	11/13/18	117-22035	Tioga	Liberty Twp
		11/13/18	117-22037	Tioga	Liberty Twp
		11/15/18	117-22034	Tioga	Liberty Twp
		11/16/18	117-22038	Tioga	Liberty Twp
		11/17/18	117-22033	Tioga	Liberty Twp
		11/18/18	117-22039	Tioga	Liberty Twp
		11/19/18	117-22032	Tioga	Liberty Twp
PVE Oil Corp Inc	4	11/5/18	083-57093*	McKean	Sergeant Twp
		11/8/18	083-57095*	McKean	Sergeant Twp
		11/13/18	083-57096*	McKean	Sergeant Twp
		11/16/18	083-57099*	McKean	Sergeant Twp
Range Resources Appalachia	7	11/6/18	007-20548	Beaver	Hanover Twp
		11/6/18	007-20549	Beaver	Hanover Twp
		11/6/18	007-20551	Beaver	Hanover Twp
		11/29/18	125-28616	Washington	Chartiers Twp
		11/29/18	125-28617	Washington	Chartiers Twp
		11/29/18	125-28614	Washington	Chartiers Twp
		11/29/18	125-28615	Washington	Chartiers Twp
Seneca Resources Corp	12	11/23/18	023-20238	Cameron	Shippen Twp
		11/23/18	023-20240	Cameron	Shippen Twp
		11/23/18	023-20239	Cameron	Shippen Twp
		11/23/18	023-20241	Cameron	Shippen Twp
		11/23/18	023-20242	Cameron	Shippen Twp
		11/23/18	023-20243	Cameron	Shippen Twp
		11/9/18	081-21718	Lycoming	Lewis Twp
		11/11/18	081-21717	Lycoming	Lewis Twp
		11/13/18	081-21720	Lycoming	Lewis Twp
		11/15/18	081-21716	Lycoming	Lewis Twp
		11/16/18	081-21719	Lycoming	Lewis Twp
		11/17/18	081-21726	Lycoming	Lewis Twp
SWN Production Co LLC	5	11/28/18	115-22560	Susquehanna	Oakland Twp
		11/29/18	115-22563	Susquehanna	Oakland Twp
		11/26/18	115-22396	Susquehanna	Rush Twp
		11/5/18	117-21910	Tioga	Liberty Twp
		11/6/18	117-21934	Tioga	Liberty Twp

	November	October	September	August	July	June
Total wells	**90**	**104**	**76**	**69**	**99**	**87**
Unconventional Gas	78	85	54	51	89	75
Conventional Gas	0	0	0	0	0	0
Oil	12	13	22	13	9	12
Combination Oil/Gas	0	6	0	5	0	0

Calendar of Events

PIOGA events

Info: www.pioga.org/events/category/pioga-events

PIOGATech: Air Quality Issues
December 18, The Chadwick, Wexford

Mix, Mingle and Jingle Holiday Party
December 18, The Chadwick, Wexford

Spring Meeting
April 10, Rivers Casino, Pittsburgh

Ted Cranmer Memorial Golf Outing and Steak Fry
June 3, Wanango Country Club, Reno

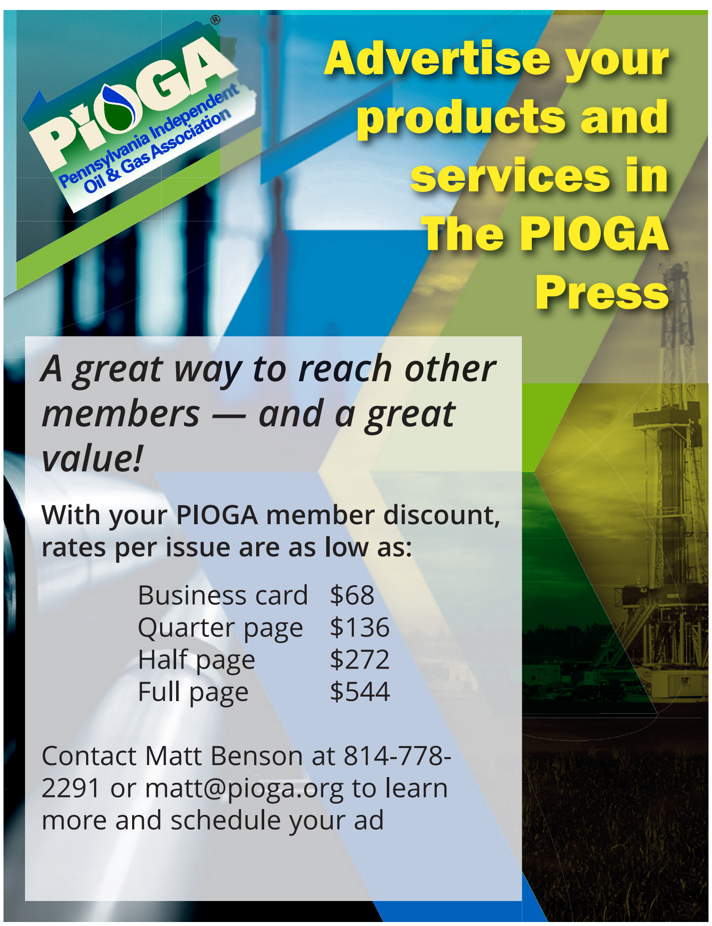
Divot Diggers Golf Outing
August 22, Tam O'Shanter Golf Course, Hermitage

Other association & industry events

IOGAWV Winter Meeting
January 22-23, Charleston, WV

IPAA Midyear Meeting
June 24-26, Colorado Springs, CO

Find more events at www.pioga.org



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