# Oil and Gas Investor

MARCH 2020

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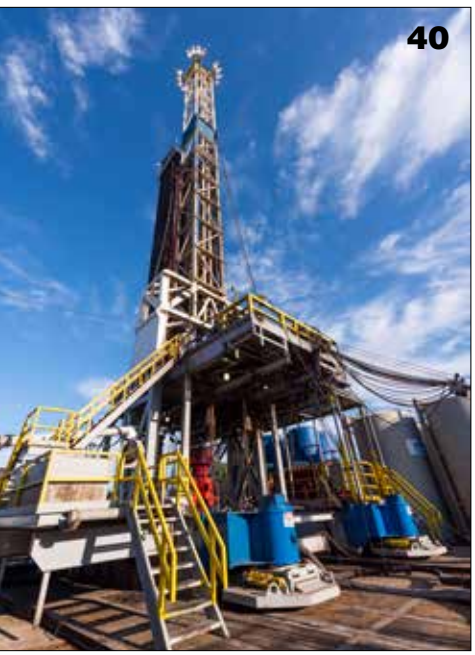
EVENTS | MEDIA | DATA | INSIGHTS

# Oil and Gas Investor

MARCH 2020/VOLUME 40/NUMBER 3





# BUILDING BLOCKS OF A STRONGER OIL & GAS INDUSTRY

| | | | | |
|---|---|---|---|---|
| UNDISCLOSED | $950 MILLION | $66 MILLION | UNDISCLOSED | $750 MILLION |
| AETHON | EARTHSTONE Energy Inc. | | ROSEWOOD RESOURCES | Matador |
| ASSET DIVESTITURE | HAS AGREED TO ACQUIRE SABALO | FOLLOW-ON OFFERING | JOINT VENTURE TRANSACTION | SENIOR UNSECURED NOTES |
| Financial Advisor | Fairness Opinion | Co-Manager | Financial Advisor | Co-Manager |
| $28 MILLION | $100 MILLION | UNDISCLOSED | UNDISCLOSED | $350 MILLION |
| VIKING MINERALS | LILIS ENERGY | PEARL ENERGY INVESTMENTS | HAYNESVILLE MINERALS PLATFORM | VIPER Energy Partners |
| ASSET DIVESTITURE | CONVERTIBLE PREFERRED STOCK | BUSINESS COMBINATION OF PORTFOLIO COMPANIES | PRIVATE PLACEMENT OF EQUITY | FOLLOW-ON OFFERING |
| Financial Advisor | Placement Agent | Valuation Analysis | Placement Agent | Co-Manager |
| $22 MILLION | UNDISCLOSED | UNDISCLOSED | UNDISCLOSED | UNDISCLOSED |
| Thunder Basin Resources | PETROFLOW ENERGY | BEELINE COLORADO, LLC | ELMRIDGE EXPLORATION | EAGLE FORD MINERALS PLATFORM |
| PRIVATE PLACEMENT OF EQUITY | ASSET DIVESTITURE | HAS DIVESTED ITS COLORADO MIDSTREAM ASSETS | HAS DIVESTED ITS COLORADO UPSTREAM ASSETS | PRIVATE PLACEMENT OF EQUITY |
| Placement Agent | Financial Advisor | Financial Advisor | Financial Advisor | Placement Agent |

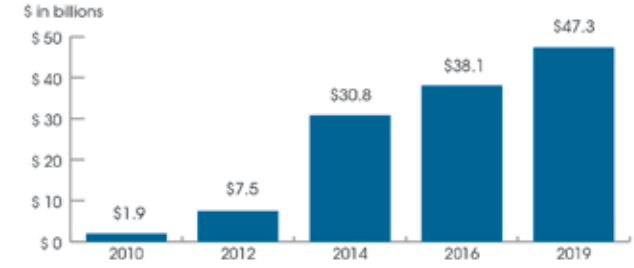
## ENERGY GROUP KEY STATISTICS

**$47.3 Billion**
Aggregate Transaction Volume since 2009

**$300 Million**
Average Transaction Size

**161**
Transactions Closed since 2009

## ENERGY GROUP AGGREGATE TRANSACTION VOLUME

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## COLUMNS



## DEPARTMENTS



ABOUT THE COVER: Appalachian operator Southwestern Energy Co. is one of a growing number of independent E&Ps that are committing to sustainable environmental, social and governance (ESG) efforts as more and more of the global investment community seek out such companies. Photo courtesy of Southwestern Energy Co.



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## LATEST CONTENT

### BP Deepens Emissions Targets As CEO Looney 'Reinvents' Oil Major
BP Plc plans deep cuts to its carbon emissions by 2050, setting one of the oil sector's most ambitious targets, as part of the biggest overhaul in the company's 111-year history by new CEO Bernard Looney.

### Permian Operator Lilis Energy Receives Second Debt Payment Extension
Lilis Energy Inc.'s bank lending group agreed to extend payments to cure its borrowing base deficiency—marking the second payment extension for the struggling Permian Basin operator so far this year.

### Distributions Improving For Midstream Companies
Alerian finds that the majority of publicly traded midstream companies are showing significant increases in distributions following a conversion period in the sector.

### Newly Formed E&P Receives Backing To Pursue Williston Basin Strategy
Pearl Energy Investments and Natural Gas Partners agreed to partner with Eagle Mountain Energy Partners to support the newly formed E&P's strategy focused primarily in the Williston Basin.

### Hess Boosts 2020 Spending On Guyana, Bakken Shale Ramp-Up
U.S. oil and gas producer Hess Corp. said it will spend 11% more in 2020 compared with last year, betting heavily on its assets in offshore Guyana and the Bakken shale play.

### Embracing New Technologies Crucial To The Industry's Progress
Digitalization, sustainability and strategic partnerships were at the epicenter of discussions at ADIPEC 2019.

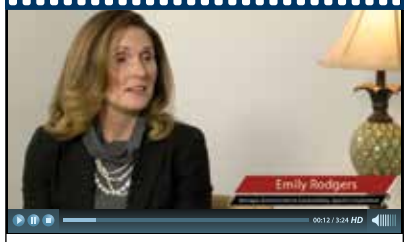
## ONLINE EXCLUSIVES

### Operators Address Casing Deformation, Talk Digital Technology
Redesigned well spacing and ultrasound technologies are helping to alleviate well integrity issues.

### Oil Industry Faces Rising ESG Pressures This Election Year
Permitting, flaring and an anti-fossil fuel movement challenge an industry that is already struggling to change public perceptions.

### Interview: Expanding Digital Transformation Into E&P Workplace
An executive from Houston-based software company Quorum discusses the key to success for any E&P company in the current macroeconomic climate.

## Videos




### Interview: Apache, ONE Future Advance Transition To Lower-Carbon Economy
Emily Rodgers, manager of environment and sustainability for Apache Corp., discusses the company's involvement in ONE Future.

www.HartEnergy.com/videos

## What's Trending

1. 2020 Outlook: Is The Permian Basin Losing Its Appeal?
2. ESG For Energy: Three Things Companies Should Be Doing (Part 1)
3. Veteran Dealmaker Steve Herod Named CEO Of Grizzly Energy
4. Indigo Natural Resources Executive Q&A: Cruising Altitude
5. Occidental Petroleum To Book $1.7 Billion Charges, Cuts 2020 Capex

CONFERENCE & EXHIBITION

# DUG PERMIAN BASIN

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## Monday, April 6

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**A&D Forum**
**1 PM - 4:30 PM**

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## Tuesday, April 7

### OPENING KEYNOTE: BIGGER OIL

**Jack Hightower**
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***HighPeak Energy Inc.***

### AFTERNOON KEYNOTE: THE BIG DSU

**Clay Gaspar**
President & Chief Operating Officer
***WPX Energy Inc.***

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# BREAK IT DOWN, BUILD IT BACK RIGHT

STEVE TOON, EDITOR-IN-CHIEF

A woman across from me at the gas pump asked, rather exuberantly, "Who do we have to thank for these low gas prices?" The price for the day was $1.88 a gallon. "Low oil prices," I said, "and the industry is hurting. People are losing jobs." I might have tamped down her enthusiasm a bit.

After essentially five years of an ongoing downturn, the oil and gas industry is desperately seeking solace. The bad news, in my opinion, is not yet. 2020 will be a year of continued trial by fire.

And that's not a bad thing.

The industry today is being squeezed through a painful transformation, one it didn't choose but is complicit in causing. In the early part of this New Year and new decade, oil and gas prices have swooned to below $50/bbl WTI and $2/Mcf, respectively. Demand for each has taken a hit with the coronavirus shutting down Chinese consumers and a warm winter crushing gas. But supply remains the ultimate reason for our conundrum. Simply, we continue to produce too much. Still.

I could wax eloquently on the myriad upsides American ingenuity has produced—the geopolitical shift away from Middle East dependence, stunningly low power generation costs—but in the present it really comes down to the money. Investors supplying the industry with capital aren't making any, and they're taking their cash and going to someone else's house until you show them how they can.

Which brings us to what must happen. What *is* happening. Think retro.

"The '90s are calling, and they want their metrics back," quipped Evercore managing director Marcel Hewamudalige, speaking at IPAA's Private Capital Conference. His point: Oil and gas companies must once again become real, sustainable businesses.

Before shale took off, the traditional conventional E&P model generated ample cash flow with reinvestment ratios that left room for shareholder payouts, he noted. Then shale hit—along with sustained outspends for more than a decade and a massive destruction of capital invested. For those that funded the inventory build, the payout never came.

"It's unbelievable that we went that long with that type of business. At this price level it just doesn't work. And the capital markets are changing their tune about how they want to participate in this next phase of the sector."

The market, he said, is demanding a return to traditional value creation principles. A new energy model built on the old.

"Ultimately, the metrics we're going to be talking about are not single-well economics or a hundred thousand years of Tier 1 inventory. It's going to be recycle ratios, ROCE [return on capital employed], sub-10% declines. All of that is going to translate to cash in your pocket, and that's where the industry needs to go."

Rethinking management compensation will be a critical factor as well. Historically, compensation rewards were tied to production growth, but that metric has actually been the worst correlation to shareholder return over the past five to 10 years, Hewamudalige said. Instead, reward managers by measuring returns-focused cash flow. "How much cash do you deliver to shareholders? That's how you're going to get paid."

Evercore estimates oil to reach $70 in the next 12 to 24 months, he said, and E&Ps that can achieve free cash flow and deliver money back to investors in the current environment "are going to be cash flow machines" when that happens. "Institutional investors are going to come back and invest in those guys."

Precious few are there now, and not every company will get there. "North America is full of companies on the E&P side that probably shouldn't be here anymore," he said. "There's too much debt in the system and those guys won't survive."

A "towering wall of debt maturities" looms over many E&Ps coming due this year and next, he noted. "This is going to be a huge part of this next year and a huge part of the asset supply" coming to market, said Hewamudalige. And this will be the turning point between industry demolition and reconstruction, he suggested.

"The industry needs to break it down and build it back up the right way. It's critical to get through this part of the cycle irrespective of how painful it is. It's a key part of what needs to happen."

Deflated commodity prices will undoubtedly and necessarily exacerbate the vetting. Many companies will undergo restructurings this year, and many will go away. Consolidation will continue in the midcap space. They "need to get together and get to that stage," he said.

It's been 20 years coming, but it's a natural and necessary part of the cycle. And like steel fired in a forge, the oil and gas industry will be stronger and purpose-built because of it. For now, endure. And adapt.

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*Skye Callantine*
*Chief Executive Officer*
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# ESG AND IRONIES

CHRIS SHEEHAN, CFA
SENIOR FINANCIAL ANALYST

As environmental, social and governance (ESG) issues have become such a widely discussed topic, it's hardly surprising that instances of irony arise as various sweeping proposals come under scrutiny.

Environmental activists are critical of the energy sector even though the industry is likely best suited to develop some of the large-scale solutions they say are urgently needed in the renewable field. Energy producers are scolded for extracting and refining crude oil, but, by one estimate, these activities make up 20% to 30% of $CO_2$ emissions versus some 70% to 80% emitted by energy consumers.

Yes, it is energy consumers—those who like their homes heated, their tanks topped up and their flights viable for vacations and work—that the energy industry is serving.

The *Times* recently reported that students occupying an Oxford college in protest were demanding the school's immediate divestment of integrated oil stocks held in an endowment fund. St. John's College, Oxford, bursar Andrew Parker told the students that this could not be done at short notice, "but I can arrange for the gas central heating in the college to be switched off with immediate effect."

Parker acceded to being provocative but hoped he was "provoking some clear thinking," he said. "It is all too easy to request others to do things that carry no personal cost to yourself. The question is whether you and others are prepared to make personal sacrifices to achieve the goals of environmental improvement (which I support as a goal)."

Others have talked the talk more than they've walked the walk. Engie Impact, a division of a French utility, has a business designed to help companies and governments convert climate pledges into reality. A study it conducted last year found that, of 1,200 companies that had set carbon reduction goals, less than one quarter were on track to meet their goals.

"It isn't a lack of willingness," said CEO Mathias Lelievre. "It's just super complex."

John Hess, CEO of Hess Corp., recently addressed a Houston meeting, saying "climate change is real." However, not only would breakthroughs in technology be needed, but the industry would also have to grapple with decarbonizing liquid fuels while making "the electric grid stable when it's dependent on intermittent renewable energy," he said.

Former CEO of BP Plc, Bob Dudley, warned against investing in new technologies prematurely, because "if you go too fast and you don't get it right, you can drive yourself out of business." Speaking on a podcast by Columbia Energy Exchange, he continued, "If we understand where we are going and invest, the best thing we can do strategically is have a strong balance sheet."

Hosting the podcast with Dudley was Jason Bordoff, founding director of the Center on Global Energy Policy at Columbia University. Earlier, Bordoff attended the World Economic Forum at Davos, which he said on his way home "seemed at times more like a climate change conference.

"Oil and gas companies face growing pressure to shift more of their capital budgets more quickly toward low-carbon energy sources, and yet risk being penalized in their share prices if they move too quickly in that direction, because they can't earn the same returns and because oil and gas demand remains robust," observed Bordoff in his notes from Davos.

The industry needs to invest in technologies "that can deliver carbon-free energy at scale," he said. This involves far more than just generating electricity from renewable or other sources, which make up only about 20% of final energy consumption. "Hard-to-abate sectors like industry, heating, shipping, aviation and trucking will require solutions that are not visible or at least cost competitive today."

Assuming functional solutions—carbon capture, carbon removal, hydrogen and others—it is the large oil and gas companies that "have the engineering, financial and project management capabilities to develop and scale such technologies," according to Bardoff. "Yet the climate activists calling for rapid action in Davos have no trust in the industry, no faith it won't stymie progress," he added.

"Given the range of technologies and scale of investment needed to accelerate a clean energy transition, rebuilding some measure of common ground and trust between the climate community and oil and gas community is an important, and daunting, challenge," said Bordoff.

Clearly, social and governance issues are far wider than the environmental aspects addressed here. But one has to wonder how wide a range of goals is realistic for producers already striving to be self-funding, dividend-paying, balance sheet-improving vehicles. And now ESG is the next indispensable objective.

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FIRST HORIZON

# CASH INCINERATOR

DARREN BARBEE, SENIOR EDITOR

Just a couple of months into the year, M&A already looks to be in for a rough 2016. You remember 2016.

Erratic, unpredictable commodity prices have upended what should have been a lackluster year and potentially tipped it into the 2014 version of "Hey, is OPEC doing anything after Thanksgiving?"

Deloitte's upbeat spin on 2020 M&A: "More of the same, but a little bit different," according to its Feb. 11 report.

Maybe not even that.

The firm said that the giant headline mergers of 2018 and 2019—looking at you, Occidental Petroleum Corp.—could contribute to divestitures. More consolidation, along the lines of Callon Petroleum Co. buying Carrizo Oil & Gas Inc. and Parsley Energy Inc. purchasing Jagged Peak Energy, seemed possible.

Alas, the world slightly lost its mind shortly thereafter.

As Hess Corp. CEO John Hess said at the Argus Americas Crude Summit in February, the world is "awash in oil right now," and the Wuhan coronavirus is a "major headwind." (If you are asking, "What's a coronavirus?" return immediately to your bunker.)

The coronavirus will either be a wildly overblown threat to oil and gas prices or a sign of the end times, according to analysts. Granted, China on its own hasn't been a real market for U.S. crude since the tariff tantrums began. In 2019, annual U.S. oil exports to China fell by 64%. However, oil exports to South Korea, Taiwan, India and other Asia and Oceania nations have cumulatively increased by 472,000 barrels per day (bbl/d) in the first half of 2019, according to the U.S. Energy Information Administration.

The coronavirus is already playing havoc with that, even after accounting for the initial patella-dislocating knee-jerk by the market. China's Wuhan Province is linked to the supply chain of hundreds of major manufacturers, including carmakers, Bloomberg reported. On Feb. 8, OPEC recommended an extension of its current production quotas through the end of 2020 and mulled a further cut of 600,000 bbl/d.

Such a reduction by OPEC would be "nothing like enough, but about as much as they can credibly cobble together after a fractious December meeting," Paul Sankey, managing director at Mizuho Securities USA LLC, said in a Feb. 10 commentary.

Andrew Fletcher, senior vice president of commodity derivatives for KeyBank National Association, seemingly cried uncle the same day. He observed that crude and natural gas prices were taking it on the chin.

"The coronavirus needs to burn out," Fletcher said. "OPEC-plus need to be on the same page. That is the answer for crude. Natural gas is about weather, which is absent. If these low prices persist, producers will have to shut in gas or worse."

So, no, not a good start to the year. Need more proof? It's the Environmental Protection Agency's 50th birthday.

It doesn't take a yarn winder to measure the upshot of price turmoil. As Opportune LLP's Amy Stutzman and Lynn Loden wrote in February, companies such as Chevron Corp., Royal Dutch Shell Plc and Range Resources Corp. have announced likely impairments in their next earnings reports. However, it's guaranteed that even after writing down their assets, they'll still remember what they paid for them. And so the bid-ask dance continues.

"Similarly, privately held companies are facing the same issue in preparing financial statements to comply with debt covenants and investor reporting requirements," they wrote, adding that oil futures through 2023 indicate further price declines are likely.

"Due to these price declines, some oil and gas reserves are no longer economically viable," they said.

Translation: Whatever low-ball offer an E&P was grudgingly considering just got lower.

Worth noting: Oil prices were already starting 2020 in the hole. Brent and WTI prices were both down $7/bbl compared to 2018.

But leave it to Hess to brighten up the world. Apparently catching the world by surprise, Hess told a Houston audience that shale resources aren't infinite after all. Eagle Ford production appears close to a plateau, while the Bakken will hit peak production within the next two years before tapering off. The Permian Basin, he said, would "plateau in mid-decade and is already facing well interference issues," he said.

Shale is being recalibrated, Hess argued, to win back the "hearts and minds of investors" by moving from "drill baby drill" to "show me the money."

Or, to borrow another famous quote, "I'm the king of the world! … Glug, glug, glug."

# EVENTS CALENDAR

*The following events present investment and networking opportunities for industry executives and financiers.*

| EVENT | DATE | CITY | VENUE | CONTACT |
|---|---|---|---|---|
| **2020** | | | | |
| **Energy Capital Conference** | **Mar. 2** | **Dallas** | **Fairmont Hotel** | **energycapitalconference.com** |
| **Women In Energy Luncheon** | **Mar. 4** | **Houston** | **Hilton Americas-Houston** | **womeninenergylunch.com** |
| LOGA Annual Meeting | Mar. 4-6 | Lake Charles, La. | Golden Nugget Hotel & Casino | loga.la |
| OOGA Annual Meeting | Mar. 4-6 | Columbus, Ohio | Hilton Columbus at Easton | ooga.org |
| CERAWeek by IHS Markit | Mar. 9-13 | Houston | Hilton Americas-Houston | ceraweek.com |
| TIPRO Annual Convention | Mar. 23-24 | Dallas | Hilton Anatole | tipro.org |
| PIOGA Spring Meeting | April 1 | Pittsburgh | Rivers Casino | pioga.org |
| **DUG Permian** | **April 6-8** | **Fort Worth, Texas** | **Fort Worth Convention Center** | **dugpermian.com** |
| OGIS New York | April 20-22 | New York | Sheraton New York Times Square | ipaa.org |
| Mineral & Royalty Conference | April 27-28 | Houston | Post Oak Hotel | mineralconference.com |
| Texas Energy Alliance Annual Meeting | April 28-29 | Wichita Falls, Texas | MPEC Convention Center | texasalliance.org |
| Offshore Technology Conference | May 4-7 | Houston | NRG Park | 2020.otcnet.org |
| **DUG Haynesville** | **May 19-20** | **Shreveport, La.** | **Shreveport Convention Center** | **dughaynesville.com** |
| Louisiana Energy Conference | May 26-29 | New Orleans | The Ritz-Carlton | louisianaenergyconference.com |
| **Midstream Texas** | **June 2-3** | **Midland, Texas** | **Midland County Horseshoe Pavilion** | **midstreamtexas.com** |
| CIPA Annual Meeting | June 4-7 | Santa Barbara, Calif. | TBA | cipa.org |
| Petroleum Alliance of Okla. Annual Meeting | June 4-7 | Las Colinas, Texas | Four Seasons | thepetroleumalliance.com |
| AAPG Annual Conv. & Exhibition | June 7-10 | Houston | George R. Brown Conv. Center | ace.aapg.org/2020 |
| **DUG East/Marcellus-Utica Midstream** | **June 16-18** | **Pittsburgh** | **David L. Lawrence Conv. Center** | **dugeast.com** |
| IPAA Midyear Meeting | June 29 | Newport Beach, Calif. | Pelican Hill | ipaa.org |
| Unconventional Resources Tech. Con. | July 20-22 | Austin, Texas | TBA | urtec.org/2020 |
| Summer NAPE | Aug. 12-13 | Houston | George R. Brown Conv. Center | napeexpo.com |
| EnerCom The Oil & Gas Conference | Aug. 16-19 | Denver | Westin Denver Downtown | theoilandgasconference.com |
| **DUG Eagle Ford** | **Sept. 9-11** | **San Antonio** | **Henry B. Gonzalez Conv. Center** | **dugeagleford.com** |
| **DUG Midcontinent** | **Sept. 22-24** | **Oklahoma City** | **Cox Convention Center** | **dugmidcontinent.com** |
| **Monthly** | | | | |
| ADAM-Dallas/Fort Worth | First Thursday | Dallas | Dallas Petroleum Club | adamenergyforum.org |
| ADAM-Greater East Texas | First Wed., even mos. | Tyler, Texas | Willow Brook Country Club | getadam.org |
| ADAM-Houston | Third Friday | Houston | Brennan's | adamhouston.org |
| ADAM-OKC | Bi-monthly (Feb.-Oct.) | Oklahoma City | Park House | adamokc.com |
| ADAM-Permian | Bi-monthly | Midland, Texas | Midland Petroleum Club | adampermian.org |
| ADAM-Tulsa Energy Network | Bi-monthly | Tulsa, Okla. | The Tavern On Brady | adamtulsa.com |
| ADAM-Rockies | Second Thurs./Quarterly | Denver | University Club | adamrockies.org |
| Austin Oil & Gas Group | Varies | Austin | Headliners Club | coleson.bruce@shearman.com |
| Houston Association of Professional Landmen | Bi-monthly | Houston | Houston Petroleum Club | hapl.org |
| Houston Energy Finance Group | Third Wednesday | Houston | Houston Center Club | sblackhefg@gmail.com |
| Houston Producers' Forum | Third Tuesday | Houston | Houston Petroleum Club | houstonproducersforum.org |
| IPAA-Tipro Speaker Series | Second Wednesday | Houston | Houston Petroleum Club | tipro.org |

*Email details of your event to Brandy Fidler, bfidler@hartenergy.com.*
*For more, see the calendar of all industry financial, business-building and networking events at HartEnergy.com.*

# AFTER 100 YEARS, THE PERMIAN BASIN IS CHANGING TEXAS AGAIN

This year marks the 100th anniversary of oil production in the "the Basin," and the region promises to sustain big production numbers for many years to come. Forecasts vary, yet some say its production could grow another 50% by 2025 and others say it will double.

Disagreement over growth rates cannot mask the consensus. Virtually everyone agrees it will get bigger. Pipeline operators are adding takeaway capacity as fast as they can, but new pipes fill as quickly as they come online.

The noted analysts at Enverus wrote, "This basin will lead all other U.S. areas in production growth in short, mid- and long term." Spindletop may be the famous crude oil gusher for which Beaumont remains proud, but the Permian long ago dwarfed East Texas' output—and that was before drilling and production operations extended into the Delaware Basin and crossed the border into New Mexico.

Hart Energy just published a special book to mark the 100th anniversary. Its title tells the story—*"The Permian Basin: The Play That's Changing Everything."* That's not hyperbole. With daily oil production climbing, the Permian is now the largest oil-producing field in the world. West Texas producers helped the U.S. deliver an effective counterpunch to OPEC and become the world's de facto swing producer. Now Exxon Mobil Corp. and Chevron Corp. by themselves are racing to be the first major company to reach 1 MMbbl/d of production from this prolific province.

***The DUG* Permian Basin *Conference & Exhibition brings over 2,300 influential industry professionals together for knowledge-sharing and networking.***

## 2019 Event Metrics

- 2,385 Attendees
- 90+ Speakers
- 28 Sponsors
- 173 Exhibitors

**What's happening there today?**

The best way to get a boots-on-the-ground update for West Texas' resource development activity is to register and attend the 2020 **DUG *Permian Basin* Conference & Exhibition** coming **April 6-8** at the **Fort Worth Convention Center**. (This annual event takes place in Fort Worth because there isn't a large enough venue or sufficient hotel capacity to hold it in Odessa or Midland.)

Since the Basin employs over half of the U.S. drilling fleet, it is the bellwether for what lies ahead for upstream activity and capital investment. Last year nearly 2,400 industry professionals registered for the **DUG *Permian Basin*** conference.

Professionals attend to hear leading producers reveal what's working and what's next for their operations. This year, the conference's opening keynote address will come from a **48-year industry veteran—Jack Hightower**, president and CEO of **HighPeak Energy Inc.**—and the afternoon keynote will come from **Clay Gaspar**, president and chief operating officer of **WPX Energy Inc.**

As this piece goes to press, **Scott Josey**, chairman and CEO of **Sequitur Energy Resources**, also has been confirmed to speak—and more than a dozen other producers are

***Over 2,000 oil and gas executives, engineers and technicians will make connections on the exhibit floor at the opening reception and throughout the event.***

checking their schedules to determine whether they can participate as well. A healthy mix of both public and privately held companies is a hallmark of Hart Energy's programs.

Technology panels are in high demand, too, as operators seek added efficiency and new solutions to reach a common goal: living within free cash flow. **David Reid**, chief marketing officer for **NOV**, will join one panel. **Hayley Stephenson**, lead reservoir analytics engineer at **Baker Hughes'** Energy Innovation Center, will speak—and **Schlumberger** will participate as well. For current details on the agenda, please visit the conference website.

**What's new at this year's event?**

There are **two pre-conference forums** (separate registration required) that offer topical deep dives into logistics and asset transactions, respectively.

In response to attendee requests, the **Permian Water & Sand Forum** combines two popular sessions from the 2019 event into a single program. Its speakers include representatives from **H2O Midstream** and **UL Water Midstream**; **Covia**; **CIG Logistics**; **Hydrozonix**; and **Oilfield Water Logistics**.

The concurrent **A&D Forum** offers a nationwide perspective, so it isn't limited to Permian deal-making, but the Basin's overall dominance in today's market ensures it will be covered thoroughly. Executive speakers from **SunTrust Robinson Humphrey**; **EnergyNet**; **EnCap Investments**; **Glendale Energy Capital**; **RBC Capital Markets**; **Carrizo Oil & Gas**; **EnCore Permian**; and **Admiral Permian Resources** have already been confirmed.

***DUG* Permian Basin *affords plenty of time for face-to-face meetings with peers, colleagues and prospects on the exhibit floor and during numerous networking opportunities.***

For current information on the agendas for either the Permian Water & Sand Forum or the A&D Forum, please visit the website. Registration for all three events—the Forums and the main **DUG *Permian Basin* Conference & Exhibition**—is open now at **www.dugpermianbasin.com**. □

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# NewsWell

## Pace of new oil projects set to slow; higher oil prices coming

The growth of crude oil supply in 2020 and 2021, in terms of new projects coming online around the world, is slowing down; therefore, the outlook for crude oil pricing is looking very bullish in the near term, says one investment bank.

"A key reason for that is the sharp slowdown in long-lead-time oil project startups," said Raymond James analysts in a recent note.

In a new bottoms-up analysis, the firm compiled a list of 200 oil development projects that started up from 2015 through 2019 and compared those data to preproduction projects that, according to their operators, are expected to come online in 2020 and thereafter.

"The pace of project startups is slowing, and in fact slowing meaningfully. The dearth of new startups adds to our view that non-OPEC, ex-U.S. supply is likely to flatten out, or even decline, over the medium term. Combined with the productivity slowdown in U.S. shale, this points to the need for sustainably higher oil prices to stimulate drilling."

Raymond James found that in 2020 and 2021, "much less" production will be starting up than in any of the past five years. "The amount of capacity that started up during 2015-2019 was 9.8 million barrels per day (MMbbl/d) or 2 MMbbl/year. By contrast, what is scheduled to start up over the next two years *combined* is only 1.6 MMbbl/d."

The most significant project startups in recent years are offshore. These include the first phase of the Equinor-operated Johan Sverdrup project offshore Norway at 440,000 bbl/d—the world's largest oilfield startup of the past decade. It began producing in October 2019, but it will ramp up to full supply this year.

Offshore Guyana, the Liza Phase 1 project, at 120,000 bbl/d, began producing in December 2019, led by an Exxon Mobil Corp. consortium that also includes Hess Corp. Next on tap, the larger Liza Phase 2 is scheduled to come online in 2022 at the rate of 220,000 bbl/d. "The consortium plans to develop at least five FPSOs, totaling 750,000 bbl/d, by the middle of this decade," Raymond James said.

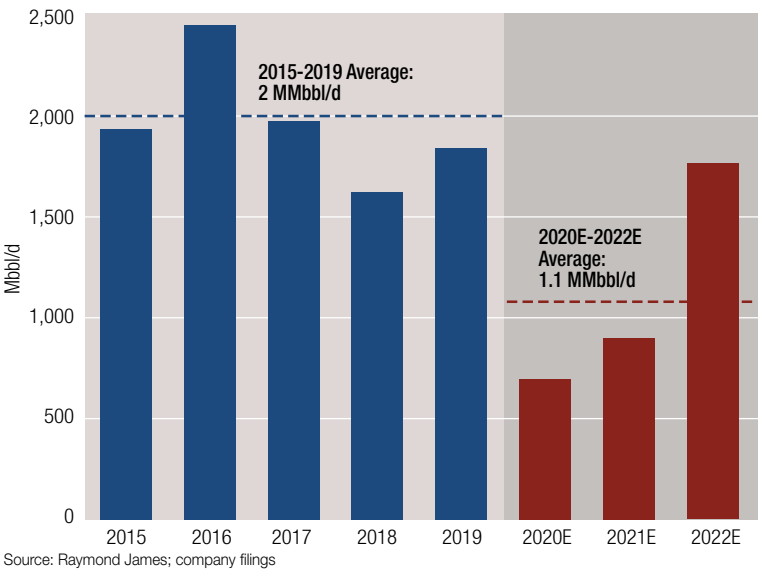
"Looking ahead to 2022, a pick-up is likely, but the 2020-2022 average still comes out to 1.1 MMbbl/d per year, just over half the level of 2015-2019. To be clear, this estimate of startups represents a best-case scenario, based on the assumption that all construction will move forward in line with operators' plans."

The world's largest project startups over the next three years will be in Saudi Arabia and Kazakhstan. Saudi Aramco's Marjan expansion of 300,000 bbl/d is due to come online in 2022. In Kazakhstan, Chevron Corp.'s massive Tengiz Field will be expanded by 260,000 bbl/d, also in 2022. However, Raymond James pointed out that projects of such a large size usually end up facing delays.

For this reason, the firm did not project beyond 2022. Many large projects have been indicated, but they have not reached final investment decision, it said.

*—Leslie Haines*

**Sanctioned Long Lead Time Oil Project Startups**




Source: Raymond James; company filings

## Bernstein: What sets the gas price floor?

Sliding natural gas prices may start heading back up soon if the expected bounce off the bottom due to lower drilling activity and an accompanying production dip in the coming months comes to fruition.

Henry Hub pricing for natural gas had averaged around $2.25 per thousand cubic feet (Mcf) during the last half of 2019; however, prices have now slumped below $2, beginning the month of February 2020 at around $1.80.

Gas spiked to a 2019 high of over $4 last March. Investment group Bernstein sees pressures from the lower prices potentially driving down the gas rig count and expects producers would let production fall, which could add support to boost gas prices during the second half of the year.

"The near-term floor is probably in the high ones, higher than vertical cash cost and not driving day-to-day shut-ins," said Bernstein analyst Jean Ann Salisbury in a published report. "Over the next few months, it should lead to rig rebalancing though and a $2.25 longer-term structural floor."

The price hit is being felt most in gas-prone plays across the Lower 48, such as the Marcellus. The Bernstein note says that its predicted $2.25 floor would fall short of what Marcellus-Utica players would require to earn full-cycle returns.

**Henry Hub Gas Price Slide** (Gas price slid to sub-$2 in January)


Source: Bloomberg; Bernstein analysis

There is also the natural time lag to consider when predicting a floor. It can take up to six months for a rig to generate first month production, according to Bernstein, which sees more rigs will be dropping off in the Marcellus-Utica over the next few weeks. The resulting lower gas supply will work its way into the system during the second half of 2020.

Rigs have already been dropped in Appalachia. The plunge off the price spike last March resulted in the region's rig count being reduced by 40%. This impact on gas production should also be felt around mid-year.

Shorter term, over the next three months, Bernstein sees the floor drifting lower being set by the persistent presence of nonhorizontal stripper wells.

The half-million active U.S. nonhorizontal wells drive about 30 Bcf/d of production. Average production from one of these wells, according to the investment group, is 8 barrels per day (bbl/d) of oil and 60 Mcf/d of gas.

With an estimated cash cost of $2,000 to $3,000 per month, as little production as 3 bbl/d of oil could cover the tab without any gas revenue. Shut-ins are not likely to occur with these wells due in part to the cost of the process as well as the potential loss of future production if the wells failed to come back online.

*—Blake Wright*

## KeyBanc: Volatility To Drive Oil, Gas Prices In 2020

The current energy investing environment is "the worst we've seen in multiple decades," according to KeyBanc Capital Markets analyst Leo Mariani, characterizing investor interest in oil and gas company equities. Multiples of many E&P companies are below even where they were in the late 1990s—prior to the shale era—when they had an exploration model with a much higher risk than it is today, he said.

Mariani provided an industry outlook at a breakfast hosted by KeyBanc at NAPE in February.

One headwind energy investors face is the constant narrative that oil demand growth is going to zero, he said. "We're going negative at some point in the future, but I continue to strongly believe that is overblown." Oil demand growth decline "is a multidecade process and not something that happens abruptly in this new decade."

Keybanc forecasts oil to average $58/bbl WTI over the course of 2020, though it might be a rocky road getting there, he said, not unlike 2019. Last year, oil averaged $57, but with a nearly $20/bbl price swing, "there was tremendous volatility. I wouldn't be surprised to see something like that play out again this year."

Certainly, that scenario is already in play, as prices entering the year topped $60/bbl, and in a matter of weeks flopped to just below $50, pressured by demand fears related to the coronavirus outbreak in China.

Mariani said the Chinese pandemic was a wrench thrown into the equation. "Coronavirus is driving the bus right now. The world market was in a process of healing itself prior to the outbreak of coronavirus," he said. "We started to see greenshoots and improvement on the demand side."

But the epidemic wasn't as impactful as many anticipated, he said. "I expect as the coronavirus blows over we will get a significant snap-back in demand. I'd not be surprised if we get back in the low $60s by the middle of the year."

Oil price volatility through the year is more likely to come from geopolitical tensions in the Middle East, which are "as high as they've ever been since the Gulf War in the early '90s. There are tons of barrels that are offline or at risk of potentially going offline."

Mariani believes OPEC will play its part via production cuts to keep Brent crude prices in the $65 to $70 range to support member country budgets, but non-OPEC supply remains a wildcard. New projects in Canada, Guyana, Brazil and Norway could accelerate growth from a brief slowing in 2019, from 1.3 million barrels of oil equivalent per day (MMboe/d) to 1.45 MMboe/d.

U.S. producers are not helping to slow growth, at least not yet, particularly in regards to Permian Basin production. Looking at large producers such as majors Exxon Mobil and Chevron Corp., and large independents EOG Resources Inc., Concho Resources Inc. and Pioneer Natural Resources Co., "we're not seeing a sea change in the rate of growth and what they're forecasting," he said. "I think you're seeing more of a soft landing in terms of U.S. oil production growth. I expect it to decline in 2020 but not at a draconian level."

The optics for oil production growth improve in the back half of the year, he predicted, and he believes global oil growth will fall below 1 MMboe/d. This "should lead to a healing in the oil markets," he said.

Natural gas faces a tougher path to healing, however. "Unfortunately, it's been a train wreck the past couple of years," he said, resulting from "unbelievably high" production growth of 11% in 2018 and 9% in 2019. "When you couple that with a warm winter, that has absolutely crushed the market—and I don't think we're going to see a material recovery this year."

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**U.S. Oil Production Growth By Region**

| | Average Annual Rates (Mboe/d) | | | | | | Annual Changes | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | | 2018 | 2019 | 2020 | 2021 |
| **Permian Basin** | 2,441 | 3,455 | 4,381 | 5,135 | 5,738 | **Permian Basin** | 1,014 | 926 | 754 | 603 |
| **N. Dakota Basin** | 1,070 | 1,264 | 1,410 | 1,533 | 1,589 | **N. Dakota Basin** | 194 | 145 | 123 | 56 |
| **Eagle Ford** | 1,138 | 1,237 | 1,236 | 1,242 | 1,248 | **Eagle Ford** | 99 | (1) | 5 | 6 |
| **Oklahoma** | 449 | 550 | 582 | 583 | 549 | **Oklahoma** | 101 | 32 | 1 | (34) |
| **Colorado** | 364 | 487 | 516 | 592 | 630 | **Colorado** | 123 | 28 | 76 | 38 |
| **Wyoming** | 207 | 241 | 278 | 307 | 334 | **Wyoming** | 34 | 37 | 29 | 28 |
| **Gulf of Mexico** | 1,680 | 1,758 | 1,885 | 1,972 | 2,002 | **Gulf of Mexico** | 78 | 128 | 86 | 30 |
| **Alaska** | 495 | 479 | 466 | 455 | 442 | **Alaska** | (16) | (13) | (10) | (13) |
| **California** | 475 | 463 | 441 | 412 | 389 | **California** | (12) | (22) | (30) | (23) |
| **Other U.S.** | 1,032 | 1,058 | 1,042 | 1,035 | 1,000 | **Other U.S.** | 25 | (16) | (6) | (35) |
| **Total** | 9,351 | 10,992 | 12,237 | 13,266 | 13,921 | **Total** | 1,640 | 1,244 | 1,028 | 656 |

Source: KeyBanc Capital Markets; Thomas Reuters

KeyBanc projects natural gas prices to average $2.15/Mcf across the year, undercut by continued oversupply in the U.S. "for the next year or so."

Mariani did offer that he sees an upside. "We're at a price where a lot of these existing wells, particularly in mature basins like the Rockies and Midcon, they are simply not economic to produce. However you want to paint it, those prices don't work for producers, so I think we will see shut-ins during the course of the year and next, which can certainly help balance things out a bit as we get into the second half."

He also points to solid demand growth, which might slow "a bit" in the near term, but "it's not going to go negative." Eventually, he said, supply and demand "should work, and we should see prices go higher in a couple of years."

A silver lining resulting from the painful downturn: Low prices have forced a spending austerity by producers, resulting in balance sheets a lot healthier than in the past. This "has put a lot of

these companies in much better shape to withstand lower commodity prices."

*—Steve Toon*

### Hess' balancing acts: offshore and shale

In the energy world where profitability is king, North American shale is oftentimes pitted against offshore developments, with each having its positives and negatives. However, chasing the rock that delivers returns is the route companies like Hess Corp. and Royal Dutch Shell Plc are taking, with portfolios that include both as cash and growth engines.

"What people don't realize is shale is 8% of world oil supply. It's going to grow to about 12% mid-decade and then it plateaus," Hess Corp. CEO John Hess said at the recent Argus Americas Crude Summit. "Our strategy has always been to invest in returns, go to where we can be low cost to supply. It's really about the best rocks or the best returns, so there's still good opportunities in the offshore."

Some offshore players moved onshore when the U.S. shale revolution picked up pace, lured by quicker and cheaper drilling along with technological advances that lifted the U.S. to the world's top crude producer. But deepwater developments, once notorious for large cost overruns, have become more cost-efficient as players continue to cut down time from discovery to first oil while utilizing existing infrastructure.

Hess opted to remain both offshore and onshore. "We thought that shale-only strategy was not sustainable," he said.

Despite operating onshore and offshore, energy companies—including oilfield service companies—in general have faced pressure to improve free cash flow, reduce debt and cut budgets while being mindful of environmental, social and governance issues that could impact their financial coffers.

Oil and gas executives speaking at the conference agreed that having shale and offshore assets in portfolios are necessary to meet short-term and long-term needs. Breakevens and costs appear to be falling for both.

Matthew Fitzsimmons, vice president of Rystad Energy's oilfield service team, pointed out that breakeven prices have fallen since 2013 to 2014 compared to 2017 to 2018. Shale breakevens dropped nearly 50% with a roughly one-year payback time for wells compared to six-plus years for their offshore counterpart, he said. About half of that, he added, was due to service price declines.

Efficiency, however, is also leading to "more tangible cost savings" including by use of zipper fracturing, which Fitzsimmons said is utilized by about 50% of the U.S. shale marketplace. "It helps to redirect the fluid flow as the well is completing from one well to another without actually having to disconnect."

# ON THE FRONTLINES OF ADVANCING ESG INITIATIVES

Marathon Oil is a leading independent E&P company committed to furthering the environmental, social and governance (ESG) progress of our business and the sustainability of the communities where we live and work.

Marathon Oil is proud to play a role in maintaining U.S. energy security and fueling the world in which we live. Being a safe, responsible and ethical operator, and being mindful of our neighbors and communities, is critical to our ability to run efficiently and forms the basis of our license to operate.

We know that our stakeholders are particularly attuned to environmental, social and governance issues, often referred to as "ESG." Because of this, we've prioritized and improved how we communicate our sustainability work through our annual sustainability report which highlights our efforts to achieve environmentally responsible operations.

We expect that oil and gas development will remain crucial to the world economy for the foreseeable future as well as being part of a cleaner, stronger, all-of-the-above energy agenda. We're constantly evaluating our business model, new technologies and industry innovations to ensure we're taking steps to sustainably deliver energy that consumers need.

At the same time, we recognize the concerns about the impact of greenhouse gas (GHG) emissions and other air emissions on global climate and air quality. As part of Marathon Oil's long-standing commitment to sustainability and managing climate-related risks, we work to quantify and mitigate our GHG emissions, use well-established business processes to evaluate climate change risk in our investment decisions, and engage with external stakeholders to understand their perspectives.

Activities like adding saltwater disposal and additional pipeline for produced water to reduce truck hauling and subsequent emissions, as well as doing a trial of water reuse for fracturing jobs are examples of how we're reducing our operational impact on the environment while saving costs and increasing efficiency. In addition, we are a founding member of The Environmental Partnership, a voluntary industry effort focused on technologies and best practices to lower air emissions.

Our stakeholders – from investors and employees to regulatory agencies – want assurances that Marathon Oil will be profitable, safeguard our workforce, work to reduce our operational impacts on the environment, and contribute to the communities where we live and work. And we are dedicated to meeting and exceeding these expectations as a responsible, responsive and successful E&P business. By living our values to collaborate, take ownership, be bold and deliver results, we believe we're securing our future with strong operational, financial and nonfinancial performance through a business strategy guided by sustainability. □

The pricing power of suppliers in the well services market is also a factor, according to Fitzsimmons.

"North American shale is significantly more saturated [compared to offshore], and so for proprietary technologies it's hard to charge a premium for those services," he said, noting Schlumberger Ltd., for example, used a different business model, licensing its technology to remove itself from the pricing game.

Looking offshore, he pointed out how the sector has shifted from newbuild projects, or greenfields, and exploration activity making up 48% of its overall offshore portfolio about 20 years ago to about 28%. Most of offshore spending today and over the next few years is on legacy assets. Offshore players are pursuing more phased developments to reduce risks.

Shale players face another challenge: steep declines.

"It's tight rock," Hess said. "When you drill a shale well in the first year, it declines 70%; the second year, it declines 35%, and the next year, it declines 15%, and then it goes on a plateau."

That's problematic for a powerhouse on the global oil market, considering shale is a capital-intensive business that requires cash to flow back into the business to grow production and ultimately grow overall free cash flow. Yet, investment wanes, following a period that saw investors infuse dollars into shale.

"The [shale] business is recalibrating itself to a more sustainable rate where you can grow but also generate free cash. That keeps investors happy. But it also keeps shale producers disciplined," Hess added. "But there's a limit to that growth. You're starting to see the Eagle Ford mature to where it's plateauing. The Bakken in the next two years, I think, will plateau, and then the Permian probably by mid-decade will plateau as well."

Hess has grown its Bakken production by about 20% per year. The company aims to produce about 180,000 barrels per day (bbl/d) in the Bakken this year and to 200,000 bbl/d in 2021, staying flat for the next year years, a level Hess sees as optimal for net present value and return to shareholders.

Cash flow from Hess' Bakken assets will go toward longer-term developments such as offshore Guyana, where the company is a partner in the Exxon Mobil Corp.-led consortium. It has made 16 discoveries—more than 8 billion barrels of oil equivalent of estimated recoverable resources—on the Stabroek Block.

*—Velda Addison*

## Opportune: Energy companies must tackle ESG issues

Energy companies of all sizes and types, from oil and gas producers to those focused on renewables, should take steps now to develop plans and implement initiatives in ESG (environmental, social and governance) issues, according to consulting firm Opportune LLP. Eventually they will be asked by government regulators to do so—and probably required to do so.

Focusing on the "E" in ESG, Opportune said that contrary to public perception, the energy industry will continue to safely integrate renewable energies into the existing energy infrastructure that connects production to utilities. These companies have the expertise and technologies to safely add wind and solar power to the grid while also reducing their emissions from traditional oil and gas production.

"Many larger, public energy companies are at the forefront and are already underway with ESG strategies, implementation plans and initiatives," said Tony Jones, Opportune's director of process and technology in Houston. New and existing energy companies will be building and expanding bioethanol plants and cogeneration facilities to meet increasing demand for renewable energy, he said.

More capital will be needed in the future, and it seems clear that investors will increasingly want to allocate capital to energy companies that incorporate ESG into their businesses. "Along with regulatory requirements, market-driven forces will also continue to increase as ESG investment strategies will allocate more and more capital for companies committed to sustainable practices," he said. "Smaller public and private companies will need to follow suit."

Jones outlined three broad strategies companies should take. First, they should develop, publish and execute an ESG strategy that covers sustainability programs geared for renewal, recovery and removal (what Jones calls 3R) along the value chain:

- Renewal means to outline a transition toward sourcing more renewable energy.
- Recovery means to address improvements in energy efficiency.
- Removal means to control and reduce greenhouse-gas emissions.

Second, companies should set up organizational business line(s) for sustainability and renewables or operational and nonoperational:

- Sustainability lines should manage nonoperational 3R programs.
- Renewable lines should own the operational value chain and implement 3R plans also.

Third, companies need to govern their sustainability and renewable programs for reporting and audit:

- Assess, measure, track, report and repeat.
- Prepare for board reviews, internal audits and eventual external ESG audits.

Jones said that companies will be able to handle the expansion and integration of renewable energy value chains into their existing operations. But, they are less prepared in the nonoperational space, such as with their IT teams, and therefore, they will need to improve their front-, mid- and back-office functions now, before adding to their existing landscape.

*—Leslie Haines*

## 2020 outlook: Is the Permian Basin losing its appeal?

The booming Permian Basin has been the largest source of production growth in the U.S., with a pace that pushed domestic production past 13 million barrels per day of oil in 2019. However, some oil and gas executives are saying they're reluctant to invest in the basin in the New Year,

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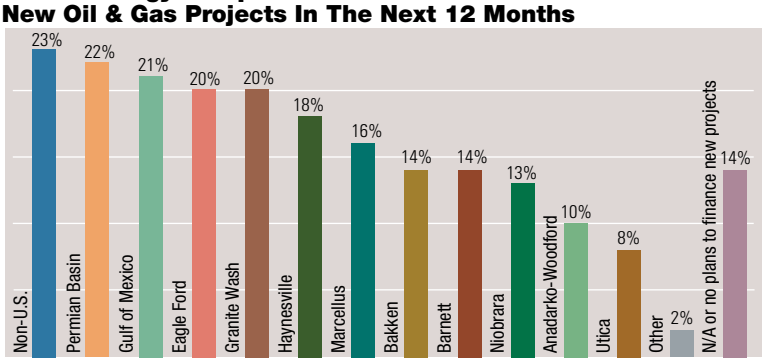
**Where Energy Companies Plan to Finance New Oil & Gas Projects In The Next 12 Months**




Source: BDO

according to a recent study by BDO's energy practice.

In a CFO outlook survey, BDO said 86% of CFOs of oil and gas companies plan to finance new projects in 2020 and, even though the Permian Basin remains a focus, nearly a fourth of energy companies (23%) are looking elsewhere to break new ground—even outside of the U.S.

"While the Permian Basin remains a focus for oil producers, smaller companies are clearly looking elsewhere for new opportunities as oil majors have taken over Permian operations," Clark Sackschewsky, national leader of BDO's energy practice and global leader of oil and gas, told Hart Energy.

Sackschewsky pointed out that the study recorded a huge interest from investors to finance new projects in the Gulf of Mexico (GoM). According to the study, which polled 100 CFOs at U.S. energy organizations with revenues ranging from $250 million to $3 billion, the GoM ranks second to the Permian Basin out of projects in the U.S.

"Although there are large upfront costs of operation in the GoM, there are also a large amount of recoverable reserves available in the region," he said. "For oil producers, this means that there is more certainty around the costs associated with drilling and returns, which is important in a low-price environment. In addition, it is easier to get funding when investors know the payoff is between three to five years."

BDO's study also forecast the industry this year will contend with fierce competition, regulatory uncertainty, low oil prices and a lack of available new capital amid increased market volatility and a potential economic downturn. Therefore, energy companies will be forced to live within their means, either by cutting costs or discovering new operational efficiencies—or else, risk insolvency.

Most energy CFOs in the survey said even though their businesses are currently thriving (71%), they're worried about regulatory uncertainty (21%). The concern is in large part due to continued trade policy turbulence and the 2020 U.S. presidential election—the outcome of which will determine how the industry is regulated for the next four years.

In addition, CFOs said their biggest workforce challenges in 2020 include increasing labor costs, training and development and a skilled worker shortage. Increased overall demand for labor in high-production regions like the Permian Basin drives up salaries for workers across the supply chain, which can lead to substantial cost increases for businesses operating in those areas, the study added.

The study also addressed the issue of climate change, calling it "the biggest long-term threat," which is existential and extends beyond industry and country borders.

As Sackschewsky pointed out, "climate change isn't just a business issue; it's a national security emergency that requires a long-term commitment to reducing human impact on the environment and ensuring the earth is livable for generations to come."

Energy CFOs in the survey agreed that solar energy will be the most dominant type of alternative energy in the U.S. by 2023. Further, by 2024, almost 33% of the world's electricity is forecast to come from renewables.

Companies are also facing hurdles when trying to build new infrastructure, particularly around the potential environmental impacts of projects. Almost a quarter of energy companies reported a climate change dispute in the past 12 months.

The study also showed that trade tensions and tariffs are intensifying the negative financial headwinds facing energy companies, with 30% of oil and gas CFOs saying tariffs have had an unfavorable business impact.

Another major, persistent issue for the industry is low oil prices. Aside from a brief rise in prices following the drone attacks on Saudi oilfields, oil prices have hovered between $50 to $70/bbl in the past few years—and energy CFOs aren't confident they'll rise much higher any time soon.

A majority of the CFOs surveyed said low oil prices are having at least some impact on their business—including a slowdown of technology investments new projects, M&A as well as declining profits. These conditions are likely to persist unless oil prices rise and remain steady at a higher level.

*—Faiza Rizvi*

## CCUS advocates still waiting on IRS, DOE

More than two years ago, in February 2018, Congress passed enhanced tax incentives for carbon capture, use and storage technology (CCUS). The credits, known as 45Q tax credits under the Internal Revenue Service (IRS) tax code, are meant to encourage new CCUS projects in the U.S. and help reduce the cost of capturing carbon, advocates say.

The new tax incentives more than doubled the amount companies can claim for captured carbon, from $10 per metric ton to $35 per metric ton for carbon capture when it's paired with EOR, and from $20 per metric ton to up to $50 per metric ton for projects that store carbon in salt cavern reservoirs.

However, the IRS and U.S. Treasury Department have not yet issued final rules on exactly how to implement these credits, causing CCUS proponents a great

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deal of frustration. Former Energy Secretary Rick Perry had urged the IRS to speed up action on the problem, but nothing has happened since he left office last year and new Energy Secretary Dan Brouillette assumed the position.

Addressing a meeting of the Atlantic Council in February, Sen. Sheldon Whitehouse, said, "There is no legitimate excuse for this regulation having taken two full years." He urged CCUS developers and others to give the Treasury Department a "swift kick in the rear," according to press reports.

Last April, Senate Energy and Natural Resources Committee ranking member Joe Manchin introduced legislation asking for more federal R&D dollars for CCUS.

Meanwhile, in December 2019, the National Petroleum Council (NPC) under chairman Greg L. Armstrong (retired chairman of Plains All American Pipeline), delivered its study on CCUS that Perry had requested. The study included input from 300 participants from the oil and gas and other industries, the DOE and academia. It made recommendations to implement such projects and provide a road map to speed up development, and sent a letter to Brouillette asking that action be taken.

The study looked at the entire value chain from carbon capture to use and storage in across diverse industrial sectors. It addressed the technical, legal, regulatory and economic factors involved and asked for more federal intervention in the form of enabling policies and R&D.

Study leaders included the former chairman of BP America, the CEOs of Occidental Petroleum Corp., Schlumberger Ltd., Shell Oil Co., Bechtel, Valero Energy Corp. and Southern Gas Co., among many others.

"In the first phase, clarifying existing tax policy and regulations could double existing U.S. capacity within the next five to seven years," the study said. "Extending and expanding current policies and developing a durable legal and regulatory framework could enable a second phase of CCUS projects (i.e., 75 to 85 mtpa) within the next 15 years. Achieving CCUS deployment at scale (i.e., an additional 350 to 400 mtpa) within the next 25 years, will require substantially increased support driven by national policies."

A cost assessment tool for CCUS has been developed by Gaffney, Cline & Associates, allowing stakeholders to change the cost and financial assumptions to generate their own view of costs. It was expected to be available in late-January 2020, according to the NPC study. Further details and the full study are available at npc.org.

*—Leslie Haines*

### Limited lending will continue in 2020

The outlook for improving capital access for oil and gas companies

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in 2020 remains grim as investors will continue to look elsewhere for better returns on their money.

That was a prevailing message given to attendees at the recent Private Capital Conference hosted by the Independent Petroleum Association of America. With commodity prices languishing and oil companies having to shift from growth mode to one of living within cash flow, additional investment dollars have become much tougher to come by. Some estimate the number of banks that would even entertain investing in new deals in the market down by half over traditional numbers.

"The last six months or so have been rather difficult," said Don McKinnerney, managing director for RBC Capital Markets. "We've seen some failed syndications, some tough syndications, in the RBL [reserve-based lending] market. For new deals, we think that the bank market right now is about 25 banks that are willing to put capital to work. Historically, the market has been around 50 banks."

So what will bring the banks back? At this point, the key to the return of external investment revolves around oil companies proving they can generate free cash flow. The "shale gale" that blew through the industry for several years beginning in the early 2000s saw investors rewarding growth and paying less attention to the poor returns being achieved. That wind has since shifted. Energy has underperformed as an industry, and investors have turned their attention away from hydrocarbons and toward more rewarding ventures.

"Investor interest in this industry has been cut in half over the last decade," said Tim Perry, co-global head of oil and gas for Credit Suisse. "Energy-focused funds have dried up. Free cash flow is really what investors are looking for. Technology is slower growth than E&P but higher free cash flow, and unfortunately, these other industries really offer higher returns to investors."

Even with fewer banks and scarcer private-equity opportunities, there remains some cash available for companies with solid management teams and strong assets. Direct lenders are proving to be another source of capital. Refinancings with first-lien revolvers or first-lien term loans are available for liquidity needs, according to Perry.

"Until we can demonstrate good returns I think investors will continue to stay on the sidelines," said Kyle Kafka, partner of EnCap Investments. "As a result, the A&D market is broken. There is no capital to go buy assets. Sellers don't want to sell while valuations are at all-time lows, so there are really not a lot of transactions happening."

EnCap has about $6 billion in cash spread across two funds focused solely on the U.S. upstream market—one of the larger war chests of dry powder available in the market today. The capital is supporting its existing base of management teams as well as seeking new investments.

Energy is now only 4.4% of the S&P 500. In just the past

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decade, that number ran closer to 9% to 12%.

"There is little incentive for portfolio managers to continue to invest in energy," said Kim Bourgeois, managing director at HPS Investment Partners. "Borrowing base decreases are at an all-time high. So that is certainly causing liquidity strains on companies."

*—Blake Wright*

## *Energy transition to take center stage for oil industry*

Amid uncertainty in commodity prices and global economic conditions, 71% of senior oil and gas professionals expect to maintain or increase investment in decarbonization, which marks a sharp increase compared to 2019 levels, according to a new study by DNV GL.

Despite a push in low-carbon investments, the overall optimism for industry growth has slightly weakened this year, according to another key finding of the study. While two-thirds (66%) of senior oil and gas professionals are confident of industry growth in 2020, this is down 10 percentage points from the 76% recorded in 2019, the report stated.

"The [industry growth] numbers have fallen in 2019, probably due to a mixture of geopolitical issues and climate change concerns, but confidence is still very high compared to the years before 2018," Frank Ketelaars, regional director of Americas at DNV GL, told Hart Energy.

Overall, DNV GL reported the outlook, which is based on a survey of more than 1,000 senior oil and gas professionals and in-depth interviews with industry executives, showed greater recognition of the urgency of the world's climate problem and that a solution will involve adoption of various sources and measures.

Companies are looking at a portfolio of solutions, according to Liv A. Hovem, CEO of DNV GL's oil and gas business unit, including reducing carbon emissions, diversifying into renewable energy, decarbonizing oil and gas production and increasing investment in decarbonized gas such as hydrogen produced from electrolysis and renewables, or from natural gas combined with carbon capture and storage (CCS).

**% Of Respondents Who Agree That Their Organization Should Decarbonize Faster By Region**

| | |
|---|---|
| Europe | 49% |
| Latin America | 63% |
| North America | 25% |
| Asia Pacific | 58% |
| Middle East & North Africa | 70% |

Source: DNV GL

"More and more people in our sector are realizing that we cannot sit and wait for the perfect solution to jump to a completely decarbonized energy system," Hovem said in a statement. "The industry will emit too much $CO_2$ in the meantime, so we have to start working on decarbonizing the oil and gas sector with the technologies we have already in order to meet national and international climate goals."

However, Ketelaars pointed out that European oil and gas companies are most likely to lead the way as the study showed that there are certain regions that are exceptions to the global hype of low-carbon efforts.

In Asia, for example, the focus will be more on meeting the soaring demand for energy to maintain economic growth and development. Meanwhile, in North America, the study recorded only 25% of respondents intended to move toward decarbonization in 2020.

"European headquartered oil majors are under pressure to lead the decarbonization effort, which has a lot to do with public opinion and local regulations in Europe," he said. "In many European countries, including large producers like Norway, Denmark, U.K. and the Netherlands, where decarbonization is on top of the agenda."

Although the energy transition is impacting investment decisions and boosting new business opportunities, a smaller proportion of North American respondents reported that their organizations are working toward a lower-carbon energy mix. CCS emerged as a concern in the region, while digitalization and cybersecurity remained the highest priorities for R&D and technology investment.

Ketelaars added another takeaway of the study is that companies are maintaining their focus on cost control to ensure they build new efficiencies on the hard-won gains in the past four to five years since the downturn.

Oil and gas prices are expected to remain low for longer, and the industry needs to remain competitive with renewable energies, the costs of which are expected to continue to drop during the next 30 years.

The survey reported that some 64% predict their organizations will hit profit targets this year, which is largely consistent with 2019 levels. In addition, nearly half (46%) of respondents said their companies would still achieve acceptable profits if the oil price were to average less than $50/bbl.

Although the natural gas markets faced a few obstacles in 2019, long-term demand remains strong as the industry continues to invest in the cleaner-burning fuel. With gas expected to overtake oil to become the world's largest energy source in the mid-2020s, 74% of respondents expect to maintain or increase investments in gas projects, compared to 65% in 2019. Asia-Pacific respondents reported the sharpest rise in their intentions to invest in natural gas, jumping from 67% to 81% of respondents, despite a challenging year. Almost all respondents (92%) were in unanimous agreement of either increasing or maintaining their level of spending on digitalization in 2020.

"Digitalization has been on the agenda of the oil and gas industry for the past two to three years, and there is now quite a clear understanding on what companies want to achieve through that," Ketelaars explained. "Digitalization is seen as a key enabler to reduce costs further through automation/remote operations and enhanced oil/gas recovery. … Three key areas [of digitalization,] as mentioned in the report, are the use of platforms to manage data, the use of cloud computing and artificial intelligence."

The study reported that this year will also mark an increase in renewable energy investment. Offshore wind is expected to lead this effort with 63% of


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organizations anticipating to increase their investment, up from 40% in 2019.

Globally, more than half (56%) of respondents agreed that there will be a significant increase in investments in CCS within the oil and gas industry during the next five years.

The survey also reported hydrogen as the largest proportional increase of all clean energy sources among those looking to invest outside of oil and gas. Twice as many respondents (42%) are looking to invest in hydrogen in 2020, compared to 20% for 2019. Despite lessening in severity relative to 2019, skills shortages and an aging workforce were among the top-five barriers to growth in 2020. Some 45% of respondents said that the industry will face a critical skills shortage this year, while more than half of respondents are currently concerned about losing talent to rivals (54%) and other industries (51%).

DNV GL's 2020 outlook suggests that "progressive stances and tangible steps forward on both digitalization and decarbonization can potentially help attract and retain younger talent."

*—Faiza Rizvi*

## Progress for Ovintiv in the Anadarko

While some players in the Anadarko Basin's Scoop/Stack play have seen better days, the company formerly known as Encana Corp. said one-fourth of its 2019 free cash flow was delivered by assets in the basin.

"With a rate of return of about 50%, this play not only competes within our portfolio, but … it is competitive with the very best shale plays across North America," Ovintiv CEO Doug Suttles said on a recent call with analysts. "We've outperformed initial expectations through rapid cost reductions and consistent well performance. We expect these trends to continue just like we've demonstrated everywhere else we operate."

The results come nearly a year after the newly renamed and relocated Denver-based Ovintiv acquired Newfield Exploration Co. along with its oil-weighted, stacked-pay asset with multiple zones—which proved to be ideal for Ovintiv's cube development model.

By developing all prospective benches at once, instead of the most certain benches first, the company said it is focusing on value and returns.

Lower well costs play a big role in higher returns, particularly in the Stack.

Ovintiv said its drilling and completion (D&C) costs in the Stack play dropped to $6 million per well, about double the original $1 million reduction target. D&C costs for recent pacesetter wells in the play fell further—down to $5.2 million.

Legacy Newfield D&C costs were $7.9 million per well.

Analysts with Tudor, Pickering, Holt & Co. (TPH), however, pointed in a note to Ovintiv's "downward revision to headline Stack EURs (-19% total; -26% oil from previous 1.3 million boe total; 455,000 bbl of oil to midpoint of new 900,000 to 1.2 million boe total; implied 288,000 to 384,000 bbl of oil, for a 10,000-foot lateral)," as influencing trading momentum the most. Analysts saw this as "more than offsetting progress made on well costs thus far."

TPH said modeling current well costs plus facilities and the new EUR range results in a 30% after-tax rate of return breakeven of about $45 to $50/bbl, which exceeds the TPH estimate of about $40 to $45/bbl using legacy EURs and well costs.

Ovintiv also highlighted improved capital efficiencies, having brought down its spud to first production cycle times in the basin by 35% in 2019.

Mike McAllister, president of Ovintiv, said the company's supply management team delivered nearly $100 million of savings during the first year of operations in the Anadarko. "Our frac sand costs have been cut in half from 7 cents to 3 1/2 cents per pound," shaving about $700,000 off costs per well.

Plus, fewer rigs are producing more hydrocarbons.

Despite dropping the rig count from 11 to five, Ovintiv said fourth-quarter production averaged 164,000 barrels of oil equivalent per day (boe/d), above third-quarter volumes.

Brendan McCraken, the company's executive vice president of corporate development and external relations, pointed to a set of Stack black oil Meramec wells normalized to 10,000-foot lateral length, to illustrate how crude and condensate performance improved with its cube development wells and lowered costs.

"The orange curve represents 99 wells that were a combination of Newfield drill and Ovintiv completion," McCracken said. "The blue curve represents 67 wells that are open to only cube development."

McCracken noted the company's crude and condensate performance were slightly improved for its cube wells.

"This is exactly what we expected," he said. "And the key is the costs are dramatically lower. In fact, when we combine these well results with our $6 million well cost, 19% royalty rate, $2.50/boe LOE and realized price at WTI, this is what delivers the 50% rate of return."

Ovintiv said it also continues reducing drilling time in the play.

In less than a year, "We achieved an average drilling rate of more than 2,200 feet per day in our latest cube," said Greg Givens, the company's executive vice president and COO. "We recently drilled a pacesetter well in nine days from spud to rig release. This was achieved by drilling the lateral more than 60% faster than the previous best in class well."

Learnings in the Stack, which dominates Ovintiv's activity in the basin today, are now being applied to the Scoop.

"In a recent cube, we reduced our drilling days by 20%," Givens added. "We have an active 2020 plan in the Scoop and expect to see additional cost improvements as our teams continue to innovate and apply our learnings across the organization."

Ovintiv said it has about 70 undeveloped operated drilling spacing units (DSUs) in the Scoop and about 200 undeveloped operated DSUs in the Stack across its more than 365,000 net acre position in the Anadarko Basin.

*—Velda Addison*

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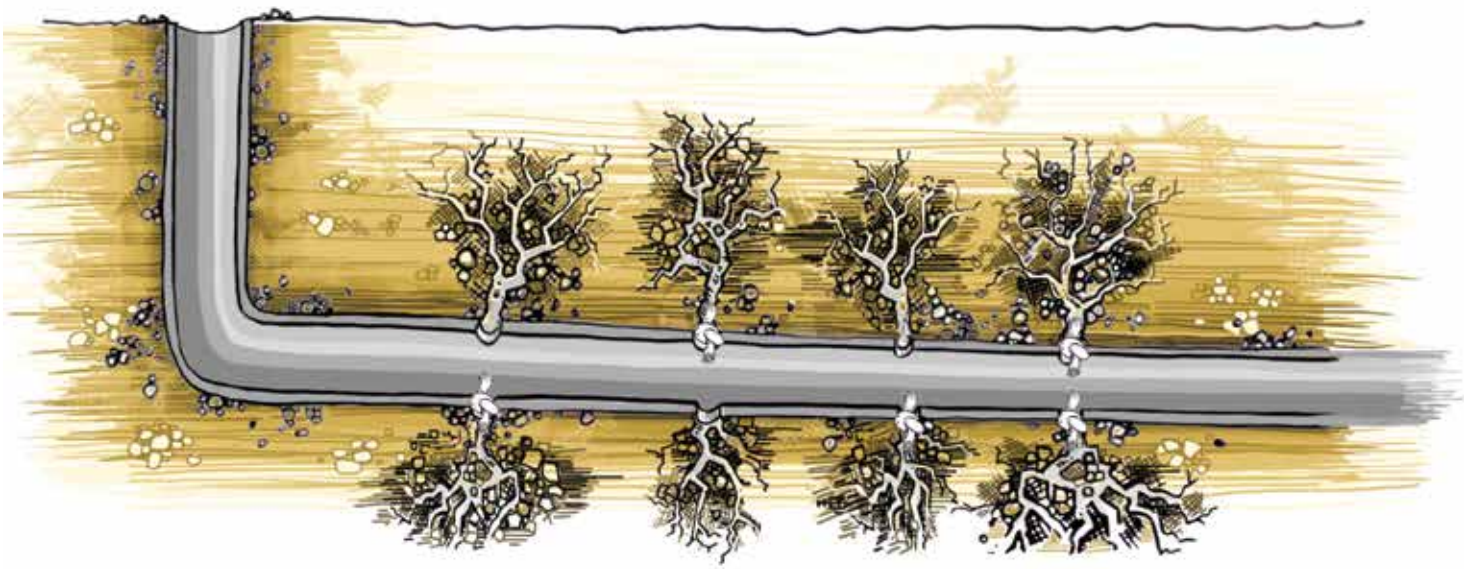

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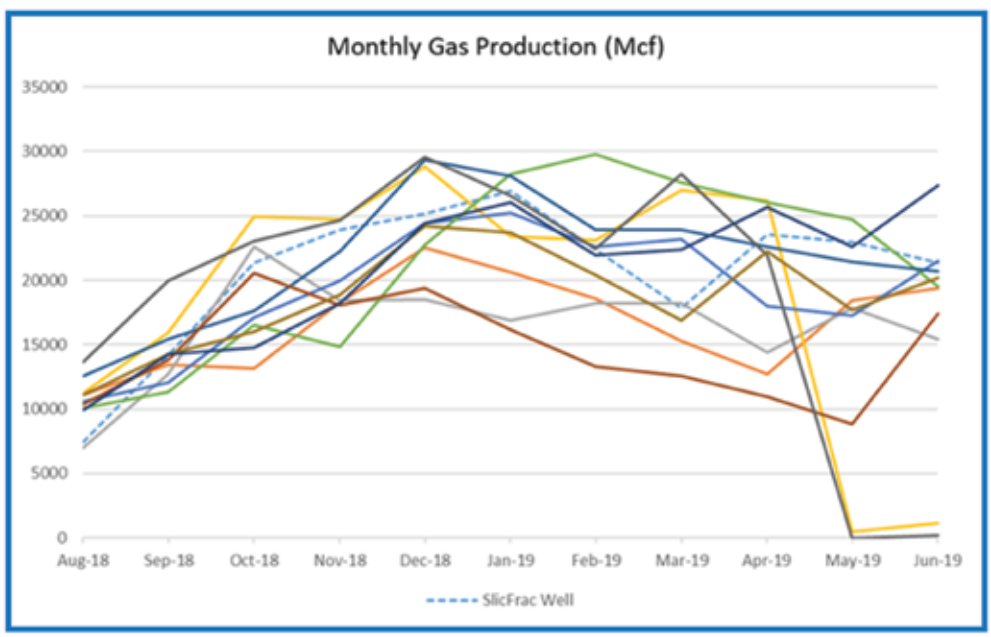
*Incorporating Perf PODs as an alternative to frac plugs for zonal isolation allowed the operator to complete the wellbore as designed, despite casing limitations.*

***Due to multiple casing ID restrictions, a customer in the DJ Basin required an alternative solution to isolate intervals and effectively stimulate the entire lateral.***




The customer replaced all frac plugs with **SlicFrac** Perf PODs, deployed between each frac stimulation to isolate and divert the flow to the next interval of perforations. By isolating each perforation the customer was able to efficiently stimulate the entire lateral; attaining more reservoir contact with improved perf cluster efficiency. **SlicFrac** Perf PODs were deployed to divert fluid from the dominant perforations and provide breakdown of the less dominant or under-stimulated perf clusters within each interval.

For this 55 stage completion, degradable Perf PODs were deployed from surface maintaining isolation for the entirety of the 10 day frac stimulation. **TTS'** Standard Milling BHA was used post frac to cleanout residual sand and circulate the wellbore clean before putting the well onto production.

By replacing frac plugs with **SlicFrac** Diversion, the customer was able to effectively stimulate the entire wellbore as designed, while reducing overall completion costs and eliminating the risks associated with setting and removing reduced OD plugs. The chart above shows production of the well where **SlicFrac** was used in comparison to other wells in the field; the production is higher than many of the wells and continuing to trend upward.

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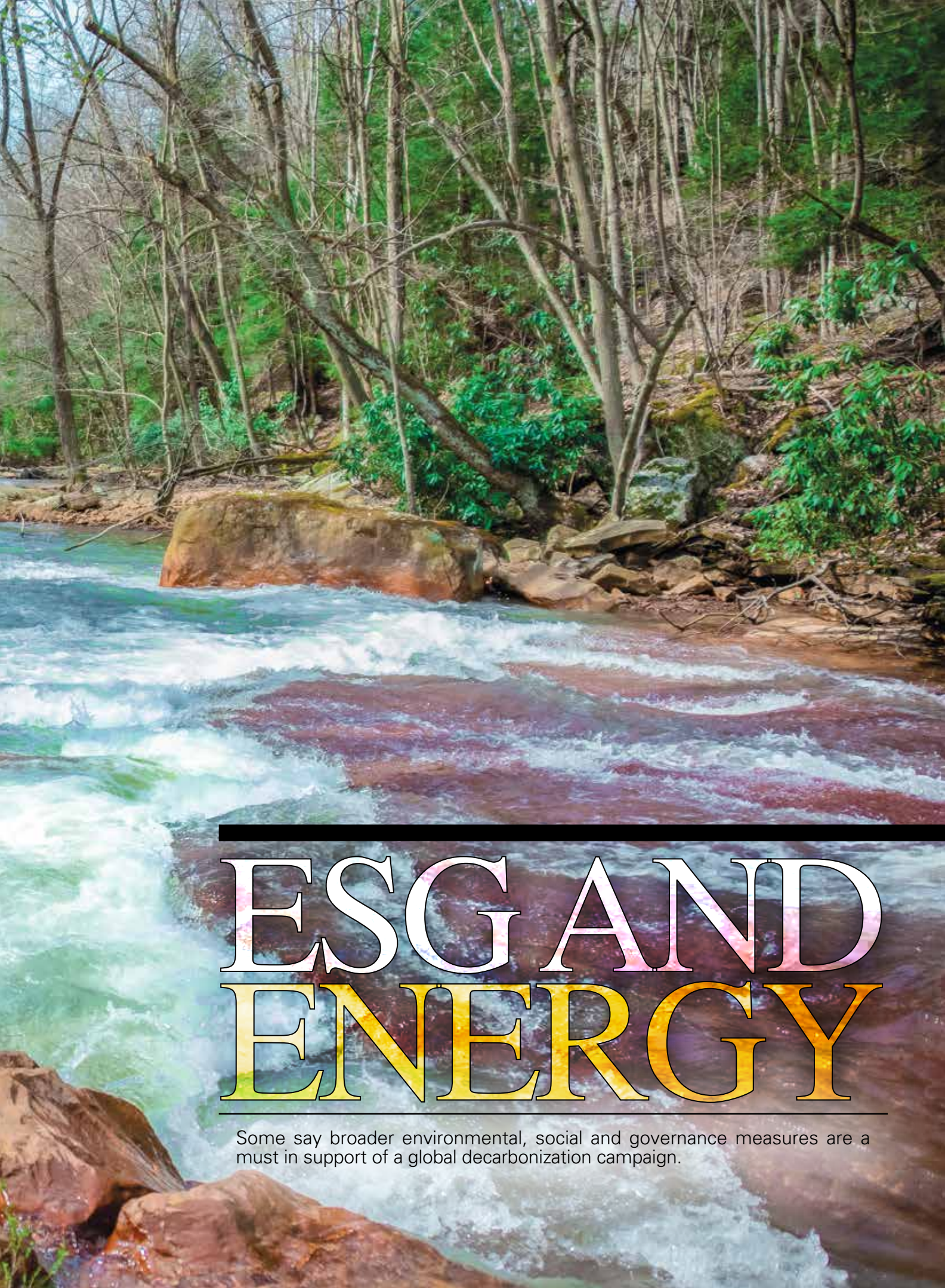
***Southwestern Energy Co. partnered with the West Virginia Department of Environmental Protection to restore Muddy Creek to its natural state, which suffered pollution from ongoing drainage from abandoned mines.***



# ESG AND ENERGY

Some say broader environmental, social and governance measures are a must in support of a global decarbonization campaign.

ARTICLE BY
CHRIS SHEEHAN, CFA

PHOTOS COURTESY
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***Professionally managed funds in the U.S. that are subject to some form of ESG criteria have tripled in size since 2012, reaching over $11 trillion, according to Pavel Molchanov, energy research analyst with Raymond James & Associates Inc.***

Getting your arms around environmental, social and governance (ESG) issues can be quite some task. As one observer noted, current criteria used to evaluate ESG issues are "highly diverse on a massively complex subject."

ESG issues have never before claimed such importance. Public companies, no matter in what sector they may operate, "ignore this at their peril," according to Pavel Molchanov, an energy research analyst at Raymond James & Associates Inc.

On the environmental issue alone, the divide is wide—very wide—in terms of opinions. As one industry magnate summed up, there are two sets of people: one that denies climate change is occurring and another that "thinks it will be easy to solve."

With some $7.43 trillion in assets under management, BlackRock hit the headlines when CEO Larry Fink touched the subject of "sustainability-related risk" in fossil fuel stocks. Action has to be taken now, he urged, but the issue is not going away anytime soon.

"We're not running away from all hydrocarbons, because we do believe they play a role," said Fink in a CNBC interview. "The climate change is going to require a huge energy transition. It's going to be 40 or 50 years. So we're not running away. We need to have an organized plan."

European political leaders have led the charge but not without ESG issues on their doorstop. Germany still relied on lignite coal—a coal with higher carbon emissions—to generate 22.5% of its electricity in 2018. Some $45 billion of government funds have been earmarked to phase out coal by 2038.

In January, world leaders gathered at the World Economic Forum in Davos, Switzerland, where ESG issues were one of the more frequently addressed topics. The "No. 1 hypocrisy," one commentator noted, was that such a large number of world leaders arrived by private jet.

In the U.S., the active part played by consumers of energy was similarly highlighted by David Swensen, Yale University's chief investment officer, in a publicized speech.

Divesting energy holdings, he argued, unfairly targets producers rather than consumers. "The real problem is the consumption of fossil fuels. And every one of us in the room is a consumer. And I guess it's a little harder to look in the mirror and say 'I'm part of the problem.'"

All things considered, where do the chips fall for energy firms trying to navigate around ESG issues?

Like it or not, ESG-related issues are now front and center among investors, particularly those that view energy as having entered an era of "abundance" from a previous one marked by energy scarcity.

Subash Chandra, senior equity analyst covering the E&P sector at Guggenheim Securities, is adamant that ESG issues are here to stay. If anything, investors are prone to treat

***Right, Southwestern Energy's self-owned Rig #45 drills for Marcellus Shale in northeastern Pennsylvania. Southwestern is one of a growing number of E&Ps dedicated to improving ESG-related activities.***

***"The train bearing down on us is decarbonization," said Subash Chandra, CFA, senior equity analyst with Guggenheim Securities. "It's a global phenomenon."***

ESG issues as a read-through to the quality of overall management performance. "If a company decides to do one thing well, it will tend to do all things well," he observed.

It's in the interest of the E&P sector to "be a good neighbor," said Chandra. It will only benefit the sector if it maintains standards that are higher than regulations in force at the federal, state or local level. If E&Ps hold themselves to a higher level, it reflects a sign of "leadership," he added.

Chandra noted that 2018 and 2019 had seen significant changes in terms of proxy voting on various ESG-related issues by investors. And, of course, everyone wants a "safe workplace environment" from a health, safety and environmental viewpoint.

"But the train bearing down on us is decarbonization," he observed. "It's a global phenomenon."

### Decarbonization in Europe

In Europe, where the decarbonization trend is typically strongest, some European banks have pulled back from providing finance to certain energy sub-sectors, noted Chandra.

"The number of interested parties is large enough to disrupt capital flows," according to Chandra. "It's the money that greases the wheels. If you don't need the money, you may not need to worry about it. You may have the luxury of saying, 'I don't need capital throughout the organization.' But even some smaller areas, like business insurance, are involved."

In a recent report on greenhouse-gas (GHG) emissions, Chandra noted that the U.S. accounted for 11% of global GHG emissions, based on 2018 data from several sources, including CAIT Climate Data Explorer. Over the past decade, GHG emissions in U.S. and Europe have trended downward, while those for India have moved higher, and emissions for China have risen sharply but show signs of leveling out of late.

The oil and gas sector is mainly associated with methane and $CO_2$ emissions, with the former known for having markedly higher heat-trapping potential than $CO_2$, noted Subash.

Power generation and transportation are the two largest sources of GHG emissions in the U.S. It is fossil fuel consumption—rather than fossil fuel production—that is the "overwhelming driver behind $CO_2$ emissions," according to Chandra. Combustion of fossil fuels accounts for 93% of emissions, with power generation and transportation making up 73%, between them, split almost evenly.

"The battle to contain $CO_2$ emissions will have to occur mainly with cars, trucks and power plants," said Chandra, while oil and gas producers are "bit players in the $CO_2$ debate," he commented. However, they could be impacted by decarbonization of the global economy, or they could play a role in helping attain GHG goals through use of carbon sequestration techniques.

As for methane, the energy sector has a larger hand in its emissions, with upstream and midstream sectors accounting for roughly 30% of methane emissions as compared to only 1% of $CO_2$ emissions, according to Chandra. However, while less prevalent than $CO_2$, methane is some 25 times more potent than $CO_2$ in trapping heat, he noted.

In a binary decision as to either flare natural gas or vent it, the choice of flaring—so as to produce less heat-trapping $CO_2$ emissions—does less harm from an environmental viewpoint. However, both of the above options fall short, from both an environmental and a commercial perspective, of a more optimum practice of avoiding leaks and fully capturing natural gas volumes to take to market.

As one analyst observed, capturing the above emissions is in essence "a win-win."

### $11 trillion 'off limits'

Molchanov described the trajectory of ESG investing as being "firmly upward and onward." Professionally managed funds in the U.S. that are subject to some form of ESG criteria have tripled in size since 2012, reaching over $11 trillion, he noted. This represents roughly 26% of professionally managed (versus passive or index) equity and fixed income funds.

If public companies want to maximize their access to capital markets, attracting institutional investors is likely to be hampered by the absence of appropriate ESG credentials, said Molchanov. And with 26% of actively managed assets already "off limits" of late, the headwinds will only stiffen if the trajectory of ESG-oriented funds continues on a path of further market share gains.

Rather like rating agencies that deal with a company's financial standing, a number of rating agencies—some say 50 or more—have sprung up to provide an evaluation of a company's ESG metrics. However, unlike the more precise analysis possible in the credit sector, the ESG sector finds itself in the midst of a growing number of rating agencies using confusingly differentiated criteria.

Molchanov offered a review of typical ESG sub-categories around which E&Ps must now navigate.

"As a rule of thumb, roughly half of the ESG score for an oil and gas producer pertains to environmental metrics," said Molchanov. "The highest-weighted component in this category is the carbon intensity of its operations, followed closely by other types of emissions and waste. Other factors include impacts on water, land use or any use of toxic materials, etc."

The other half of the score, in rough terms, is made up by the social and the governance weightings. These are more directly comparable to industries other than energy. For example, health and safety falls under the social heading, while community relations and board independence fall under governance. Here is a breakdown of the average weightings for E&Ps rated by Sustainalytics:

- **Environmental**: 51.5%, comprised of carbon—own operations at 16.5%; emissions, effluents and waste at 15%; carbon—prod-

***Environmental issues garner the attention of most that think of ESG, but Southwestern emphasizes the importance of the other two categories as well. For example, some 25% of its workforce is female—with 100% pay parity for like positions—and 13% is minority.***

ucts and services at 13.9%; land use and biodiversity at 3.2%; resource use at 2.9%;
- **Social**: 12.4%, comprised of solely occupational health and safety; and
- **Governance**: 36.1%, comprised of community relations at 11.4%; corporate governance at 7.9%; bribery and corruption at 7.2%; human capital at 6.9%; business ethics at 2.7%.

"If management takes the time to publish a sustainability report, that will help the ESG score but not by much," said Molchanov. "The way the score can be improved significantly is when companies are taking genuine steps to improve their operations. Publishing a sustainability report with an ESG strategy and some targets spelled out in it will tell ESG analysts that you're getting serious."

This sends a "positive message," he added. "But management ultimately has to deliver on the strategy."

In general, an ESG score is assigned based on a company's performance relative to other companies in the same or a similar industry. For example, said Molchanov, an E&P is typically compared to another E&P, or possibly, say, a pipeline company. Ultimately, however, the score will reflect a degree of discretion on the part of the ESG analyst, he observed. "A lot of it is more art than science."

In addition, the score will to some degree reflect the hydrocarbon mix of a company's production and reserves. As is well-known, "gas has a lower carbon footprint than oil," he noted. "So a company producing predominately gas will get a better score, other things being

equal, than a company that produces predominately oil. That's the nature of the asset and the geology."

A higher score may depend more on actions that a company can do on the operating front. Positive moves may include the use of electric fracturing in place of traditional diesel fracturing," he continued. "Or companies can replace diesel generators with solar generators and batteries. In addition, they can opt to minimize flaring, which reduces $CO_2$ emissions into the atmosphere."

These measures are not without cost, but over time they will tend to pay for themselves with lower operating costs, according to Molchanov. For example, a company may use an existing diesel generator—viewed as a sunk cost—to provide electricity, but it has to buy diesel regularly to run it. By contrast, with a solar system and battery, there is an upfront cost, but operating costs are nearly zero "as sunlight is free."

### Not losing money

A policy of "having good ESG practices does not have to mean losing money," said Molchanov. "These cash outlays aren't made just out of the goodness of somebody's heart. There are ways to implement ESG strategies that are profitable. And a better ESG score has the potential to broaden the scope of investors and, in turn, enable the company's stock to trade at a higher valuation."

A similar viewpoint was put forth by Molchanov for costs of training, etc., in the social aspect of ESG.

"If people are better trained, they will make fewer mistakes, and there will be fewer accidents," he said. "And a better trained workforce is generally a happier workforce, which means they will likely stay longer at a company instead of jumping ship. That reduces turnover, which saves money in the long run. It's another example of how an upfront investment can deliver dividends over time."

Bill Thomas, CEO of EOG Resources Inc., makes it clear that sustainability is a top priority for his company.

"Being a good corporate citizen goes hand in hand with delivering long-term value to our shareholders," said Thomas. "Responsible stewardship of our resources is essential to our long-term sustainability. Put simply, to create long-term value for our shareholders, we must be good stewards of all our resources: our assets, the environment, our people and the communities where we live and work."

Moreover, EOG's sustainability strategy is designed to improve key metrics across all three ESG fields.

"EOG's culture is our sustainable competitive advantage. Our culture is one of continuous improvement throughout all aspects of our operations," said Thomas, noting EOG's drive to innovate, improve efficiencies and reduce costs. "That same focus extends to our environmental stewardship, fostering diversity of thought, experience and background at all levels of our organization, and making a positive community impact on a local, national and global scale."

EOG's sustainability report for 2019 will be its third. Previously, much of the information in the report was disclosed on the company's website and is updated annually. The company noted that, in response to stakeholder interest in greater disclosure of EOG's climate-related risk assessment and management, it integrated in 2018 with recommendations by the Task Force on Climate-related Financial Disclosures organization.

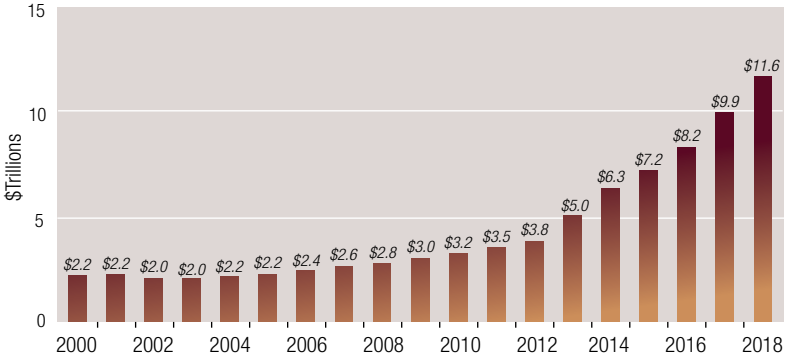
### Reducing methane emissions

One of the first items addressed in EOG's 2018 sustainability report focuses on methane emissions. While methane made up less

***"Being a good corporate citizen goes hand in hand with delivering long-term value to our shareholders," said Bill Thomas, CEO of EOG Resources Inc. "Responsible stewardship of our resources is essential to our long-term sustainability."***

***Health and safety impact ESG scoring. In 2018, Southwestern trained every employee an average of 14 hours in HSE, and reported a total recorded injury rate of 0.64, a record low.***

**U.S. ESG Assets**




Source: SIF Foundation; Raymond James research

***Growth in professionally managed assets covered by ESG criteria has been accelerating and, over the past five years, has more than doubled from roughly $5 trillion to $11.6 trillion in 2018.***

than one-eighth of EOG's total GHG emissions—12.25% versus 87.68% for $CO_2$—its potential heat-trapping effect makes reducing methane emissions a priority. EOG set for itself a "qualitative goal for 2019 to reduce our methane emissions intensity rate below 2018 levels."

EOG was able to report a reduction in its methane emissions intensity rate of more than 45% in 2018. This stemmed from an initiative to retrofit or, where feasible, remove high-bleed pneumatic controllers from operations. Pneumatic controllers are used in energy production to regulate equipment pressures, temperatures and liquid levels, typically utilizing pressurized natural gas to open and shut valves.

"We're optimistic we've reduced our methane emissions intensity rate further in 2019," said Creighton Welch, manager of government relations and communication for EOG. "Retrofitting a controller from high-bleed to low-bleed results in an approximate 96% reduction in methane emissions," Welch noted, citing Environmental Protection Agency data. High-bleed designs still made up 62% of controller methane emissions in 2018.

A GHG emission intensity rate is measured by comparing the tons of methane (or $CO_2$ equivalent if a conversion rate for methane is used) that are emitted for every thousand barrels of oil equivalent.

***"Going forward, it's increasingly likely that ESG factors are going to be a metric for doing business," said Ashley McNamee, director, communications and corporate responsibility, Whiting Petroleum Corp.***

### Water recycling and reuse

A water intensity rate is also calculated to assess improvements in recycling and the reuse of water by EOG. The intensity rate measures barrels of water used for each barrel of equivalent produced in the U.S.

"To accelerate implementation of best practices in water management, EOG has formed a strategic water resources team with representatives from each of our operating area offices," said Welch. "The team evaluates the life cycle of water used in our operations, from acquisition through transportation, storage, production, treatment, reuse and disposal."

The focus of the team is to determine water quality needs, develop multiple alternative water source options and maximize recycling and reuse options. Reuse is a term used by EOG to categorize treated fluid and/or produced water that is generated by the company's operated oil and natural gas wells.

"We expanded our water reuse operations, increasing our percentage of reuse water to more than 20% and to much higher levels in the Delaware Basin," noted Welch. "On a combined basis, reuse and non-fresh water provided nearly two-thirds of our water needs in 2018, consistent with our efforts to minimize fresh water use."

The team also focuses on water transportation infrastructure to maximize water moved on pipelines and to reduce truck traffic. In 2018, EOG transported 99% of its Permian Basin water by pipeline.

EOG is also far from timid in terms of innovation. Following the oilfield service sector's development of "e-frac" equipment, "EOG is a first mover in, and we believe the largest user of, electric-powered hydraulic fracturing," observed Welch. In a different area, for example, EOG is experimenting with drones in efforts to monitor leak detection more efficiently.

On governance issues, EOG can point to independent directors making up 88% of its board members. In January of last year, Julie Robertson joined the board of directors, 25% of which comprises women, and in April, she was named chairperson of the nominating, governance and sustainability committee. In August, Gordon Goodman was also named as the first director of sustainability.

### Transparency for stakeholders

Southwestern Energy Co. is quick to emphasize the importance of looking at all three ESG components.

"With respect to the environment, being a good steward of our natural resources and environment is vital to being a responsible operator," said Jim Schwartz, director of corporate communications. "But you also have to keep a perspective on social and governance issues. Fund managers are spending greater efforts on all three issues, as investor focus has widened, especially among pension funds and endowments."

Southwestern has seen investor interest move in a number of areas over time. On environmental issues, for example, a focus mainly on liability exposure has transitioned to the long-term sustainability of the business. Governance issues, once centered on Sarbanes-Oxley compliance, have shifted to focus more on appropriate management incentives and actions to benefit shareholders and other stakeholders.

"Southwestern endeavors to be transparent to all stakeholders: shareholders, employees, contractors, neighbors, government officials," said Schwartz. "By focusing on performance and engaging stakeholders on ESG matters, an operator like Southwestern can demonstrate that we understand our responsibility to do business the right way."

Southwestern published its first corporate responsibility report in 2015 and has continued with a report each year since then. In addition, the company files a report with the Global Reporting Initiative. This allows Southwestern to provide information to rating agencies that the agencies may have missed. Among rating agen-

cies, MSCI, ISS and Sustainalytics are cited as being "highly impactful."

Reducing methane emissions is a key goal for Southwestern. Methane performance metrics are on the scorecard used to evaluate senior operating executives at the firm, and the board of directors regularly reviews the subject. In 2018, Southwestern achieved a leak/loss rate 0.056%, which was 96% below the industry average of 1.62%, based on a National Energy Technology Laboratory report.

In overall GHG emissions, Southwestern saw a 39% improvement on a year-over-year basis in 2018. The company said its leak detection and repair program exceeds the standards of many of its peers by covering all operational facilities, equipment and components. Southwestern said it has no high-bleed controllers in its current facilities and does not use them in new facility design or installation.

**Freshwater neutrality**

In terms of a water resource strategy, "the company's commitment to freshwater neutrality is unprecedented in the oil and gas industry," according to Southwestern. Its commitment to being freshwater neutral is "a key part of meeting our goal to be a model operator and lead the way on responsible unconventional energy development," it said.

"While we seek to minimize our use of fresh water as much as possible, primarily through water reuse and recycling, we know our operations will continue to need fresh water," said Southwestern. "That is why we have committed ourselves to achieve and maintain fresh water neutral operations. We attained this goal in 2016, 2017 and 2018, and we believe we are the only oil and gas operator to achieve this benchmark."

The Southwestern formula for fresh water neutrality is when "total water used in its operations is less than, or equal to, the sum of alternative and reuse water, operation offsets and conservation offsets for each of its operating areas."

Last October, Southwestern announced it had returned more than 10 billion gallons of freshwater to the environment through "its comprehensive approach to optimizing water usage and 10 innovative, company-sponsored water conservation projects." Its commitment to freshwater neutrality meant that "each gallon of freshwater used is replenished or offset," it added.

Ashley McNamee, director of communications and corporate responsibility with Whiting Petroleum Corp., cited several reasons why investor focus on ESG issues has been gaining momentum.

"If you're a company approaching sustainability in a productive way, you have the ability to add value to your company," said McNamee. "Sustainability practices and some of the metrics within a sustainability framework offer ways to achieve efficiencies and to create and drive long-term value, which of course makes a company more sustainable—hence the term."

"The other perspective relates to the investment audience. We'd heard several years ago that European investors were reluctant to invest in our stock because our disclosure was not ro-

***Southwestern ranks high in mitigating greenhouse gas emissions. In 2018, it achieved a methane leak/loss rate of 0.056%, or 96% below the industry average of 1.62%.***

# QUANTUM'S ESG STRATEGY

Quantum Energy Partners has been a long-time advocate of environment, social and governance (ESG) principles, according to managing director, Sean O'Donnell. As a private-equity sponsor, he sees the firm having greater scope and flexibility for ESG to contribute to the "business case" of energy investing rather than a short-term "check the box" role played in some parts of the public sector.

"There is a business case for ESG," affirmed O'Donnell. "Being private, you can be inwardly focused on developing your own business case with your key stakeholders, such as limited partners (LPs), management teams and lenders," he noted. "That's where private-equity sponsors have an advantage over our publicly traded peers."

"The dialogue with our stakeholders around ESG has evolved to now include a consistent theme about value creation and retention around ESG," said O'Donnell. "Key issues are: What is the business case that we're developing around the ESG data? How is it going to make our assets better? And how is it going to make our investment more valuable?"

Putting ESG protocols on paper is nothing new to Quantum, whose funds have numerous overseas investors, including sovereign wealth funds, major public pension funds, etc.

"We've done it for years," said O'Donnell. "We write it into our governance documents. For each of our portfolio companies, we do ESG diligence screens and establish protocols before we engage with a company. It is part of our due diligence, and it's a closely monitored element of the business as every program requires a degree of customization."

As examples, said O'Donnell, "water issues in New Mexico are different from water issues in West Virginia. And worker safety programs and community relations on our drilling sites are different from our various solar construction sites."

With European investors typically in the forefront of ESG, Quantum is well aware of rising ESG priorities. As the universe of LPs interested in energy investing is getting smaller in size and smarter on ESG, the bar is rising in terms of the level of the ESG dialogue, he observed.

"Some of our largest investors are in Europe, and they have sophisticated ESG programs," O'Donnell commented. "We mutually share best practices, mistakes and successes with their ESG investments in order to continuously improve and benchmark our programs. We have the benefit of a private, direct dialogue with our investor base about what our ESG business case should be in various business lines."

For example, the days of slide decks showing ESG criteria in meetings are long gone, said O'Donnell. "Investors say: 'Don't give me PowerPoints; show me how it's actually being implemented,'" he said.

The returns on investment from ESG measures provide "a fundamental litmus test," even though "not all the benefits are numerically available today," according to O'Donnell.

"If I have a robust ESG program for the next five years of operations, what is that worth to a potential buyer?" he asked. "I may not have an exact answer to that today, but it's certainly worth something. It's costly, if not impossible, to retrofit an asset after years of lost time to bring it up to best-in-class ESG standards. Doing anything late and in a hurry is expensive, and astute buyers should see it from a mile away. So there is value there."

Also, when the A&D market reopens, a priority will be to have portfolio assets in shape for a potential sale after an extended hold period by private-equity sponsors.

"The large majority of private-equity exits are ultimately to public companies," said O'Donnell. "Hold periods have been longer, and our portfolio companies will be larger at the time of exit. Our counterparties will be the larger surviving public companies whose ESG standards are going to be rising. And so we need to be keeping up, if not staying ahead, on key ESG topics."

The point is "you've got to give the public companies reasons to say 'yes' across a number of deal metrics, including ESG, to make the transactions go smoothly, especially where you've got multibillion portfolio companies," said O'Donnell.

How is Quantum changing its strategy, if at all, to the rising tide of ESG and climate change concerns that are absorbing much of the conversation among major investors?

"Our conversation with them is: 'We are a private-equity firm that invests broadly across the energy value chain. We are not going to change what we do—investing in energy,'" said O'Donnell. "But we are committed to continuously improving how we do it. And that's where our strategy includes an ESG lens. How can we become better energy investors and producers by involving ESG more in our business case."

bust enough. That isn't why we started an ESG program, but it's something we've watched over the years. Now, investors like BlackRock have made it clear they expect companies to report on sustainability."

**ESG: A metric for doing business**

"We believe that the investment community cares substantially about sustainability," she continued. "It wants to be sure it's investing in companies that are sustainable and operating through that ESG lens. Going forward, it's increasing likely that ESG factors are going to be a metric for doing business."

Whiting began putting sustainability-related data on its website in 2016 and, later that year, brought in a consulting firm "who formalized the process and provided a very robust reporting program."

"Reducing flaring is a challenging issue for the industry and has been a significant focus for Whiting. The Williston [Basin] has grown at a pace that the midstream providers and the E&P sector itself didn't anticipate," said McNamee. "We became so efficient as an industry that everything just became more productive in the same timeframe."

Whiting has been a leader in ongoing discussions aimed at reaching a consensus on how best the sector can reduce flaring and GHG emissions in North Dakota, according to McNamee.

"We really try to lead by example," she said. "We will not sacrifice our environmental responsibility for production. That's our promise, and we will follow it. If you look at publicly available data, you'll see we've consistently satisfied the regulations and captured a higher proportion of our gas than industry. We view the ESG program as a means to focus awareness across the company on key nonfinancial metrics."

McNamee acknowledged it may at times "seem counterintuitive to release data that the industry hasn't done historically, and which may not cast the industry in the best light. However, it's important to create a baseline and then to drive improvements year-over-

***Southwestern Energy holds approximately 480,000 net acres in northeastern Pennsylvania and West Virginia. The company is committed to being 100% freshwater neutral, offsetting any freshwater usage with an equal amount of water added back through conservation projects. In 2018, that totaled 3 billion gallons.***

**Bloomberg ESG Weighting For E&Ps (%)**

| | | | | |
|---|---|---|---|---|
| Environment | Climate Risk | Total GHG $CO_2$ Emissions Intesity per Sales | 2.75 | |
| | | Total GHG $CO_2$ Emissions Intesity per Mboe | 2.75 | |
| | | Embedded Carbon In Total Reserves | 2.75 | 13.75 |
| | | Production Mix Oil Percent | 2.75 | |
| | | Climate Change Policy | 2.75 | |
| | Climate Risk | Energy Intenstiy per Mboe Produced | 2.75 | |
| | | Water Instensity per Mboe | 2.75 | 8.25 |
| | | Biodiversity Policy | 2.75 | |
| | Emissions | $SO_2/SO_X$ Intesity per Mboe | 2.75 | |
| | | $NO_X$ Intesity per Mboe | 2.75 | 11.00 |
| | | Spills per Mboe | 2.75 | |
| | | Gas Flaring per Mboe | 2.75 | |
| | | | Total | 33 |
| Social | Human Capital Management | Women Management to Employees Ratio | 3.00 | |
| | | % Women In Workforce | 3.00 | |
| | | % Employee Turnover | 3.00 | 18.00 |
| | | Equal Opportunity Policy | 3.00 | |
| | | Anti-Bribery Ethics Policy | 3.00 | |
| | | Employee Protection/Whistle Blower Policy | 3.00 | |
| | Health & Safety | Lost Time Incident Rate | 3.00 | |
| | | Total Recordable Incident Rate | 3.00 | 12.00 |
| | | Fatality Rate | 3.00 | |
| | | Health and Safety Policy | 3.00 | |
| | Supply Chain | Human Rights Policy | 3.00 | 3.00 |
| | | | Total | 33 |
| Governance | Independence | CEO Duality | 0.89 | |
| | | % Non-Executive Directors on Board | 0.89 | |
| | | % Independent Directors | 0.89 | |
| | | Independent Chairperson | 0.89 | 6.23 |
| | | Independent Lead Director | 0.89 | |
| | | Former CEO or Its Equivalent on Board | 0.89 | |
| | | Board Size | 0.89 | |
| | Remuneration | % Board of Director Comp Pd in Stock Awards | 0.89 | |
| | | Say on Pay Number of Votes FOR | 0.89 | |
| | | % Non-Executive Directors on Comp Committee | 0.89 | 4.45 |
| | | Clawback Provision for Executive Comp | 0.89 | |
| | | Chg of Ctrl Benefits/Golden Parachute Agreements | 0.89 | |
| | Audit | % Independent Directors on Audit Committee | 0.89 | |
| | | % Non-Executive Directors on Audit Committee | 0.89 | |
| | | % Audit Committee Members on 3+ Boards | 0.89 | 5.34 |
| | | % Audit Committee Meeting Attendence | 0.89 | |
| | | Independent Audit Committee Chairperson | 0.89 | |
| | | Years Auditor Employed | 0.89 | |
| | Diversity | Board Average Age | 0.89 | |
| | | Board Age Range | 0.89 | |
| | | CEO Age | 0.89 | 5.34 |
| | | Chairman Age | 0.89 | |
| | | % Executives that are Women | 0.89 | |
| | | % Board Members that are Women | 0.89 | |
| | Entrenchment | # Board Members Serving > 10 Years | 0.89 | |
| | | Average Board Tenure | 0.89 | |
| | | Average Exec Tenure | 0.89 | 4.45 |
| | | CEO Tenure | 0.89 | |
| | | Chairman Tenure | 0.89 | |
| | Overboarding | % Non-Executive Directors on 3+ Boards | 0.89 | |
| | | % Executive Directors on 2+ Boards | 0.89 | |
| | | # Board Positions CEO Holds | 0.89 | 4.45 |
| | | # Board Positions Chair Holds | 0.89 | |
| | | # Exec Positions Chair Holds | 0.89 | |
| | Shareholder Rights | Dual Class Unequal Voting Rights - Common Shares | 0.89 | |
| | | Classified Board Systems | 0.89 | 2.67 |
| | | Poison Pill Plan | 0.89 | |
| | | | Total | 33 |

Source: Bloomberg; Bernstein Analysis

***Various ESG rating agencies feature their own criteria and weightings to reach a reported score. This one, from Bloomberg, details the types of considerations that impact an E&P company's overall score.***

year thereafter. The key to sustainability is to make improvements."

Elsewhere, Whiting has had continued success in its long-standing leak detection and repair program. The company reported in 2018 a 90% reduction in issues discovered during inspections. In addition, it said it saw nearly a 200% improvement in the number of inspections that found no issue as well as a greater than 400% increase in the time between issues being detected on tank batteries.

On governance issues in ESG, the feedback from major shareholders is that governance remains a "significant component," said McNamee. "If your governance is sound, and your board is engaged, it improves the function of your business. Governance provides the oversight."

### Return of obstetric services

On social issues, Whiting has had a solid history of engagement with local communities, according to McNamee. "We've always practiced community relations, but in a very proactive way," she said. "When Whiting went into North Dakota, we hired local people, and the benefit of that is that they know those communities and care more about them than anyone else."

An example of Whiting's support is when in 2017 it joined with the McKenzie County Healthcare System in helping build a hospital wing to bring back obstetric services.

"The oil patch tends to be boom and bust, and over time, labor and delivery services had been eliminated," she noted. "The majority of our labor force in the area is under the age of

40, and so it has affected our employees who are living there, working for us and having children. We really wanted to do something to make that opportunity available to them again."

"Whiting partnered with the hospital to underwrite the labor and delivery wings, and this summer they will be able to deliver babies in Watford City again," said McNamee. "Up until then, in winter, they had been driving hours to reach a hospital to deliver babies, sometimes delivering on the side of the road, or in someone's home, instead of safely in a medical institution."

"We thought Whiting's ability to provide that service again would have a meaningful impact to the community and their wellbeing going forward."

**From niche to mainstream**

"Momentum on ESG is definitely accelerating; it's going from niche to mainstream," observed Joanne Howard, vice president of sustainability and corporate communications at Crestwood Equity Partners LP. "The driver is multifaceted; it's not just one thing. The investment community is the most important driver, but we're also seeing pressure from a confluence of other stakeholders."

As for the outlook, "I only see this continuing," she added. "It's just going to get bigger and bigger."

Crestwood, based in Houston, is a midstream services provider operating in multiple areas of the U.S. The company's more gas-oriented gathering and processing activities are in the Marcellus, Fayetteville and Barnett shale plays, while its more crude-oriented midstream assets are in the Bakken Shale, Powder River Basin and the Delaware side of the Permian Basin.

Crestwood is notable for its attention to ESG issues in that it is an MLP. Unlike a C corp, which at times can come under pressure applied by shareholder activity, investors in an MLP are unable to file a shareholder resolution. However, MLP investor demands have changed and are continuing to evolve.

"As generalist investors are entering our stock, they are increasingly demanding transparency on ESG," said Howard. "Therefore, Crestwood is taking a proactive and strategic approach in navigating the rising tide of ESG."

While environmental issues typically hold the headlines, social issues have also grown in importance in ESG for midstream companies, according to Howard.

"As infrastructure in the midstream sector is becoming more crucial to the energy sector, with midstream companies developing infrastructure across the U.S., pipelines are sometimes coming in close proximity to communities," she noted. "So now, more than ever, it's important to maintain your social license to operate when you're working in these communities. Being able to have long-term community relations is vital."

Also in the social field, "it is paramount to develop meaningful relationships founded in respect when working with indigenous communities," said Howard. Crestwood has experience in this area through its operations on the Fort Berthold Indian Reservation in North Dakota, where the company has "tribal relations specialists who are themselves Native Americans and integral members of the community."

Crestwood was one of the first midstream MLPs to issue a sustainability report in 2018 and to create a Sustainability Board Committee that oversees ESG issues. In addition to conducting a materiality assessment, in which it identified 12 material ESG topics for Crestwood, Howard went on to create a three-year sustainability strategy to further integrate sustainability into the company.

This involved selecting five key areas where the company "can really make some traction" and will seek to further advance each of the goals. The five components of the three-year plan were: supply chain management, ESG investor strategy and disclosure, environmental stewardship, diversity and inclusion, and social investment.

"People ask me if sustainability costs a lot of money, and it's the wrong way to think about ESG," commented Howard. "If you're operating in a sustainability friendly way, you think of it more as a way of cost avoidance over the long term by doing the correct measures and responsible measures now."

In Howard's view, the energy sector has historically not played as strong a hand as it could in terms of winning over the public on issues relating to the many benefits that energy delivers.

"But I see the rise of sustainability reports as an impactful tool for the energy industry to tell its story and to demonstrate all the important and valuable things it is doing. It's a call to action for everyone." □

***"Momentum on ESG is definitely accelerating; it's going from niche to mainstream," said Joanne Howard, vice president, sustainability and corporate communications, Crestwood Equity Partners LP.***

***Righands connect drillpipe on Rig #45 in northeastern Pennsylvania for Southwestern Energy in October.***

# A NEW DAWN FOR ORYX

Permian crude oil mover Oryx Midstream Services accepted a $3.6 billion takeover bid last year and is now recapitalized to go so much further. What that might look like is left to the imagination of its founding team.

INTERVIEW BY
STEVE TOON

PHOTOS
COURTESY OF
ORYX MIDSTREAM

*Oryx Midstream Services is the quintessential tale of a private-equity-backed company getting a first-mover advantage and ultimately achieving a wildly profitable exit. Formed in 2014 with $300 million in capital from Quantum Energy Partners and Post Oak Energy Capital, the company began building out gathering and transport crude infrastructure in the nascent Delaware Basin as producers were just discovering the bounty of resource there. In 2019, after investing almost $1 billion to build out infrastructure across the Delaware Basin, Oryx had grown to become the largest privately held midstream crude operator in the Permian Basin. In April, a buyer valued the company at $3.6 billion.*

*But the exit for Oryx and its financial backers was not an exit at all for the management team, led by CEO Brett Wiggs and COO Karl Pfluger. The next iteration for the Oryx team, it turns out, is once again Oryx—same company, same team—just a new private-equity sponsor resetting the baseline and the expectations.*

***After being acquired by Stonepeak Infrastructure Partners, Oryx Midstream CEO Brett Wiggs said, "We as a management team continue to remain excited about the business and about a capital provider that has deep pockets and will be able to provide us the capital and the opportunity to aggressively grow the business."***

*A year ago, New York-based infrastructure private-equity fund Stonepeak Infrastructure Partners purchased Oryx while simultaneously committing new growth capital into the Midland-based company. The management team reinvested alongside the new ownership. Since then and with new dry powder, Oryx has completed two deals.*

*The first, in a joint-venture agreement with Rattler Midstream LP, it established its initial footprint in the Midland Basin with the acquisition of Reliance Gathering LLC's assets for $355 million. That deal added more than 160,000 dedicated gross acres, 230 miles of pipeline, 110,000 barrels (bbl) of throughput and 200,000 bbl of crude storage. The second was a purchase from Targa Resources for $135 million, which added capacity in the Delaware Basin congruous to its existing position.*

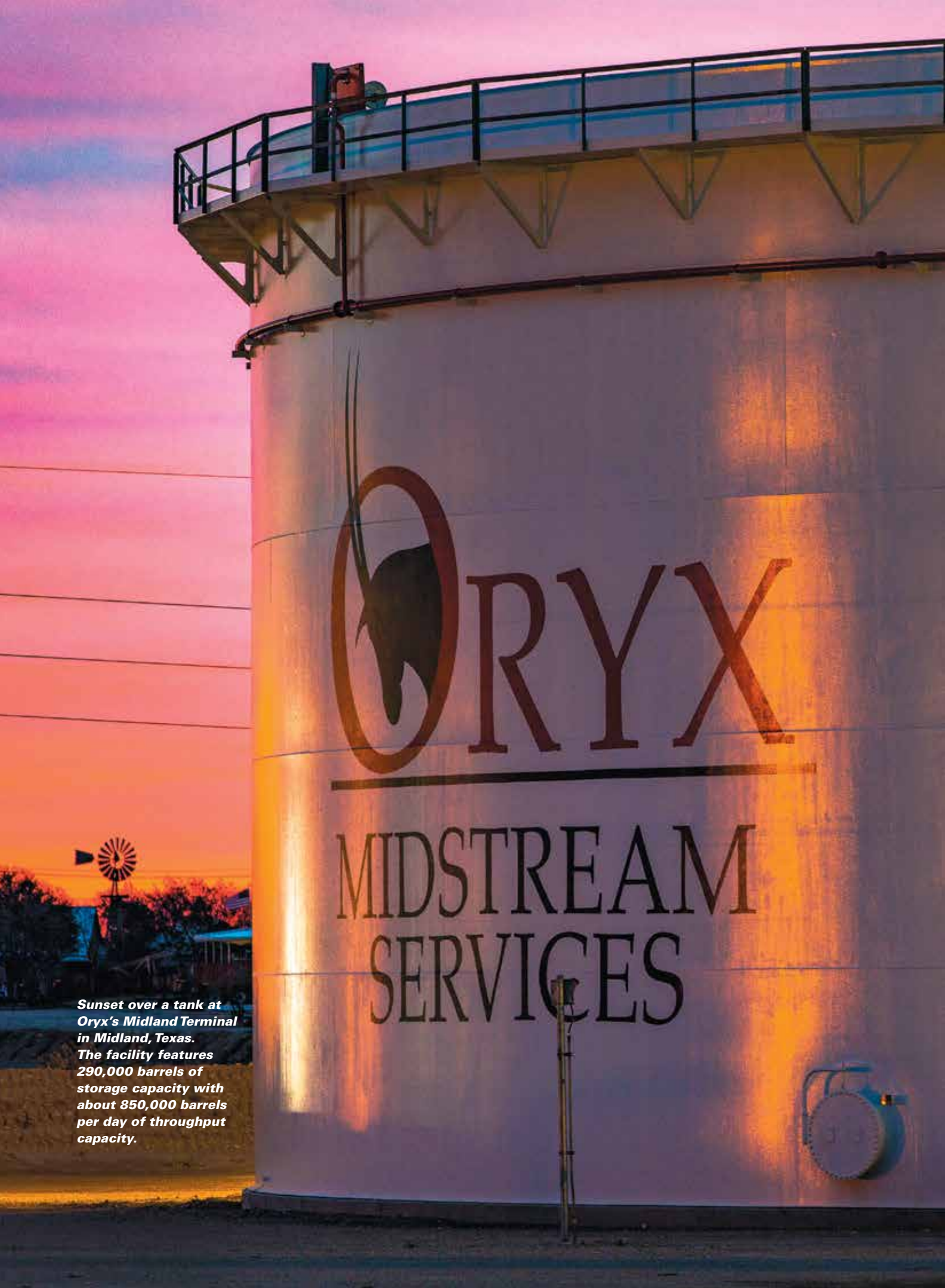
*Oryx now operates and transports a crude oil gathering system covering 1.3 million dedicated acres with nearly 40 customers in the Delaware and Midland basins. Its assets include more than 1,500 miles of pipe and approximately 2.6 million barrels of storage, with another half million under construction. Throughput at year-end exceeded 650,000 bbl/d, with a total of more than 1 million bbl of regional transport and delivery capacity.*

*Prior to forming Oryx, Wiggs was a managing director with EnCap Flatrock Midstream, a private-equity firm, and CEO of DFW Midstream Services, a Barnett Shale gas gathering company. During his career, he also worked with midstream and power companies in South America. Wiggs graduated from West Point and served in the Army as an artillery officer, including action in the first Gulf War.*

Investor visited with Wiggs regarding growth plans for the midstream company.

**Investor** How and why did the sale to Stonepeak come about?

**Wiggs** Oryx started as a traditional private-equity-backed startup company five years ago. We followed the traditional strategy of primarily greenfield development, and our focus was entirely in the Permian Basin developing oil assets.




***Sunset over a tank at Oryx's Midland Terminal in Midland, Texas. The facility features 290,000 barrels of storage capacity with about 850,000 barrels per day of throughput capacity.***

"I definitely think it's more of a challenged market, but at the same time the best place to be is the Permian."

There was always a strategy of moving toward an exit for our original private-equity providers at some point. As we built the business, our capital needs continued to grow, and we reached a tipping point, a maturity in the business, where it just made sense for us to bring in new capital providers who have a longer-term view on the business.

So that started conversations with Stonepeak a couple years ago. Karl and I got to know the guys and eventually it came to fruition. We changed ownership within the company, and we as a management team continue to remain excited about the business and about a capital provider that has deep pockets and will be able to provide us the capital and the opportunity to aggressively grow the business.

**Investor** So in addition to being an exit, is this essentially a recapitalization for Oryx?

**Wiggs** It is. Since the transaction, we've continued to grow the business from the greenfield development side. On top of that, we've done two additional transactions, which has not been our traditional mode of growing the business. With the Reliance and Targa Outrigger [Crude Oil Gathering System] transactions, we were able to put incremental capital to work in growing and purchasing assets at attractive valuations. There are a lot of good opportunities to continue to put capital to work and to grow the business in what is the best basin in the world.

**Investor** What is the vision now that you've got new equity ownership?

**Wiggs** We want to continue to capitalize on the strategic position that we have in being one of the largest aggregators of oil in the Permian Basin. We want to continue to build that network. Because of the connectivity both upstream and downstream, we're becoming more of a pipeline network within the basin that creates unique solutions and optionality for our customers as we grow the business and volumes across our system.

**Investor** What opportunities will the Reliance acquisition create for Oryx?

**Wiggs** It's a good starting point and foothold for us in the Midland Basin, and something we hope to grow. We haven't participated there in the past, so it's a unique opportunity for us to expand and potentially create new opportunities of growth all the way across the Permian. It also creates the opportunity for incremental connectivity across our system where we can utilize assets on both sides of the basin to give customers a wide range of solutions, both from a gathering footprint and from deliverability across the system.

**Investor** Can you explain the overall strategy with the Targa deal in the Delaware?

**Wiggs** That was a very good fit with our existing system in the Delaware Basin. If you look on a map, the Oryx system pre-acquisition looks like a backward C with our original core position being in the southern Delaware, with the middle of the hole centered on Wink. With this acquisition, the pipe is perfectly suited to give us incremental reach from the gathering side in the middle of that open space on our map.

But also from a connectivity standpoint, we are able to access and link markets through that acquisition. We are able to increase the connectivity off of that system into Oryx's regional transport system to provide current customers incremental connectivity for downstream markets at Crane and at Midland.

**Investor** What construction projects are you funding this year?

**Wiggs** We're going to continue to build out the system. We've got an ongoing storage expansion with a half a million barrels of storage under construction today at our Pecos terminal and at our Crane terminal, and we're probably going to do some at our Midland terminal. Those are three key nexus points in the system.

In addition to that, we connect on an average between 10 and 20 new tank batteries every month, and we don't see that slowing down in the near term. That's a continuous effort for us. We run between seven and 10 construction crews continuously on those projects.

We just finished a major buildout of the system up into Lea County, N.M., up to Lynch Station near Hobbs. And then we're continuing work across the system with several different pump expansion projects to support the incremental growth in the system.

**Investor** Where are you targeting new growth? What regions do you think need additional capacity?

**Wiggs** The northern Delaware Basin. We continue to see significant growth, and that's an area where we've just expanded into. I think we'll continue to see a need and opportunity to put incremental capacity in place. That's a newer area for us, and we just haven't put as much capital there, and we don't have as big a breadth of pipe infrastructure in that region. We'll continue to see opportunity in the northern Delaware.

**Investor** Do you plan to aim any capex to the new Midland Basin footprint?

**Wiggs** We are. First and foremost is to upgrade the system to the way that we would want to safely and reliably operate that system. On top of that we are looking at opportunities to put in new truck stations and to expand month-to-

***Meter skids at an Oryx facility in the Permian Basin. Even before its latest two acquisitions, Oryx was the largest private oil gathering and transportation business in the Delaware Basin based on dedicated acreage and gathered volumes.***

***Oryx Midstream's facility in Crane County, Texas, has 730,000 barrels of storage with an additional 250,000 barrels under construction.***

month volume with some incremental producer connections. We'll definitely put dollars in that area so that we can continue to grow that business.

**Investor** Your crude system now accommodates batching. Do you see oil quality in the Permian as a growing issue?

**Wiggs** The simple answer is yes. When you look at the growth of light barrels in the Delaware Basin, the rate of growth of light barrels versus WTI barrels is dramatically higher. As the light percentage of this stream grows over time, the ability to segregate, batch and manage those qualities is going to become more and more important. And we see a differential in pricing and a pretty significant volatility on that differential in pricing. And so if you can manage the physical assets to provide the best customer solutions for where and how those grades are managed, it's value added for our customers.

We have the ability to batch and segregate three different grades of crude. Right now, we're doing two grades of crude—WTI, which is 44 degrees [gravity] and below, and WTI light, which is 44 to 50. And I think we're unique in that capability because of the way that our gathering systems were built out, and we're unique because we have invested significant amounts of capital in our system, in storage, to be able to appropriately manage those grades of products.

We do have the ability to segregate and batch condensate, but I just don't see that as a big market yet.

**Investor** Many industry observers predict that the Permian's production growth will slow. If so, how would that impact your growth plans and your capex?

**Wiggs** There's definitely been a reduction in rig count. Everybody can see that, and in the end that's going to slow the production growth. But at the same time we still see this strong production growth across the basin, and I would say that we feel pretty good about the core areas that we're in and continuing to see that rapid growth. Our volumes in 2019 doubled from 250,000 to 500,000 pre-acquisitions. So we see that growth continuing. Maybe not at as high of a rapid pace, but we do continue to see and project growth across our system.

It's a changing market, and we've got to be smart about how we employ capital and make sure that we're getting appropriate returns on that capital. We've got to be smart about where we're putting it and ensure that we do feel more confident about that growth. But we feel it's there, and we continue to be excited about the opportunities to invest and create more capacity and to move more barrels across the system.

**Investor** What decisions do you have to make differently regarding investment?

**Wiggs** I'm not sure if it's any different than the way we've always looked at the business in that the value that you create in the midstream system is always determined by the value of the resource that underlies that system.

But we need to continue to have very healthy and in-depth discussions with our customers, understanding what their activity cadence looks like, where they need the capacity and making sure that we can stay in front of that. From that aspect, just good communications and good clarity on development plans and development activities.

**Investor** Are you concerned about infrastructure overbuild in the Permian if producers slow down?

**Wiggs** We're definitely going into an overbuild situation on long-haul takeaway pipelines out of the Permian Basin, but I think production will grow into it over time. We've probably got a two- to three-year period where we're going to be overbuilt before we grow into that capacity.

"There's definitely been a reduction in rig count … and that's going to slow production growth. But at the same time we still see strong production growth across the basin."

Oryx does not have participation in any of those downstream out-of-basin pipes, but what we do provide for our customers is unique optionality to go to any of those major downstream markets to make sure that they can go to the best market to sell their production and get the best net-back pricing.

**Investor** What do you see as the biggest challenges in 2020 for midstream companies in the Permian Basin?

**Wiggs** We've got to continue to improve our efficiencies for building new assets in a cost-efficient manner, especially in New Mexico. New Mexico is a really tough market for execution on construction projects. There are significant regulatory and permitting requirements, which causes that timeline to extend out. It's tough from a cost standpoint. As you have more competition in the midstream markets, you've got to become more efficient. So we've got to continue to work on that.

**Investor** Do you foresee any further acquisitions in the near term?

**Wiggs** We'll have to see what opportunities come out. As part of the [Stonepeak] transaction, there is an incremental amount of committed capital that is available to us to grow the business where we see new opportunities.

But at this point we've made two acquisitions pretty quickly, and we need to take a breather and get those integrated into the company. I'm not sure that we're going to go out and do a lot more in the next few months, but as we see opportunities, we're definitely going to take a look and be aggressive about continuing to grow the business through greenfield and M&A.

**Investor** Would you go beyond the Permian?

**Wiggs** I'm never going to say never. If there are opportunities maybe we'll take a look, but we've got great opportunities in the best basin in the world, and so we'll continue to focus on that. I think probably that's where we'll stick to our knitting.

**Investor** Do you have plans to go public, and what would need to happen first?

**Wiggs** We're backed by a private-equity infrastructure fund, and we have a little bit longer life cycle on how we can grow the business, but at some point there has to be some type of liquidity event. I'm not sure that it's going public or potentially a merger or acquisition by a larger company. But something is going to happen along those lines.

**Investor** Do you think the markets are there for you should you reach that point?

**Wiggs** I think they would be for the right asset and for the right company. I definitely think it's more of a challenged market, but at the same time the best place to be is the Permian. We feel like we've got the core of the core in the Permian, through our dedications and our customers, and we'll continue to have opportunities for growth because of that.

**Investor** So where do you see Oryx a year from now?

**Wiggs** I see us close to a million barrels a day of throughput. I see us at probably about 2,000 miles of pipe, and 3.5- to 4 million barrels of storage.

**Investor** What impact did serving in the Army have on you and your career?

**Wiggs** The biggest thing that you learn is about leadership, how to deal with adversity and the value that individuals can provide to a group and how you as a leader can develop that, grow it, be the part of it.

I went to West Point at 17 years old and, five years later at 22 years old, I had 65 people working for me. That was a unique opportunity. The experience to learn from all of those mid-level leaders in the Army that are 10-, 20-plus years older than you are, but are willing to take you under their wing and provide the guidance and leadership to grow as an individual. They understand what you need to contribute and how you need to be as a person to get the most out of a group of individuals to create a team and a company.

I think those things were extremely valuable to the person that I am today. □

***Oryx's Reeves Terminal in Reeves Co., Texas. "There are a lot of good opportunities to put capital to work and to grow the business in what is the best basin in the world," said Oryx Midstream CEO Brett Wiggs.***

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# SPEND LESS, SMILE MORE

These four midstream companies have captured analysts' favor by heeding investor demands to generate free cash flow.

ARTICLE BY
JOSEPH MARKMAN

Despite an uptick late in the year, midstream oil and gas stocks endured a rough 2019 on Wall Street. The sector outperformed the E&P and oilfield service segments but was subdued by a general sense of investor disappointment with energy.

"I think that had a lot to do with the midstream sector spending too much money and frustration with that and people wanting them to dial things back," said Pearce W. Hammond, managing director for midstream and infrastructure equity research at Simmons Energy in Houston.

This year should be better for the sector, Hammond said, because many in the midstream have listened and responded. Four companies in particular, selected by Hammond and Kyle May, equity research analyst for Capital One Securities, are primed for strong uplifts in part because of their approach to generating free cash flow.

"Because the E&Ps are spending less money and production expectations are coming down, people want the midstream companies to spend less, and you see that with Energy Transfer [LP]," Hammond said. "They intend to spend less money in 2020 versus 2019, and then as you move forward it will be even less."

***"Because the E&Ps are spending less money and production expectations are coming down, people want the midstream companies to spend less, and you see that with Energy Transfer [LP]," said Pearce W. Hammond, managing director at Simmons Energy.***

There's a lot to like about the Dallas-based giant with a market capitalization of $33.8 billion as of Jan. 31. Hammond points out that Energy Transfer pays a dividend yield of about 9%, which will bolster investor return in addition to the expected jump in unit price.

Hammond sees the company as an attractive valuation relative to peers, noting that its units trade at about a 2x discount at enterprise value-to-EBITDA. He is also impressed that Energy Transfer operates a self-funding capital program. "They generate enough cash flow to cover their distribution and fully fund their capital program," Hammond said. "There are a lot of midstream companies that actually can't do that."

Energy Transfer also boasts an integrated wellhead-to-water business model, which allows it to take an E&P's molecules and liquids all the way from the lease to the water for export. That's a one-stop shop for gathering, processing, shipping via pipeline, fractionating and exporting—essentially whatever the producer needs.

Hammond also favors the company's restrained approach to capital spending in the less-is-more era.

"They're guiding to growth capital spending this year of $3.6 billion to $3.8 billion, and that compares to $4 billion in 2019," Hammond said. "After this year, they only have—right now—$1.5 billion worth of projects that are approved. I think that number will go up, but not to the level that would support spending $3.6 billion to $3.8 billion a year. I think the capital spending's going to fall in the next few years, and that will result in a lot more free cash flow, which is positive for investors."

### 'Management will be prudent'

Capital One's midstream coverage focuses on specialized mid-caps and small caps, which offer investors plenty of upside potential, among them one of his choices: Crestwood Equity Partners LP. *(Editor's note: Capital One Securities has received compensation for investment banking services from and managed or co-managed a public offering of securities for an affiliate of Crestwood Equity Partners LP within the past 12 months.)*

In January, Crestwood, with a market capitalization of $2.08 billion as of Jan. 31, introduced a long-term distribution policy that bases future distributions on free-cash-flow generation.

"To me, that's definitely a positive sign," May said. "It signals that the company is aware of what investors are looking for, their desire to see that return of capital, but also that management will be prudent in how they're going to return capital."

More than that, May said that Crestwood is signaling to the market that it wants to break the cycle of increasing quarterly distributions by a small amount, common among many midstream companies in the past. "This is more of a 'we're going to step things up and, based on our annual outlook going forward, we'll continue to increase the distribution, but we also want to be mindful of what our free cash flow is and be able to operate within our means,'" he said.

**Analysts' Recommended Midstream Stock Picks**

| Analyst | Recommendation | Symbol | Price As Of 01/31/2020 | Target Price | Potental Upside |
|---|---|---|---|---|---|
| **Pearce W. Hammond** Simmons Energy | Energy Transfer LP | ET | $12.59 | $20 | 59% |
| | Enterprise Products Partners LP | EPD | $25.77 | $33 | 28% |
| **Kyle May** Capital One Securities | Crestwood Equity Partners LP | CEQP | $28.96 | $43 | 48% |
| | Archrock Inc. | AROC | $8.35 | $14 | 68% |

Crestwood operates in the Bakken Shale, the Powder River Basin and the Permian Basin, and it has pumped most of its investment in recent years into those core areas. While challenges abound in U.S. unconventional plays, the Bakken rig count has held steady, May said. The Powder continues to fight for capital. Rig activity in the Permian continues to outpace other areas of the U.S., and operators who have the ability are moving rigs to the Permian from other basins. May expects these areas to continue to drive growth for Crestwood.

In 2020, Crestwood expects to improve its leverage ratio below 4x. The coverage ratio will be around 2x. "The way that our model and our projections shake out, plus with the goal posts that they provided … I think you'll see their EBITDA increase 15% year-over-year," May said, adding that he expects continued growth in 2021.

One cause for investor hesitation with Crestwood is related to guidance from a producer, Chesapeake Energy Corp., which announced in late 2019 that it would cut its rigs in the Powder River Basin from four to two.

"I know Crestwood got a lot of pressure from that at the time, but I've spoken with the company. Crestwood was already aware of this when they put out their initial guidance for 2020 so the stock maybe got hit a little bit harder than it should have at the time," May said. Balancing that news are plans by operator Panther Energy Co. LLC to add well connects in 2020. May said he also expects Crestwood to garner commercial agreements with other third parties, but he acknowledged that the Powder River is less of a known quantity with investors.

### Top tier assets

The unit price of Enterprise Products Partners LP enjoyed a strong run from December through mid-January, so its potential upside is not as strong as other picks, but the midstream giant (market capitalization of $56.7 billion at the end of January) inspires enthusiasm from Hammond.

"This is definitely a sleep-well-at-night midstream company," he said.

The No. 1 reason to favor Enterprise is the same reason Hammond likes Energy Transfer—an integrated wellhead-to-water asset base. He also points to a long track record of successful operational execution, a solid management team and strong inside ownership.

"And their assets are top tier," Hammond said. "They've got the largest position at Mont Belvieu, [Texas], and the fractionators there which is kind of an irreplaceable asset. You can't recreate that asset. They're the largest exporter of crude oil out of the United States. They're the largest exporter of LPG." Enterprise's debt ratio is around 3.6x for 2020, well below peers, he said. By comparison, the other midstream large caps are at about 4.5x.

He is also intrigued by Enterprise's partnership with Enbridge Inc., announced in December, to develop the Sea Port Oil Terminal 30 nautical miles off the coast of Brazoria County, Texas. The facility would be able to handle very large crude carriers and load as much as 2 million barrels per day.

### Relying on output

May's optimism about natural gas compression provider Archrock Inc. derives from the U.S. Energy Information Administration (EIA) production outlook. In 2019, the U.S. set a record with average output of 92 billion cubic feet per day (Bcf/d). The EIA expects 2020 output to rise to 94.7 Bcf/d before slipping to 94.1 Bcf/d in 2021.

Archrock's reduction in growth capex dovetails with the easing of natural gas production growth. Growth capex for the company, with a market capitalization of $1.27 billion, is expected to drop from the range of $285 million to $300 million in 2019 to under $125 million in 2020, or likely more than 55% year-over-year. That's exactly what the analysts say investors want to hear.

"Based on that, they'll be able to leverage their existing fleet of large-horsepower equipment and that will lead to free cash flow generation, as you have EBITDA uplift and capex declining," said May, who expects the company to achieve many of its financial milestones. "They'll begin generating free cash flow this year. They're going to improve their leverage ratio below 4x, and their distribution coverage should be above 2x this year as the company increases their dividend."

Archrock's success will depend to a large extent on operators' budgets and plans for 2020, May said. Still, if the EIA forecast points in the right direction, natural gas production will increase, and that should bode well for Archrock. "If you see some headwinds where production falls off more quickly than they're expecting, then that would definitely be a headwind for the company," May said.

### What could go wrong?

The headwinds these companies will face reflect challenges the midstream sector as a whole will endure in coming months. Hammond's top concern is the falling rig count,

***Kyle May, equity research analyst for Capital One Securities, said that Crestwood is signaling to the market that it wants to break the cycle of increasing quarterly distributions by a small amount, common among many midstream companies in the past.***

a sign that future volumes will be lower than had been expected. Also worrisome: declining well production rates. An IHS Markit analysis showed that Permian Basin oil output would have tumbled 40% in 2019 had it not been for wells that began production in that year.

The industry's strategy of relying on exports to compensate for flat oil and gas demand in the U.S. may need revising if production comes up short. It also buttresses the arguments of investors who want to rein in spending, which conflict with proposals by management teams hungry for new opportunities.

"That's the tension, the tug-of-war between those two," Hammond said. "The management team is saying, 'Hey, we got great projects that are being driven by high-quality producers,' and you have investors saying, 'yeah, but the energy business is slowing way down. You don't need to spend so much money to grow.'"

"There's going to be less volume growth coming to midstream companies, but in turn, less capex will be required than in recent years when U.S. production was rapidly growing. So, we should see a significant drop in midstream spending this year."

—Kyle May, Capital One Securities

Enterprise, a main driver of exports, is a prime example.

"The expectation a lot of people had, even just a year ago, was that the U.S. was going to grow oil production by about 1 million barrels per day per year … which is what global demand grows at," he said. "But that's not the case anymore; it's probably half that number. So you have to argue that maybe we don't need as many export facilities as we thought we did."

May agrees that the pressure on upstream companies to slow their rates of growth will lead to slower volume growth for midstream companies, but he sees an upside to that as well. "There's going to be less volume growth coming to midstream companies, but in turn, less capex will be required than in recent years when U.S. production was rapidly growing. So, we should see a significant drop in midstream spending this year," he said.

Aside from volumes, the sector has been grappling with stubbornly low prices for natural gas, with the U.S. benchmark Henry Hub sinking to 12-month lows below $2 per million Btu in late January. Much of that can be attributed to the absence of sustained cold weather across the country this winter and has contributed to financial woes experienced by gas producers.

Other issues from outside the industry can have an impact. Hammond cited the prospect of the Federal Reserve raising interest rates this year. It's always a possibility, though not a certainty. "The midstream are primarily yield vehicles," he said. "They pay big distributions or dividends, but they compete with fixed income instruments for investor dollars, so if interest rates were to move higher—they're pretty low right now—but if they were to move higher, then that could be a headwind."

And then there's the wild card: the 2020 U.S. presidential election. "If the Democrats nominate somebody who is pretty far left of center and that person wins, it may not be very favorable for energy at all," Hammond said. A week prior to the Iowa caucus, Sen. Bernie Sanders, D-Vt., a Democratic Socialist, was leading in the polls in that state, with Sen. Elizabeth Warren, D-Mass., another presidential candidate promising economic upheaval, near the top. Those two were the first choice of 40% of likely voters in a *New York Times*/Sienna College poll. Moderate Democratic candidates Mayor Pete Buttigieg, former Vice President Joe Biden and Sen. Amy Klobuchar, D-Minn., together accounted for 43%.

**What could go right?**

The industry has its share of tailwinds, though, including a January report by IHS Markit in which 67% of institutional and private-equity investors with a total of $98 billion in energy assets under management believe there is potential for the industry to enjoy a cyclical rebound in the stock market and lure back equity investors. And 63% of those surveyed view the oil and gas sector as undervalued.

Hammond believes the oil and gas industry as a whole is positioned for a strong transitional year that will result in a much more positive market. He expects much of the shift to take place in the second half of 2020 and carry into 2021 as the positive effect of the combination of lower rig counts, capital discipline from E&Ps, and slower U.S. production growth results in tighter commodity market balances. But improvement with oil supply fundamentals is only part of it. Hammond also points to companies following the lead of those listed here and adopting capital allocation reform strategies, which translate into lower spending. "It's starting to take hold," he said. "It needs more time, but it is taking hold."

The midstream sector is poised for an increase in M&A activity, he said, as well as a continued wave of conversions from MLPs to C corps. And if companies drag their feet in moving forward, count on angry activist investors to express their dismay. "If equity prices had stayed where they were in November, I think you could see some activists come in," he said.

In this positive outlook for the year, midstream stocks will benefit, though they may be outperformed by other segments.

"If you're an energy investor, you're probably going to want to buy the E&Ps and oilfield service sector and, given some of the challenges in oilfield services, you probably would buy E&P first and then oilfield services second," Hammond said. "I would think in that environment they would probably outperform the midstream sector because the midstream sector is a bit more stable, conservative and, in an upward moving commodity price environment, the higher beta stuff is going to move." □

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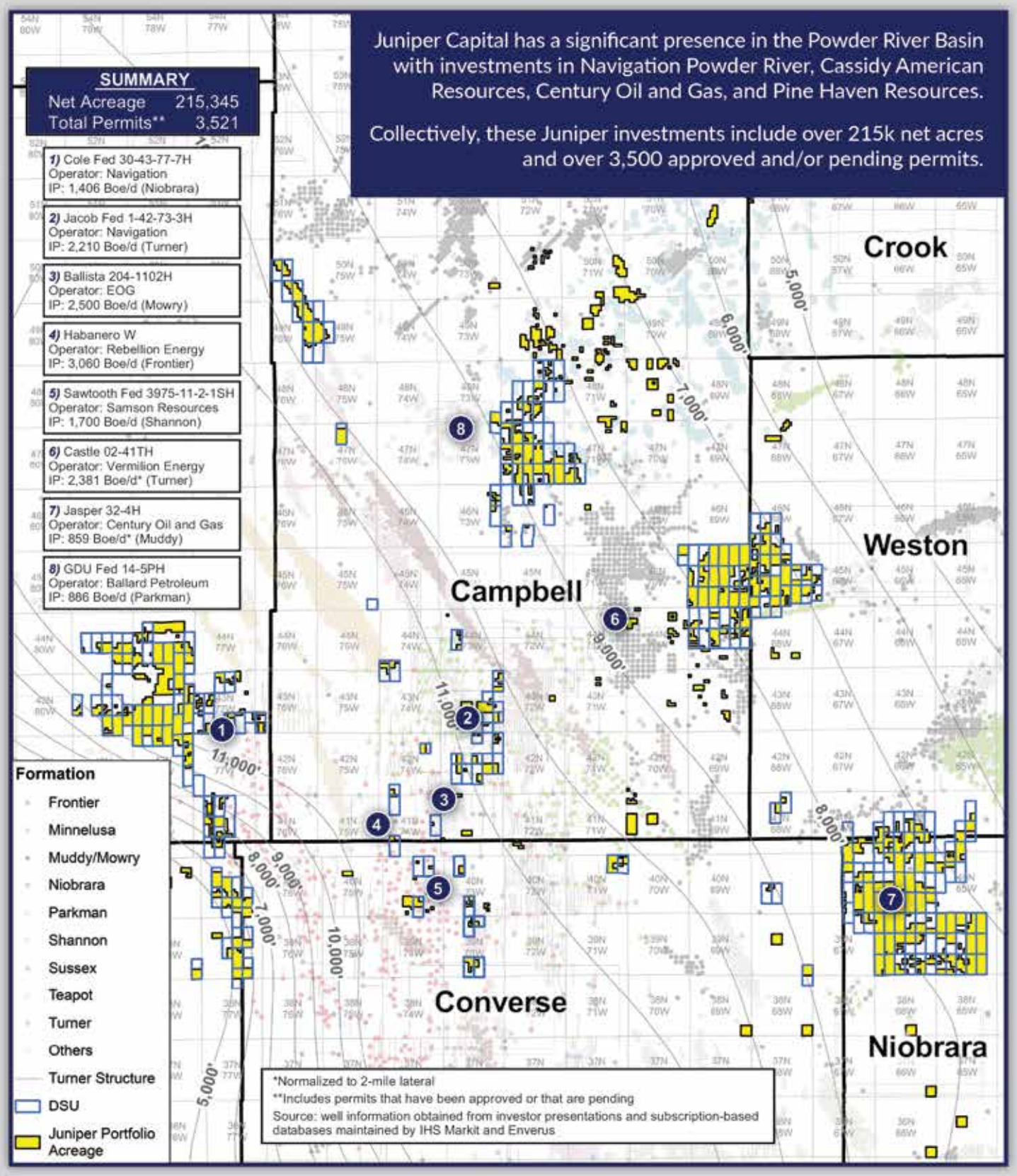


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# IN THE ZONE

E&Ps, some for the first time in years, are returning to what's always been considered the hinge point for the Powder River Basin: the Niobrara Formation.

ARTICLE BY
DARREN BARBEE

For years, the brittle rock beneath Wyoming's Powder River Basin has whispered promises of greatness to wildcatters, geologists and explorers seeking oil.

And for nearly as many years, the basin has been pitched as a sequel to the Bakken, heir apparent to the Eagle Ford, the Rockies' answer to the Permian Basin.

Upstream companies see now as the time to make believers of the rest of the oil and gas world. After Samson Resources II LLC was largely dismantled by a $4 billion bankruptcy, its leaders chose the Powder River to make the company's last stand.

In March 2017, Samson Resources emerged from bankruptcy after peeling off assets in the Permian, Williston and Anadarko basins—among others—as it unspooled nearly 500,000 net acres of oil and gas leasehold.

"We've exited everything," president and CEO Joseph A. Mills told *Investor*. "This is our last large asset. And we're very excited about it."

In 2018, Wyoming production hit a 25-year high, according to federal data. About a half of the state's oil production comes from the Powder River Basin, according to the Wyoming State Geological Survey (WSGS). In 2019, E&Ps trotted out one successful well after another in the Shannon, Frontier and Turner formations. And Wyoming oil production continued to grow through the first 10 months of 2019 by an average 15%.

But E&Ps, some for the first time in years, are returning—in force—to what's always been considered the hinge point for the Powder River Basin: the Niobrara.

The ascension of the "Nio," as some operators refer to the formation, may be at hand.

"This is the next big oil play, and we've heard it for years," said Ryan Birkenfeld, CEO of private E&P Northwoods Energy LLC. "But I think we're on the cusp of it now."

Wood Mackenzie noted in a January report that the Powder River Basin's sandstone plays have yielded "headline-grabbing wells" but doesn't expect that to translate into a surge of rigs in the basin. "These [formations] are niche plays that are more akin to conventional fields than resource plays," the report said.

The Powder River Basin's "Niobrara type curves are tracking higher every year," Wood Mackenzie said, noting that gas-to-oil ratios are less than 3:1, and Wyoming is taking steps to clear up a permitting glut. With Colorado's regulatory environment in flux, Wood Mackenzie said some operators might also shift from the Denver-Julesburg (D-J) Basin Niobrara to Wyoming in 2020.

"We expect Niobrara breakevens in the Powder River Basin to test the $45 per-barrel marker, down drastically from nearly $70 per barrel in 2016," the firm said.

In the third quarter, some operators began to signal plans to shift toward the Niobrara. Samson, Northwoods, Chesapeake Energy Corp. and others are launching delineation in the formation.

"I think we're seeing [the basin] being unlocked by multiple operators," Birkenfeld said. "Across the basin, everybody's kind of pivoting toward the Niobrara Formation."

In November, Chesapeake CEO Doug Lawler said the company's plan for the Powder River would shift to the Niobrara after the company drilled its first Niobrara well in five years.

"With the longer lateral and a modern completion design, the well has quickly become the best-performing Niobrara well in the basin," Lawler said, adding that in less than 90 days it had produced 106,000 barrels of oil.

Lawler anticipated Chesapeake would spend about 25% of its 2020 Powder River capital program in the Niobrara and would run two or three rigs in the Powder River Basin—essentially the same as its drilling plan in South Texas.

To some extent, E&Ps are refocusing on the shale formation to finally answer doubts that the Niobrara offers the same repeatability as the other great oil producing plays of North America—the Bakken, Eagle Ford and Permian.

Mills said Samson's offset competitors are all talking about Niobrara wells, and most companies in general seem to be focusing on the Niobrara.

"That's really where the juice is," Mills said.

But Mills also argues that the Niobrara is key to the Powder River Basin.

"For the PRB [Power River Basin] to become the great basin that we all know that it can be, it's all about the Niobrara," he said.

***"For the Powder River Basin to become the great basin that we all know that it can be, it's all about the Niobrara," Samson Resources II LLC president and CEO Joseph A. Mills said.***

"For this basin to have 50 to 60 rigs running in it, is all about the Niobrara."

**Big laboratory**

In 1832, explorer Army Capt. Benjamin Bonneville found a tiny, unctuous stream of what fur trappers called the "Great Tar Spring" oozing under the peaks of the Wind River Mountains of Wyoming.

As later recounted by the writer Washington Irving, Bonneville had sought out what was thought to be a medicinal substance for his company's horses and men. Irving recognized it as the "bituminous oil, called petrolium [sic] or naphtha, which forms a principal ingredient in the potent medicine called British Oil."

The oil that seeped from salt bluffs in the 1830s is not the oil of the Niobrara, which is trapped some 8,000 feet below ground in rock roughly 66 million years old.

But explorers of the basin don't believe they'll need to crack codes to rapidly bring the formation under heel for widespread development.

Birkenfeld, a geologist who served as EOG Resources Inc.'s area manager for the Powder River Basin, said he fell in love with the distinctive rock in Wyoming, which features up to 5,000 feet of stacked pay potential and multiple targets within that pay zone.

"You only have one other basin that I'm aware of in all the work that I've done over the years—and that's the Delaware Basin," he said. The Powder River "has a similar geologic makeup."

And, admittedly, the Powder River is in its "early days."

"We are still in inning one of the play, so we're not subjugated to the parent-child relationships that you're seeing across other plays," he said.

That means Northwoods and other E&Ps can siphon off what's been learned from all the other Lower 48 plays, including the Delaware, Eagle Ford, Midland Basin and Scoop/Stack.

From that, companies get a leg up on understanding the ultimate wellbore densities that the Niobrara can tolerate.

"All those other plays that have been drilled and harvested to date, that's our laboratory," he said. "So you take those learnings and say, 'Oh, well, that works here.' And ultimately rock is rock. Good rock is good rock. You pump sand, water downhole under high pressure and frac it."

Mills said that Chesapeake, EOG and Occidental Petroleum Corp. are bringing their technical talents and expertise from drilling in the Permian to the Powder River Basin.

The result, he said, is that penetration rates have increased and days from spud to turning wells to sales have fallen dramatically. Researchers cited performance efficiency 15% to 22% higher in the Powder River by using drillbit geomechanics to measure variability along lateral walls, then spacing stages to minimize horizontal stresses, according to research presented at the Unconventional Resources Technology Conference in July.

***Like other Wyoming companies, Northwoods Energy LLC raced to "capture the flag" by acquiring drilling permits in the Powder River Basin — a free-for-all system that state officials hope they have addressed with new regulations.***

PHOTO COURTESY OF NORTHWOODS ENERGY LLC

***"This is the next big oil play, and we've heard it for years," said Ryan Birkenfeld, CEO of private E&P Northwoods Energy LLC. "But I think we're on the cusp of it now."***

E&Ps' results in the Shannon, Turner and Frontier formations have so far been remarkable, particularly for their oil cuts.

"That's obviously very encouraging," Mills said.

As of January, a Northwoods well in the Shannon had produced 89% oil in its first 90 days while a Frontier well's IP30 produced 81% oil. Its Niobrara entry, the Spruce 21W33-2NH well, by contrast, produced 67% oil in its first 60 days.

Such results are typical of the Niobrara, which tends to lack the higher oil cuts of other formations. But the Niobrara scores better in two respects: It drills far easier than the Shannon and Frontier—"like butter," Birkenfeld said. And it is vast.

"The Shannon is great, but the thing about the Shannon and the Frontier that is different than the Niobrara is the fact that it is not ubiquitous," he said. "It's not everywhere across the basin where you can set up a full-fledged development plan and run multiple rigs like you see in the D-J Basin."

"The Nio is literally everywhere," he said, "and you find it in the right thermal maturity, right geologic window.

"At that point, you're off to the races. What you're beginning to see unlocked across the play is that all you have to do is put a modern-day, high-density completion on this particular rock and it generates a phenomenal oil cut if you're in the right spot."

### Capture the flag

The early days of the Powder River Basin's rise were chaotic, Mills said. That's because Wyoming has faced a race, as Mills describes it, to file drilling permits. Samson itself holds 1,600 operated permits.

"I've got to be honest—it was the Wild West out here," he said.

With stirrings by offset drillers in the Niobrara, Mills even talks about drilling wells to "protect our flanks."

Wyoming's first-to-file regulations have resulted in what Birkenfeld called a race to "capture the flag" by filing permits to lock up resources. Last year, for instance, Texas E&Ps applied for 10,764 oil and gas drilling permits. Wyoming received nearly that number of permits in the first three months of 2019.

On Dec. 20, the Wyoming Secretary of State approved new rules that significantly limit the time allotted for drilling a well under the state's first-to-file regulations.

The Powder River Basin isn't without its challenges. While the basin, once a magnet for coalbed methane production, has plenty of gas infrastructure, it still lacks a solid network of crude pipeline and gathering. Operators say many of those problems are also being addressed.

Chesapeake executives, for instance, said in November they expected to reduce gathering, processing and transportation in the basin by about 25% in 2019. In part, that reduction was the result of moving from trucking its oil production from the wellhead to an oil gathering system. The addition of infrastructure is particularly important to Chesapeake, which has grown oil production to about 8.3 million barrels in 2019—a 270% increase from 2017.

Samson, likewise, historically trucked much of its oil, and "a portion is still being trucked today," Mills said. However, Samson had already engaged in building crude infrastructure to get its oil to the Rockies oil hub at Guernsey, Wyo.

PHOTO COURTESY OF SAMSON RESOURCES II LLC

***Like other Powder River Basin producers, Samson Resources II LLC initially relied on trucks to move its oil to market—a deficiency rectified by new pipelines and a slate of additional lines that are being built or converted.***

In January, WSGS noted several pipeline projects are in progress in the state. In eastern Wyoming, Saddlehorn Pipeline Co. is expanding its pipeline to Fort Laramie and expanding its capacity by 30% to a total of 290,000 barrels of oil and condensate per day. The expansion should be operational in late 2020.

Kinder Morgan Inc. and Tallgrass Energy LP are also converting two natural gas pipelines into crude oil pipelines to transport crude from the Powder River and Denver basins to the hub in Cushing, Okla.

In July, Phillips 66 Co. and Bridger Pipeline LLC opened a supplemental open season for a line to run from the Rockies and Bakken and connect with Gulf Coast destinations. The 24-inch pipeline would run from Guernsey to Cushing.

Still, "the big issue we had was over the past, call it decade, obviously was that Bakken barrels were flooding Guernsey," Mills said. "The Guernsey hub obviously is the major trading point for all PRB barrels."

Mills said the likelihood of blowout differentials for Powder River crude subsided after the Dakota Access Pipeline came online.

"Ironically, it left Guernsey somewhat empty of barrels and left traders scrambling to fill pipes," he said, noting that differentials now range from $2.25 to $4.50 per barrel.

Those changes have made Samson and other companies less reliant on moving oil by truck. "I can't tell you the commercial rates, but I can tell you that it is far cheaper, obviously, than trucking barrels," he said.

**Room to roam**

Emily Dickinson called hope "the thing with feathers." David Moore, president of Deep Imaging Technologies, calls it "a four-letter word."

What Moore has observed in three recent jobs in the Powder River is that operators sometimes struggle to break rock during some of the stages. The company worked from August through November in Wyoming.

Fracs are also "fairly contained, so they're not running out … as erratic as some of the other plays," he said.

Moore said what his company has seen as it assists drillers by monitoring the flow of fluids up to 16,000 feet subsurface is promising.

"I think there's got to be more completions, more science and more monitoring," he said. "There's not enough science that's been done yet to really come up with a definitive answer. But from what we've seen, there is hope."

Proving the repeatability of the Niobrara remains an imperative for oil and gas companies in the Powder River.

"The laterals that we've done, the single wells have been a little shorter than what was seen in the Permian, though larger pads have drilled laterals of 10,000 feet," he said.

Moore said he sees many operators in the Powder trying to prove that their assets can match the quality of the Eagle Ford or Permian. But like all plays, the question remains whether the wells will be consistently high performing or if the current, promising results are due to E&Ps choosing the "most efficient rock to drill in first."

"They've got to figure out if they can keep that up, because they've chosen the best rock," he said.

"I think that's what everyone's doing in the Powder," he said. "They're trying to prove out that their assets are good. They haven't been fracking up there for a bunch of years, not in mass."

Operators have already made up their mind that the Niobrara will show the consistency of other shale plays.

Mills said Samson has so far been the only company that has truly chased after the Shannon and seen remarkable success. In January, the company noted that two Ogalalla wells in Converse County, Wyo., both had IP30 production exceeding 2,000 barrels of oil equivalent per day (boe/d)—both with at least 93% oil.

Mills said the company's Spearhead Federal well, in the Shannon, is a 1.4 million boe well with 90% to 95% oil.

"I put that up against any Wolfcamp well," Mills said.

Still, Samson has 100 to 150 Shannon well locations. "We have three times that in the Niobrara," he said. "Obviously the Niobrara is a widespread reservoir over large areas. It's also repeatable."

Mills said the Niobrara's widespread presence is essential for the basin's future. As of January, the company had drilled one Niobrara well.

"There's not enough running room either in the Turner or the conventional [reservoirs] to have 50, 60 rigs running here," he said. "Ultimately for us to see this basin really ramp up to its potential, it's going to be us figuring out how to unlock the secrets in the two unconventional reservoirs."

Birkenfeld, too, said the Niobrara is repeatable—it's simply a matter of understanding the play's ultimate density of wellbores and creating economies of scale by turning on large pads high-volume producing oil wells. He noted that the play's rock is soft enough to allow 10,000-foot horizontal wells to be drilled in two-bit or even one-bit runs.

"It's phenomenally easy to drill," he said, adding that a step into the wrong geologic conditions is not just tougher to drill but lacks the right relationship between permeability and porosity.

"That's what I love about the resource in place," Birkenfeld said, comparing the formation to the Permian's Wolfcamp and Spraberry. "You have that same type of scenario."

Mills offers a prediction, not unlike those made many times before about the Powder.

"I do think in the next three to five years," he paused to emphasize three to five, "the PRB will become one of the great oil basins of our country." □

***David Moore, president of Deep Imaging Technologies, said more completions, science and monitoring needs to be done in the Powder River, but the results look promising.***

# THE ART OF DIVERSION

From increasing reservoir access to fortifying well defenses, the time of diverters has arrived.

ARTICLE BY
BLAKE WRIGHT

The heterogeneous nature of the subsurface across U.S. unconventional oil and gas plays requires operators to engineer well completion schemes that can vary wildly from location to location, even in the same geographical region.

The cocktails are catered to allow maximum reservoir stimulation without jeopardizing the integrity of the well itself. The hydraulic fracturing process is designed to separate and free hydrocarbons from shale rock allowing them to flow freely to the surface, but it is a process that must be managed efficiently and economically to reap the greatest reward.

No two fractures are alike. Some penetrations into the reservoir can move great distances from the wellbore, while others may not migrate as far due again to the overall formation makeup.

In order to achieve a more uniform completion, operators can employ different equipment and techniques to ensure each fracture point, or well perforation, touches as much of the reservoir as possible. One of these techniques is the use of diverters.

Diverters are becoming more and more popular with operators looking to increase fracture complexity as well as defending existing fissures from detrimental frac hits.

According to Halliburton Co. Permian Basin technical manager Faraaz Adil, diverter market penetration is up around 60% to 70% with usage continuing to evolve to benefit connectivity.

"There has been a lot of development on different types of diverters available in the market now," he told attendees at the Hart Energy DUG Permian conference in 2019. "It is critical on how you apply it. You need to understand how it is going to benefit you versus just designing it and pumping it down."

Indeed, the "pump and pray" mantra of days past is starting to give way to a much more focused approach to the application of diverters.

Diverters come in various shapes, sizes and forms, but most can be separated into two main categories—mechanical or chemical—and are utilized to redirect (or divert) fluid from one part of the well completion to another. Each have their champions. Supermajor Royal Dutch Shell Plc, for example, prefers mechanical diverters. Both types temporarily block targeted sections of the well in order to get treatment to other areas. Think of a diverter as a sort of a downhole traffic cop, directing fluid where it is most needed to achieve the best reservoir coverage for the well, and it can be stationed for near-field, mid-stage or far-field duties.

A near-field mechanical system would be something like Enventure's ESeal ReFrac (RF) liner, an intra-well system used to isolate perforations and allow the operator greater customization over any planned refrac options.

A far-field chemical-based diverter is a product such as Schlumberger's Broadband Shield. The service uses a composite fluid system with a proprietary engineered far-field diversion pill that bridges at the fracture tip to prevent excessive growth of fracture length

***Combining its top-tier degradable particulate diverters with a mixture of light density proppant was the key to BJ Services' REACH Complete service.***

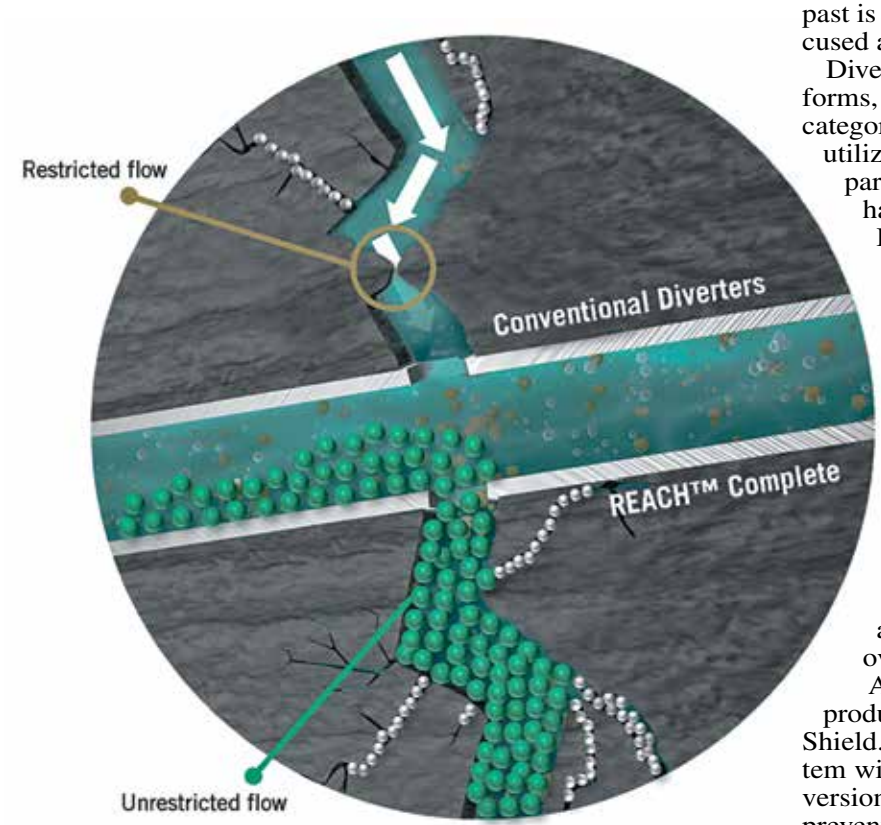



PHOTO COURTESY OF BJ SERVICES

and height, thus creating a barrier to prevent communication between wells.

### Complexity within reach

One of the newer entries in the world of chemical diversion is the introduction by contractor BJ Services of its patented REACH Complete solution. The company has long been a provider of diversion products, but with REACH Complete, BJ Services has combined its top-tier degradable particulate diverters with a mixture of light density proppant.

The REACH Complete far-field diverter blend is tailored to use with slickwater fluid to transport the diverter pill with minimum settling far into the formation—propagating fracture complexity and increasing conductivity. It is injected into the reservoir formation to plug up the micro-fracture network and create new fractures while at the same time keeping existing fractures open and eliminating risk of near wellbore choke and restricted production.

"That's the whole idea behind the concept, so we added light density proppant into it so when the particulate diverter dissolves and goes we still have the frac open by the light weight proppant," explained Shafeeq Khan, manager of engineering and technology for BJ Services.

REACH Complete began field testing around the middle of 2019 with an unnamed oil company client with wells in the Haynesville shale play of East Texas and northwestern Louisiana. Earlier, BJ laboratory tested the solution as a far field diverter with aims to create a permeability barrier at the fracture tip to contain fracture length growth.

Mid-stage use was also explored to control growth of secondary fractures to allow redistribution of fluid with the rock to increase complexity. The laboratory tests proved that by controlling the particle size of the engineered proppant and diverter mixture, the system could be tailored to plug different fracture widths.

In addition, conductivity tests showed that by using an engineered mixture of nondegradable, ultra-lightweight proppant and degradable material, conductivity in the fracture was maintained after particle degradation, which is critical when applied in the middle of a stage to increase fracture complexity.

"For BJ, the composition itself is more unique because of the patented light weight technology and also from an application point of view," explained Dan Fu, vice president, engineering and technology at BJ Services.

"When you look at diversion, you always talk about near wellbore and far field. Near wellbore you try to divert the flow from one set of clusters to another. Far field you really try and control where the fluid is going at the reservoir level. Now people realize the far field is important because it creates that complexity, but also it prevents frac hits, frac interference. People are using this technique more to prevent interference between the child well and the parent well during completion. So the light weight component of the REACH family is important."

> "A lot of the operators have been having issues with frac hits, so they are looking into the technologies that can prevent those, and diverters are one of the cheapest and easiest to mitigate frac hits."
>
> — Shafeeq Khan, BJ Services

Fu continued: "The industry is moving to a more slickwater type of fluids which is [the] standard transport medium for particles for a well. That is why the lightweight nature of the technology is extremely important. For the particles to work, they need to go where the fluid goes. It needs to move deeper into the fracture. So having a particle, like sand and proppants, to be that much more effective, you have to use a crosslink fluid, and that really increases the complexity of the operation itself. This is why we believe that REACH is very much suitable for today's environment."

As of mid-January 2020, REACH Complete had been pumped in over 330 stages across a series of Haynesville wells, and results have been encouraging from both an increased fracture complexity point-of-view and mitigation of frac hits from infill wells. A full commercial roll out of the technology is expected later in the year with eyes on most of the North American unconventional market.

"I think by default creating complexity means you don't grow a single dominant fracture and prevent a frac hit," said Fu. "In reality, we should see both the production from the parent and child … the parent well should not be impacted at the time of completion of the child well. Also, you should see an overall production increase if you truly created the additional complexity. This is what we saw with our client in the Haynesville. They have not seen any impact on the parent's production."

The diverter market in general continues to remain in flux on both sides of the operator/contractor equation. Operators have continued to explore and seek out the true benefits of diverter use, while contractors adapt and adjust diverter cocktails to maximize their potential.

"For the last couple of years I think operators have been experimenting with different diverter materials," said Fu. "Some believe in them. Some don't. But we've always been pumping diverters. I think the overall level of diverter use will remain the same, but I think we will see a gradual shift from near wellbore to far field based on discussions we've had with some of our clients. Overall I think the diverter market is flat but stable. We've had some customers who have tried them and not seen an impact, so they dropped them. We have other customers that pump them regardless—every single stage. It really depends on where you are and who you talk to."

***Jenna Robertson, SlicFrac production line manager for Thru Tubing Solutions, said that at least one client using SlicFrac Perf PODs has reported well cost savings in the range of $750,000.***

***Dan Fu, vice president of engineering and technology at BJ Services, sees the current diverter market as flat but stable.***

With operators around U.S. unconventionals transitioning toward full field development, all eyes have continued to focus on the issues caused by aggressive downspacing with detrimental results in some cases for both primary and infill well production.

"A lot of the operators have been having issues with frac hits, so they are looking into the technologies that can prevent those, and diverters are one of the cheapest and easiest to mitigate frac hits," said Khan.

"Right now, based on how the things are going, we think we have a pretty good system that will differentiate us," said Fu. "Since this is only six months in the making we need to make sure we understand the performance, understand the value and understand where we need to improve before actually doing any research on this part.

"I think as the industry is moving toward more wells per pad and in closer spacing, I think the far field and the issue of frac interference is going to be driving the use of diverters."

**Diversion ... with a twist**

Thru Tubing Solutions' SlicFrac diverter uses a proprietary, dissolvable fibrous material to create a near-wellbore mechanical diversion system that can be used for both mid-stage diversion and as a bridge plug replacement. SlicFrac Perf PODs are knot-like, designed with a solid core to seal inside the dominant perforation and tangible ends to catch the turbulent flow path. The Perf PODs wedge themselves into the dominant perforation, thus diverting the fluid/stimulation to the remaining under or unstimulated perforations. The result is a more effective stimulation due to the increased cluster efficiency.

"Our engineering department designed the SlicFrac product in-house and have continued to optimize the materials and design to match industry needs" explained Jenna Robertson, SlicFrac production line manager for Thru Tubing Solutions.

"The idea for SlicFrac originated with finding a way to replace the industry's need of bridge plugs and provide a cost saving to the customer. Using the Perf PODs as a mid-stage diverter has shown to increase cluster efficiency and optimize the stimulation, which leads to increased production. By implementing SlicFrac Perf PODs for zonal isolation, some or even all bridge plugs can be removed from the standard plug-and-perf completion design, which can equate to large time- and cost-savings for the operator," Robertson said.

The SlicFrac Diverter System commercialized in 2016 with its first job, and to date the system has been pumped in over 2,000 wells worldwide. The Perf PODs can be deployed from surface or downhole, depending on the job or application. Thru Tubing Solutions has continued development of these deployment mechanisms, allowing for more precise placement of the PODs during the frac for better results.

"The differentiating factor when comparing our Perf PODs with other styles of diverter is the ability to fully seal the perforation and remain inside the wellbore," said Robertson.

"The PODs remain inside the pipe and can wedge into both round and irregularly shaped holes. The SlicFrac POD material is degradable, which means after the fracture stimulation is complete they will degrade in the presence of water and bottomhole temperature.

Alternatively, a milling assembly can also be utilized to clean out the wellbore, which will circulate all wellbore debris and POD material back to surface."

SlicFrac Perf PODs are available in many different sizes and material compositions; however, they can be fully customized to suit

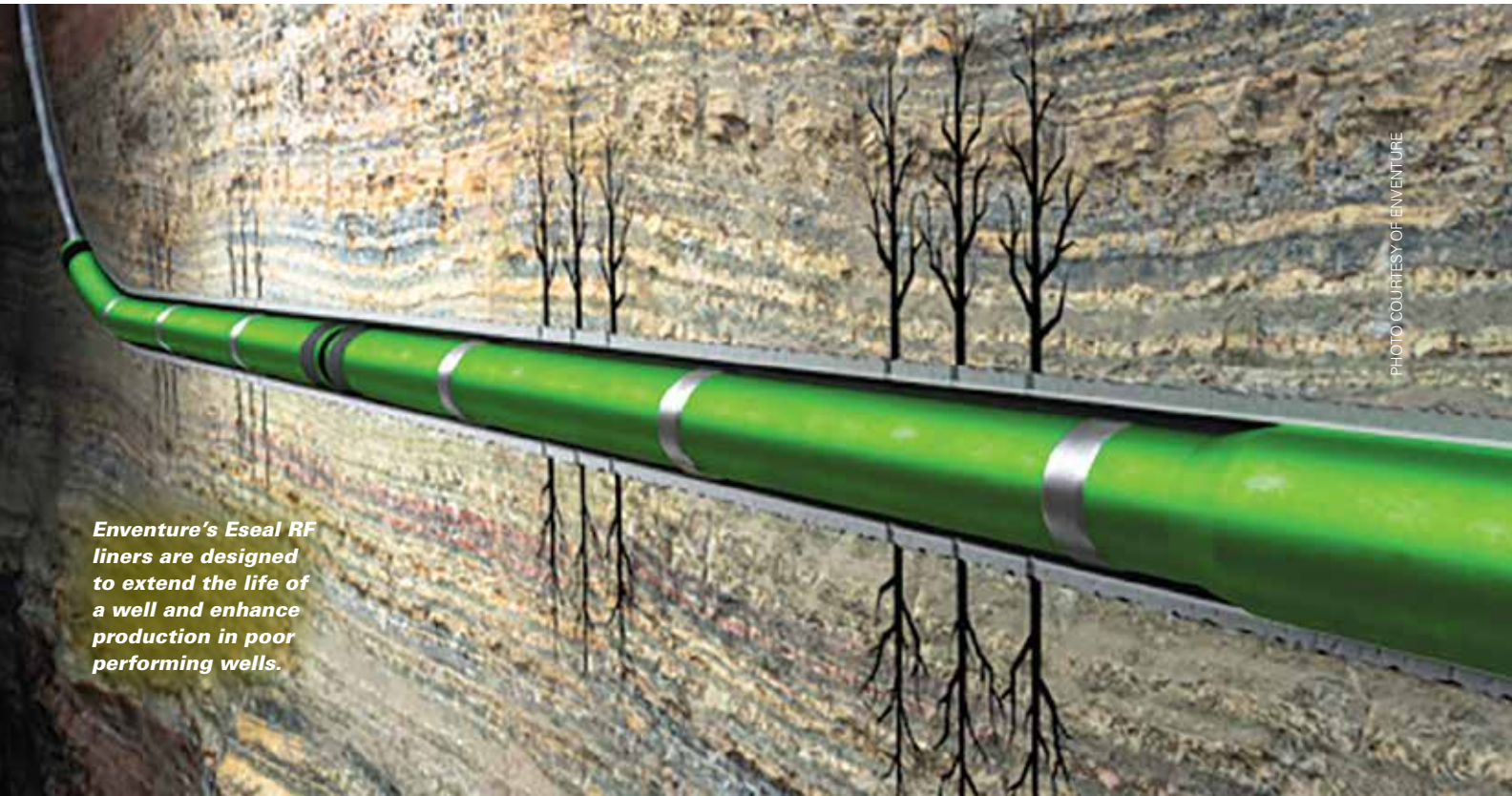


PHOTO COURTESY OF ENVENTURE

***Enventure's Eseal RF liners are designed to extend the life of a well and enhance production in poor performing wells.***

each wellbore scenario. They can be utilized for new completions as well as remedial or restimulations, where you might have washed or eroded perforations that require larger PODs.

Thru Tubing Solutions provides field personnel as well as engineering support for all applications, from setting up the job all the way through execution in the field. Adjustments to the program or POD design can be made as needed.

"In terms of cost savings, we see the most impact where stage lengths are stretched and bridge plugs eliminated," said Robertson. "By altering the current well design, to combine stages and/or eliminate bridge plugs, we see a large reduction in standby time for frac equipment and all associated services. This is helping the operator complete the wells days sooner than anticipated. Although cost savings vary widely with differing jobs and applications, there have been savings reported in the range of $750,000."

With operators extending stages—from 150 to 200 feet up to 250 to 350 feet-plus—and eliminating extra wireline runs, PODs are taking over as a complete zonal isolation mechanism.

"The product continues to progress with new applications and uses as well as continued support from our growing customer base," explained Robertson. "With the industry focus on cost savings and improved efficiency, we feel SlicFrac can be the solution to keep operators profitable in such a tight market."

### An open and shut case

Refracturing older wells is a practice operators can use to give an existing lateral a second life.

Well completions of a certain vintage were conducted with older technologies and philosophies that have since been replaced with better, more consistent methods. A refrac can address clusters that were underutilized after the initial completion work as well as re-excite fractures that may have not reached their full potential the first time around. It is also, in some cases, a more economic answer for boosting EURs than drilling and completing an entirely new well.

Expandables specialist Enventure has a mechanical diversion system designed to isolate old perforations providing more flow and power to the reservoir during refrac operations.

ESeal 3.0 RF liners are the latest generation of this expandable diverter that provide the industry's highest strength and temperature ratings and translate into a faster payback on an investment and extended production life of a reservoir.

"It [ESeal] is one continuous length using premium expandable connections," said Mark Villarreal, director of sales for Enventure. "The result is one continuous ID [internal diameter]. Depending on application, the burst ratings range from 14,500 to 17,000 psi, allowing an operator to perform high-volume, high-pressure refracs in most basins."

With the new world order of oil and gas companies focusing on living within cash flow with the aim to reengage an undermotivated investment community, being able to add new production at the highest rate of return is crucial.

With completion costs making up a healthy portion of overall well costs, operators have turned more frequently to refracture opportunities to add barrels and protect the bottom line. Enventure has positioned its ESeal diverter as a viable solution and possible difference maker in the refrac market.

"Although expandable diverter systems have an upfront cost greater than most mechanical diverter methods, we provide a cost savings of at least 2.5x that cost difference," said Villarreal.

### Focused on the future

Diverter use is up across most operations, but the technology remains in motion as tweaks to existing systems as well as all new tools are developed with the goal of driving down completions costs.

There is no one-size-fits-all solution when it comes to diversion, so the pot of gold at the end of the rainbow is forever a moving target. The benefits and drawbacks will also vary by location and application. Chemistry will continue to play a key role as will the ability for companies to either see or accurately predict the downhole condition of wells prior to diverter use.

A clearer picture of the post-frac geology can show operators where the diverter needs and doesn't need to go with respects to both optimizing cluster efficiency near field and assisting with damage mitigation from migrating fractures from an adjacent well far field. □

***"A lot of the operators have been having issues with frac hits, so they are looking into the technologies that can prevent those, and diverters are one of the cheapest and easiest to mitigate frac hits," said Shafeeq Khan, manager, engineering and technology, BJ Services.***

# LARIO'S LEGACY

A rich history of refining and E&P, with a noteworthy patriotic role as well, guides the fourth generation to run this family-owned E&P.

ARTICLE BY
LESLIE HAINES

PHOTOS COURTESY OF LARIO OIL & GAS CO.

More than the luck o' the Irish may be at play to explain the extended success of Lario Oil & Gas Co., a private E&P nearing 100 years old—never merged, never acquired and still owned by the O'Shaughnessy family. Through the Depression, World War II, the 1980s downturn, the crashes of 1998 and 2014, plus the advent of shale plays that demand more capital than vertical drilling, Lario has stood fast.

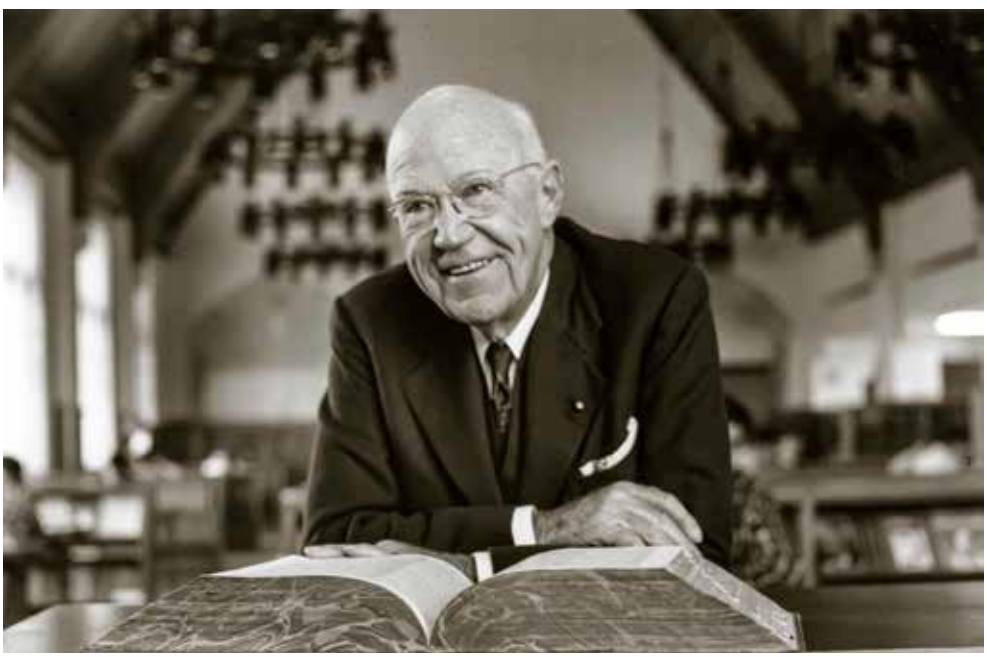
While drilling at home and abroad, Lario has bought and sold production as the situation dictated. Legacy vertical wells in western Kansas, Oklahoma and nonoperated horizontal assets in the Bakken Shale now help fund its current focus, which is the Midland Basin's Wolfcamp and Spraberry formations. But what's the secret to this E&P's staying power?

"We found ourselves looking in the rearview mirror and found that in every decade, we had significant discoveries that got us through the tough times. When you're an almost-100-year-old company, you'd better have some nice discoveries along the way," said current chairman and CEO, Mike O'Shaughnessy, grandson of the founder, known as I.A. (for Ignatius Aloysius) O'Shaughnessy.

The original business dates to 1917 when I.A., the patriarch, formed and built a small refining company in Blackwell, Okla., called Globe Refining Co., and later acquired a second one in Lamont, Ill., and then built one in McPherson, Kan. He was the youngest of 13 children of Irish immigrants; his father was a bootmaker for the lumberjacks during the golden age of lumbering in St. Croix, Minn.

After attending St. Thomas College in St. Paul, Minn., selling insurance in Texas and working for the Gates Rubber Co. in Denver, among other jobs, I.A. entered the refining business in 1917, eventually becoming one of the largest independent refiners in the U.S. But by 1927, he decided he needed to start an E&P company as well in order to get more oil as feedstock.

"The name came from I.A.'s son, Lawrence (Larry). Lari-o, for Larry O'Shaughnessy. People wonder about the name, thinking it means something exotic, but it's just named for my Uncle Larry who was a child at the time," Mike explained.



***Lario founder I.A. O'Shaughnessy rose from modest beginnings to become the largest independent refiner in the U.S. and a strong philanthropist.***

By the decades, Lario continued to expand. In the late 1920s, it was in Kansas, where it made its first discovery in Sumner County, followed by the discovery of the Ritz-Canton oil field a few years later. In the late 1940s, Lario moved into the Permian Basin when Mike's father, Don, opened the Midland, Texas, office.

Also in that decade, I.A. joined a small group of independents that formed the American Independent Oil Co., which included Phillips, Ashland Oil Co., Deep Rock Oil, Sunray, J.S. Abercrombie and Ralph E. Davis (formerly with Standard Oil), to explore in the "Neutral Zone" lying

between Saudi Arabia and Kuwait, acquiring a 6.25% interest in the concession. The forerunner of Getty Oil Co. (Pacific Western Oil Co.) bought it out later.

O'Shaughnessy admits that each generation believes they have big shoes to fill, not least of which because of his grandfather's patriotism during WWII. Globe Refining saw some of its greatest growth during the war due to the accelerated demand for fuel by the military. Many jobs were created while Globe supplied oil to the U.S. Navy, and Globe invented some new refining processes for high octane fuel as well. I.A. also served on the National Refining Board as part of the war effort and in a newspaper article of the day, I.A. was quoted saying, "The hell with profits, we've got a war to win."

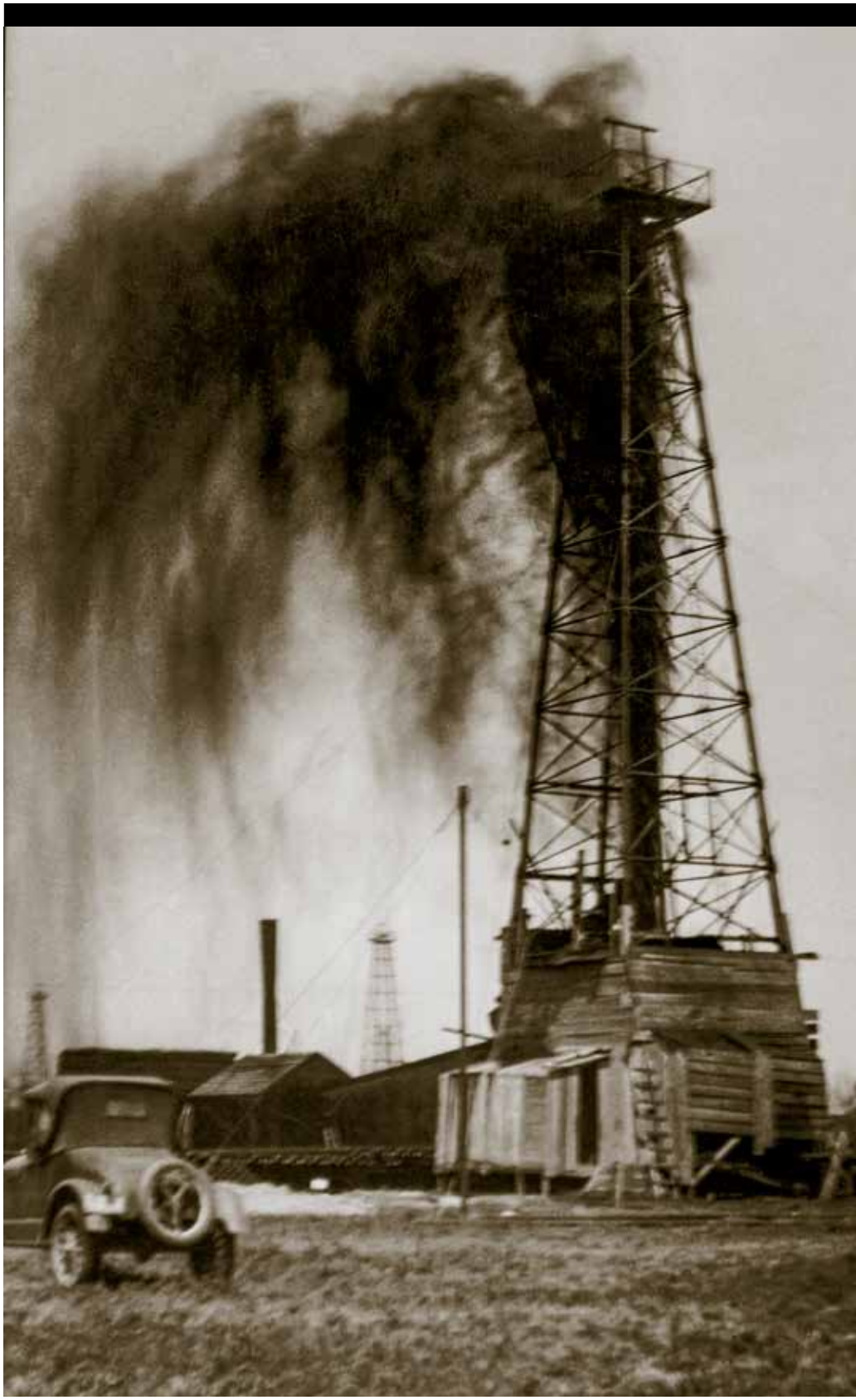
In the 1950s after all the refineries were sold, Lario was operating leases in the Goldsmith-Blakeney Clearfork Unit in Ector County and in various other West Texas fields in Scurry, Martin and Crane counties. "That long-term production helped us grow during the '50s and '60s," Mike said.

In the 1960s and 1970s, Lario went into western Canada and then the U.S. Rockies. Lario became one of the more active operators in the Minnelusa Trend and held that position until selling to the True Companies and Helis Oil and Gas Co. in 2010. Lario also exited Canada over a three-year period between 2010 and 2012.

During the 1980s, O'Shaughnessy started buying minerals throughout North Dakota, but the assets in Mountrail County were never leased until 2006 when the Bakken play was getting underway. "We had participated in the Elm Coulee Bakken development in Montana, and so we knew the Bakken could be incredible. I flew to North Dakota and found EOG [Resources Inc.] and Whiting [Petroleum Corp.] had leased up most of the county, so we brought in as many brokers as we could and leased around 75,000 net acres in Mountrail and offsetting counties." Today the company's most active partner in the Bakken is the Slawson Cos. Inc., another legacy family oil company dating from 1957 in Wichita, Kan., where Lario got its start.

Building and selling assets played a big role in the company's history, all developed by exploratory drilling. "It was all wildcatting then, but in the 1990s when wildcatting was getting tougher and oil prices were lean, we made a concerted effort to start buying PDP instead of drilling. It seems most of our growth has come during the downturns. There's always opportunity—when people are running for the exits," Mike said.

The current E&P, which is based in Denver and Wichita, Kan., with field offices elsewhere and a big presence in Midland, is headed by



***Lario Oil & Gas Co.'s first discovery, made in Sumner County, Kan., in 1928, is still producing.***

***Chairman and CEO Mike, left, and president Ryan O'Shaughnessy, the third and fourth generation to run the family company, standing near Lario's first horizontal well, Peggy #101, in Midland County, Texas.***

O'Shaughnessy, who grew up in Midland and joined the company in 1977 after stints at Tenneco and some independents.

In turn, his oldest son, Ryan, joined the company in 2014 and is president. The latter began his career at Deutsche Bank in the energy sector and then spent 12 years working for investment banker and analyst Tom Petrie; he then served with the Agee family-owned company, Wapiti Oil & Gas LLC, in Houston, so he was very familiar with A&D tactics and energy financing. In 2014, Mike and his immediate family bought out most of the remaining family's interest in Lario, with Ryan able to complete the deal through his banking connections.

"We have a rich family history in the company, so I guess we'll have to wait a while to see if that continues into the fifth generation, as my oldest of 16 grandchildren is only 11," Mike said.

Through the years, the company has learned how to operate wildcat drilling, conduct waterfloods in Wyoming and Kansas, go horizontal, and partner with key figures in the Bakken. Now it's applying those horizontal lessons in the Midland Basin.

Learning quickly from mistakes has been one of the hallmarks that keeps Lario going, Mike said. "Now we like to say, 'Fail fast; learn faster.' No one wants to fail, but it seems our best lessons come from it and provide the impetus for growth and change.

"If you've got some long-term plans and long-lasting properties, you can take advantage of great opportunities. It used to be you held things from cradle to grave, but that's changed," Mike said. "We've often given up good long-term assets for buying even better assets. It's important to be opportunistic, but you've got to do your homework; don't move on rumors or information from press releases or third parties. Prove it yourself. Avoid group-think and ask hard questions again and again."

Relationships matter, Mike believes. "Being born and raised in Midland, I know what a small world the oil industry can be. Old friends and acquaintances often end up being your partner."

Starting out in the oil patch by sand blasting in the Texaco Inc. tank farm east of Midland, during blazing West Texas summers, Mike moved on to tagging along with Lario's company landman to the courthouses.

"Being inside an air-conditioned courthouse was a vast improvement over getting sunburnt every day, but I loved it all. I never wanted to do anything else," he recalled. Summer oil internships followed while he worked toward a degree in petroleum land management at The University of Oklahoma.

### Bright future in the Permian

Today, Lario has 87 full-time employees who manage the company's operated production in West Texas, Kansas, Oklahoma and nonop assets in the Bakken Shale, partnering with operators such as Slawson, EOG, Equinor (formerly the assets of Brigham Oil & Gas) and Whiting Petroleum.

The learning curve in the Midland Basin is steep, as it's quite different from the Bakken, Mike told *Investor*. Cash flow from its horizontal Bakken assets and legacy vertical Kansas wells helped fund Lario's renewed focus on the Permian Basin in its early stages of drilling.

In 2017, it acquired 10,000 acres in Midland and Martin counties from private-equity-backed Trail Ridge Energy Partners II for $345 million, a significant bolt-on to some assets it had acquired there a few years earlier.

At one time Lario also had properties in the Delaware Basin, but it has exited its handful of blocks there, finding it was getting too expensive to build the acreage position it wanted, Mike said, adding the company never likes to overpay. Instead it is focused entirely on the Midland Basin where it had a larger position. Add several dozen additional large and small acquisitions, and its position there now totals around 20,000 acres.

Since the end of 2017 the company has been running two rigs and one frac crew in the Midland Basin to hike operated current production

above 22,000 barrels of oil equivalent per day. Lario has over eight to 10 years of inventory at this two-rig pace. "We'll be cash-flow positive by the summer of 2020," said Mike.

Lario joins several hundred private companies operating throughout the greater Permian Basin, but unlike many of them, it is not backed by a private-equity fund. All along, this has been built from the ground up, funded by internal cash flow from legacy production and a few select private individuals. However, Mike said, it restructured its business model in the 2014 to 2015 downturn to be more like a private-equity-backed company when it began rebuilding its technical horizontal team.

Adaptability has been a hallmark of Lario's endurance. At one time it left West Texas in favor of more Bakken activity once that shale play took off. But, needing more capital to satisfy its share of authorizations for expenditures, it decided in 2013 to sell a portion of its Niobrara Denver-Julesburg Basin assets. In the data room, ConocoPhillips Co. expressed interest in acquiring 100% of those assets, so Lario struck a deal. With the proceeds, it decided to return to West Texas in a big way and did so via the Trail Ridge deal.

"Going back to the Permian as an operator meant hiring some of the best minds in the business," Mike said. "Our new team was formed specifically to drill and complete horizontal wells, and it came from great companies like Noble Energy [Inc.], Pioneer [Natural Resources Co.], Halliburton [Co.], Chevron [Corp.], Enduring [Resources LLC] and Apache [Corp.]. We've drilled 86-plus horizontal wells so far."

In 2020, Lario's focus will be on Wolfcamp A, B and lower Spraberry benches. The company has drilled some of the deeper benches to hold acreage, Mike said, "and now we're systematically drilling from the bottoms up. The company is extremely data-driven, which helps in all our facets of drilling, completing and operating."

Mike's son, Ryan, added: "As far as the question of well spacing in the Permian goes, the industry's focus needs to be on development sequencing in addition to the distance between wells. Lario analyzed public and private, proprietary data to reach this conclusion.

"While there's been a lot of attention paid to co-development and in some cases cube development, we have concerns that these development strategies are impacting well productivity. Our philosophy at this stage is to honor a bottoms-up process in a single bench, as we believe this maximizes well performance."

There's been some debate in the industry on whether the Permian will eventually be a play only for the majors. True? "No. Companies like us can also compete and be highly successful here," Mike said.

"It's challenging though, because the title is so busted up; it took us five years to acquire enough acreage in the core area to build out our drilling units. But, keep two or three rigs running in the Permian and you can build a nice business.

## HIRE TALL MEN

In the early days of the U.S. oil industry, in the late 1920s and 1930s, it was common for E&P and refining companies to sponsor their own baseball and basketball teams, which would compete against regional oilfield teams and/or teams fronted by other industries. A forerunner of Lario Oil & Gas Co., Globe Refining Co., had its own basketball team, and apparently it was a good one, since its members participated in the historic 1936 Olympics in Berlin.

"My granddad I.A. loved sports," said Lario CEO Mike O'Shaughnessy. Indeed I.A. O'Shaughnessy was a star offensive tackle at the College of St. Thomas in Minnesota, and at one time he worked for the Amateur Athletic Association. He graduated in 1907. Later when he became the largest independent refiner in the U.S., he formed the Globe Refiners basketball team out of McPherson, Kan., which eventually lost the AAU championship against the Universal Studios team from Hollywood by one point. Players from those two teams formed the 1936 U.S. Olympic team, which went to the Berlin Games.

Team USA won gold by defeating the Canadians. This was the first time that basketball became an official Olympic sport. It was also historic because Adolph Hitler refused to award medals to any of the winning teams if they had African American players—recall that African American track star Jesse Owens won several races in these Games, which enraged Hitler. So instead, the iconic James Naismith, who had invented basketball in 1891 in Springfield, Mass., presented the gold medal to Team USA. He wrote the original rule book and lived to see the game become an Olympic sport. In the end this was a far greater honor for the players.

"I'll take the Permian over any other basin any time, even the Bakken, much as I love the Bakken. I've never seen anything like it before. We believe our position is located in one of the most economic, multibench areas of the Midland Basin. We've built a position we love."

If Mike were to boil it down to three things that have enabled Lario to be closing in on its 100th anniversary, it would be consistently good leadership, perseverance and optimism.

"My grandfather, I.A., was the dynamic founding entrepreneur, and we are still very much aware and in awe of the legacy he left us. My father, Don, and his brother, John, took the reins in the next generation. They were followed by my cousin Patrick, who was CEO before I took over, along with his brother, Gerry, who contributed great entrepreneurial ideas in the third generation. I am the beneficiary of their careful management and wise counsel.

"The business has changed greatly in the last 10 years and the same perseverance that got us through the tough times in past historical downturns is what provided the will to change from more of an exploratory business to today, a data-driven resource company.

"But I think the greatest characteristic of any successful company, especially in the energy industry, is optimism. You just can't operate in this environment if you don't believe that you can find solutions to the challenges, that you can adapt to the changes and that the future is bright. If I didn't truly believe all that, I wouldn't be here today. I have a lot of faith in the new generation of our company and am optimistic that we'll be here well beyond that 100th anniversary. And it doesn't hurt to count on a little Irish luck, too." □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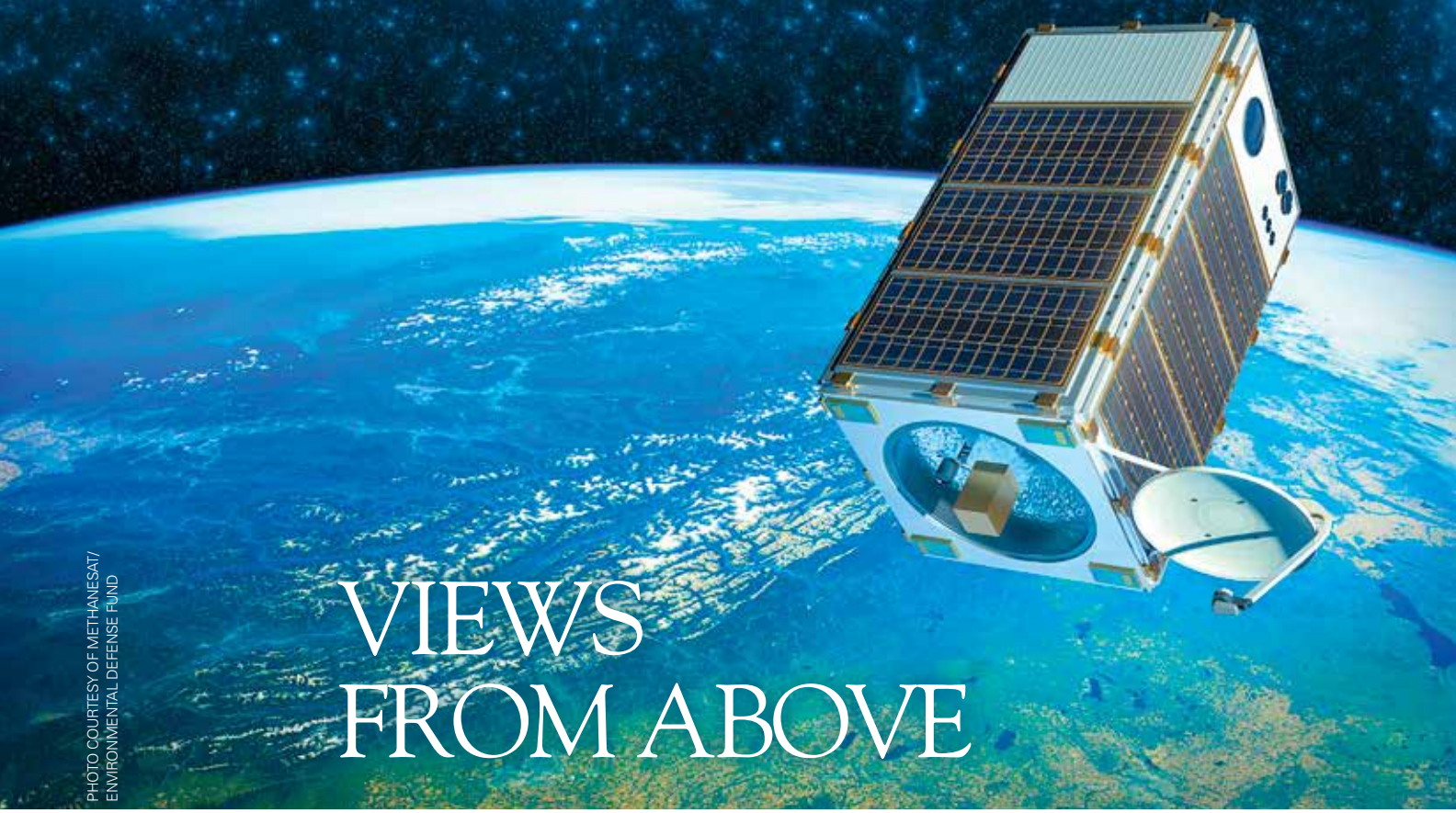


PHOTO COURTESY OF METHANESAT/ ENVIRONMENTAL DEFENSE FUND

# VIEWS FROM ABOVE

The Environmental Defense Fund has teamed up with industry experts and scholars to launch a methane-detecting satellite within two years, aiming to cut such emissions from oil and gas facilities 45% by 2025.

ARTICLE BY
VELDA ADDISON

If all goes as planned, a satellite weighing just more than 770 pounds will be launched into space and orbit the Earth once every 90 minutes, assessing what lies beneath.

Its mission: detect methane emissions, mainly from oil and gas sites across the world, from about 500 kilometers above the earth.

The satellite is the centerpiece of an $88 million donor-funded effort led by the Environmental Defense Fund (EDF), a New York-headquartered nonprofit environmental advocacy group. MethaneSAT, an affiliate of EDF, said the satellite will pinpoint methane-emitting sites and the magnitude of such emissions using a wide, 200-kilometer view path.

Hopes are that it will be able to measure emissions from about 80% of the world's major global oil and gas facilities about every four days.

The goals are lofty: launch the satellite by first-half 2022 to support EDF's efforts to cut methane pollution from oil and gas sites 45% by 2025. Working with oil and gas companies to find solutions also remains on the agenda.

"Methane is a growing challenge for the industry, and it's a challenge for operators of all sizes and at every step of the supply chain," EDF president Fred Krupp told Hart Energy. "Transparency is key, and new technologies are making these invisible problems visible to investors, employees and regulators."

***Pictured above, an illustration depicts the satellite, being developed by Environmental Defense Fund's MethaneSAT, above the earth.***

The efforts come as the world turns more toward natural gas to displace coal, which emits more $CO_2$. Emissions from combustion of gas are also lower than oil. However, methane—a potent greenhouse gas—is the main component of natural gas.

Oil and gas companies have worked to bring down methane emissions from operations using a variety of techniques. These have included optical gas-imaging cameras, which use infrared technology to detect methane, and green well completions—a process that separates gas and liquids from the flowback, enabling the gas to be treated and used or sold—to minimize venting of volatile organic compounds and methane.

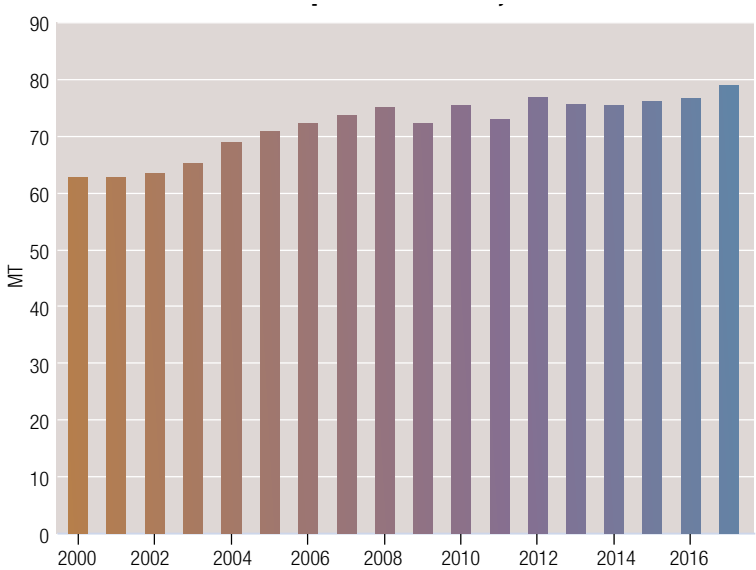
Some companies have also joined voluntary initiatives, such as the Oil and Gas Climate Initiative and Our Nation's Energy Future Coalition, aimed at curbing methane emissions.

However, emissions remain high despite industry-led initiatives, according to the International Energy Agency (IEA).

Methane emissions from the oil and gas sector reached nearly 80 million tonnes in 2018, according to the IEA's January 2020 Methane Tracker.

"These emissions came from a wide variety of sources along the oil and gas value chains, from conventional and unconventional production, from the collection and processing of gas,

**Global Methane Emissions From Oil And Gas Operations In The Sustainable Development Scenario, 2000-2030**




Source: IEA

as well as from its transmission and distribution to end-use consumers," the IEA said. "Some emissions are accidental, for example because of a faulty seal or leaking valve, while others are deliberate, often carried out for safety reasons or due to the design of the facility or equipment."

## Views from above

EDF's MethaneSAT will be equipped with a pair of sensors, according to Tom Ingersoll, MethaneSAT project director and former CEO of Skybox Imaging. The two infrared-imaging spectrometers, an instrument that measures wavelengths of light where it is absorbed by methane, will be focused on both oxygen and methane.

"You use oxygen as a proxy for the mass and the constituency in the air column that you're looking at," Ingersoll explained.

Pinpointing emission sources will also require inversion analysis—used to distinguish human-made emissions from ambient sources—and algorithms that account for the impact of wind on methane plume sizes and locations among other factors.

"We've got to be able to almost march that plume back in time to say, 'OK, in order to create a plume of this magnitude, where are the point sources located and at what magnitude leaks would [these] have occurred to be able to create a plume of this size?'"

While the satellite will detect methane concentration over a certain area, the team aims to convert that data into leak rates, which Ingersoll said will be in kilograms per hour of methane being emitted at certain sites.

"That's an important part of the overall system that we're trying to develop. The satellite is a key piece of it, but it's not all of it," he said. "There's a lot of horsepower and analysis that's going to be required to convert the concentrations to leak rates."

***"Methane is a growing challenge for the industry, and it's a challenge for operators of all sizes and at every step of the supply chain," said Fred Krupp, president of the Environmental Defense Fund.***

Data and analysis will be available to the public.

"MethaneSAT is designed to both identify and solve a global environmental problem. By providing global emissions data on a regular basis, the mission [aims to] help both companies and officials identify and reduce emissions," EDF said. "It will vastly expand the public's knowledge and understanding of both [the] problem and the opportunities to solve it."

Prior to the satellite's launch, in a project called MethaneAIR, scientists have installed an instrument like the one that will go into space aboard a Gulfstream jet. They are flying over areas with known methane emissions, collecting data to help refine algorithms that will be used by the satellite.

Key to the obtaining data from space will be successful ground communications linked to the orbiting satellite.

Ingersoll said plans are to use an existing ground network of sensors, the Total Carbon Column Observing Network used by NASA and others, to calibrate and validate satellite-based sensor data. The validation strategy will rely on those ground-based sensors.

"You really have to have it [the scientific instrument] highly calibrated and validated so that you can believe the result," Ingersoll said.

MethaneSAT said it anticipates the satellite will be able to quantify methane emission rates for a major oil and gas field with an expected 25% to 35% error. "In other words, the emission rate will be no more than 17.5% above or below the measurement from MethaneSAT on average. By taking repeat measurements over time, uncertainty will drop and the ability to effectively detect changes in emission rates will increase," he said.

"Our objective is to understand emissions from the oil and gas sector, and so we are putting together a list of where that infrastructure is located globally," Ingersoll continued. "We'll be imaging those regions.

MethaneSAT will be able to angle the satellite in either direction by 20 degrees or so. However, it will not be capable of imaging through clouds or at night.

## Marking milestones

MethaneSAT was announced in April 2018 during TED2018 as part of The Audacious Project: Collaborative Philanthropy for Bold Ideas. Since then, its efforts have come a long way. In the past 12 months, the team has refined requirements around the science and the satellite's sensors, so its design yields the greatest accuracy and picks up desired signals, as part of the now completed systems requirements review process, Ingersoll said.

Ball Aerospace was selected to serve as the methane-detection payload provider, while Blue Canyon Technologies was tapped to supply the platform for the satellite.

In January, preliminary design review began, a process during which project requirements and design concepts go through rigorous analysis. The intent is to make sure the systems can

accomplish the objective, Ingersoll said, adding long lead parts are ordered.

By year-end, the team anticipates having a rocket on contract to launch the satellite and being months into the critical design review process, preparing to start assembling the satellite.

"MethaneAIR will have been flying, and we will be able to use that data to begin to baseline our algorithms for data processing," Ingersoll said. The team wants to mature the algorithms as much as possible before the satellite launches.

Providing oversight will be two groups—one technical, one scientific—comprised of big names in the space industry. They include Dan McCleese, an atmospheric scientist, founder of Synoptic Science and former chief scientist for NASA's Jet Propulsion Laboratory. The lab is known for its expertise in trace gas detection. Top technical talent also includes Joe Rothenberg, former director of NASA's Goddard Space Flight Center and director of engineering and operations for Google's Terra Bella.

The groups will be involved in second-tier development, particularly around converting data gathered from MethaneAIR, and assessing algorithms.

"We aren't cutting any corners on the science of the satellite," Ingersoll said.

**Big picture**

Pinpointing sites of methane emissions and accurately determining how much methane is being released into the atmosphere is just one part of the solution.

Next steps involve working with oil and gas sites to address problematic areas.

"We are currently working with many oil and gas companies, and we definitely do plan to continue to do that work after the data is generated," EDF's Krupp said.

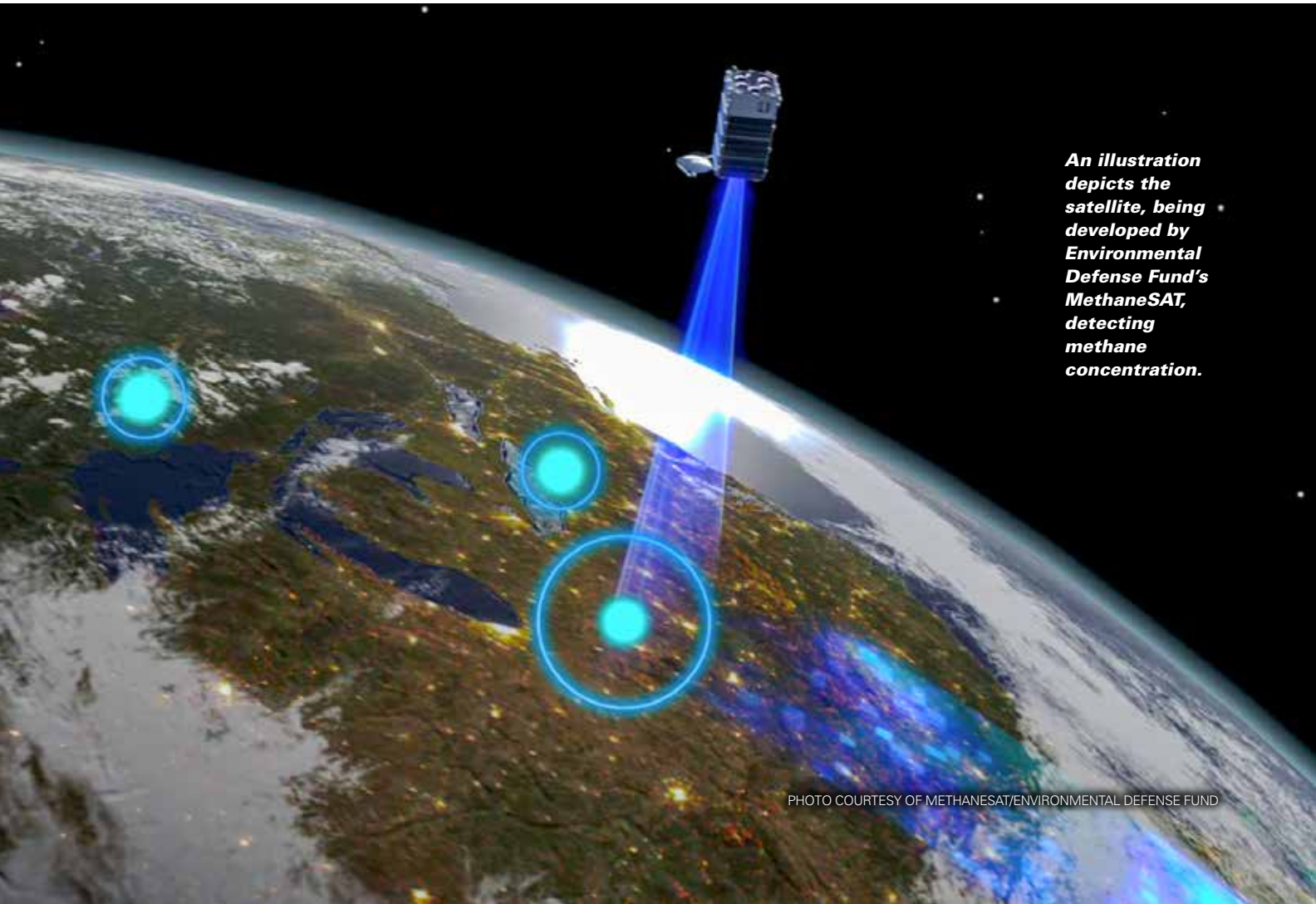
Past efforts have included teaming with Exxon Mobil Corp. and Stanford University to test methane detection devices and creating a virtual reality program that allows a user to enter an oil field, spot methane leaks and learn how to fix them, he said.

"The good news is that not only are there technologies emerging that allow companies to see the problem, but also there are technologies, including the same technologies, that provide the means for companies to solve the problem," Krupp said. "We are working with companies to bring their attention to those new technologies and also working with companies to roll out those technologies."

MethaneSAT will create actionable data for industry and others, fitting into the ongoing digitalization that's already underway, he added.

"We're aware that that can feel a little daunting if you're in the business," Krupp said. "But in the long run, it's going to work to everyone's advantage because, the same technologies that make the emissions visible are the ones that can help companies reduce their methane emissions faster at lower cost—and enable them to objectively demonstrate their progress." □

***"Our objective is to understand emissions from the oil and gas sector, and so we are putting together a list of where that infrastructure is located globally," said Tom Ingersoll, MethaneSAT project director.***



***An illustration depicts the satellite, being developed by Environmental Defense Fund's MethaneSAT, detecting methane concentration.***

PHOTO COURTESY OF METHANESAT/ENVIRONMENTAL DEFENSE FUND

# ATTRACTING VALUE INVESTORS

Say goodbye to growth investors; value investors have risen as the industry's best opportunity. But to woo this market effectively, energy companies must make some critical changes. And fast.

ARTICLE BY
REID MORRISON

ILLUSTRATION BY
ROBERT D. AVILA

For an industry with more than 100 years of operating as a growth venture, change can be hard and, oftentimes, unpopular.

Increasingly, investors and banks are reducing exposure to oil and gas, forcing companies to self-fund or get creative. Many growth-minded investors no longer view the industry as a growth play, yet many companies currently do not operate as a value opportunity to attract the value-minded investor.

To shift from the century-old operating model of a growth stock to the disciplined model of a value stock, oil and gas companies must begin to accept some hard truths about what appeals to investors—and make arguably unfamiliar changes.

### How investing in energy has changed

At the height of historic oil prices in 2008, the energy sector accounted for about 15% of the S&P 500 index. Ten years later, the industry took the title for the worst-performing stock sector and fell to less than 5% of the S&P 500, according to Refinitiv Datastream data. This declining performance caused a notable shift in investor appetite the past few years, reducing available capital and causing concerns for the industry's continued growth.

Broadly, institutional investors fall within three camps:

1. **Growth Investors**—Those who bought into oil and gas when the investment thesis was "peak oil";
2. **Environmental, social and governance (ESG) Investors**—Those who recently pulled money out of oil and gas, seeking alignment with carbon-neutral objectives; and
3. **Value Investors**—Those who are industry-agnostic, seeking low-risk, predictable and reasonable yield investments.

As oil and gas companies lose growth investor interest and work to appeal to ESG investors, value investors have risen as the industry's best opportunity. To woo this market effectively, energy companies must make some critical changes.

### Appealing to value investors

So, where to start with this coveted demographic of market participants? An unspoken factor at play is management's focus and skillset as it relates to moving from a historically growth-oriented model to a dividend-focused model. With growth as the predominant mindset of leaders for the past 20 to 30 years, naturally, the industry cycle required strategies and skills oriented toward expansion.

However, the current cycle calls for a different mindset and skills unfamiliar to many in the industry, such as delivering earnings outcomes competitive with the S&P 500 "dividend aristocrats"—those S&P 500 companies that have paid and increased their dividend annually for at least 25 years in a row—regardless of the commodity price environment.

To deliver competitive earnings that rise above oil-price swings, the industry must look deeply at total costs and revenue at the most granular level, in ways few in the industry have done previously. Gaining a "high-resolution vision" into the organization entails leveraging existing yet enormous amounts of data on all costs and determining whether those activities and assets are accretive or dilutive in a low-commodity price environment.

Anything that does not create a net profit when commodity prices are low suggests two things: the parts of the business that are profitable in the low-oil price cycle are effectively subsidizing parts of the business generating net income, putting the dividend at risk; and companies must avoid acquisitions that merely serve to drive top-line growth and instead must selectively pursue only those that will contribute directly to net income.

Additionally, getting such a granular vision can likely enhance management's ability to take firmer control of financial and operational performance to instill confidence in value investors. The more oil and gas companies feed to the bottom line and unlock greater free cash flow, the more they can feed the dividend.

### Matching earnings and return on capital to supply

Along with driving commodity prices down, the supply glut challenges investors' confidence that returns on capital are safe. But in a low- to moderate-price environment, oil and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The increasing importance of the dividend above 5% will challenge many.

gas companies should consider new modes of efficiency to meet investor expectations.

According to a recent oil and gas survey by PwC that examined the strategic alignment of management and investors, many participants identified cost management as an underperforming area—but one critical to achieving free cash flow. Indeed, the survey found nearly all business leaders (95%) agree cost management is important to generate greater free cash flow, yet just 16% of respondents grade their organizations as being strong in this area.

Cost management assumes different forms, including improving asset management for 100% uptime and supporting the top-performing activities while divesting the average-performing ones.

For example, recent advancements in digital technology and analytics, such as the use of artificial intelligence and Big Data, have helped streamline operations and identify new opportunities—but too many oil and gas companies still take a "not invented here" approach to new technology. These technologies are becoming powerful tools to unlock free cash flow, but if it wasn't created inside their walls, companies are less likely to adopt it and will instead spend capital to invent their own tech, limiting the company's ability to focus on exceptional areas of the business.

Thus, despite the oil and gas industry's legitimate standing as a vanguard of science and technological innovation in many respects, the industry has been slower to adapt as we've entered the age of the Fourth Industrial Revolution, or 4IR. In fact, according to PwC's study, just 7% of oil and gas leaders rate themselves as excellent and 37% as good in terms of digital maturity. By partnering with trusted providers to develop digital solutions, energy companies can stay focused on the core business needs, making their operations and use of capital more efficient.

### Increasing the dividend above 5%

While the oil and gas industry has historically based budgets and investments on mid- to peak cycles, value companies have built more resilient plans around low-cycle economics. Therefore, to entice the value investor, oil and gas companies must shift strategy to make the dividend their first principle, targeting a range of 6% to 8% to offer a premium to offset investor concerns. To do this, companies must first generate and maintain enough free cash flow at a breakeven level below $50 a barrel.

Some oil and gas companies have already taken this first hard step. In the same survey noted, achieving free cash flow was the top objective for industry leaders by far. However, despite prioritizing free cash flow, a majority of survey participants believe that a dividend below 5% can still attract value investors. This indicates that while many oil and gas companies understand the importance of free cash flow, they still haven't taken the second important step of directing that cash flow to increase the dividend above 5% to attract value investors.

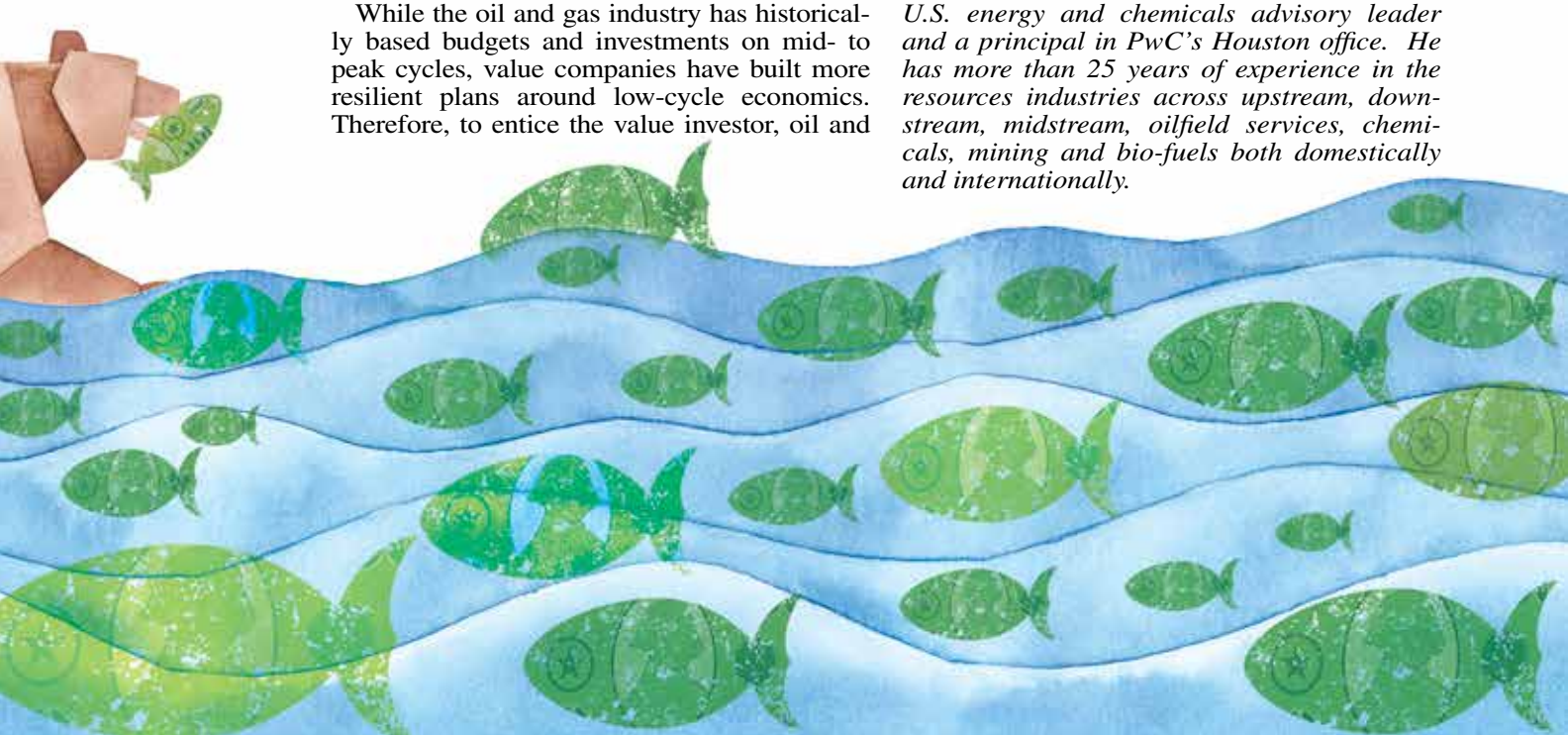
Instead, free cash flow is being used for share buybacks or invest in growth. And while that investing pattern aligns with management's focus on the future, maintaining a desirable dividend in the present ensures that investors provide the much-needed capital for continued growth. Time will tell what investors value most—whether it's a "pay me now" approach, a bet on the future, or a mix of both. Regardless, the increasing importance of the dividend above 5% will challenge many.

### Hard changes for a soft landing

Ultimately, oil and gas companies should realize some arguably uncomfortable new strategies and efficiencies to increase their appeal to value investors. Prioritizing reliable shareholder returns through effective capital deployment in any price environment may position them for continued profitability.

And free cash flow isn't enough—increasing dividends competitive across all industries and shifting managerial focus to a value-driven model communicates confidence to value investors, allowing oil and gas companies to see another day and earn the right to focus on future growth opportunities. □

*Reid Morrison is the global energy and U.S. energy and chemicals advisory leader and a principal in PwC's Houston office. He has more than 25 years of experience in the resources industries across upstream, downstream, midstream, oilfield services, chemicals, mining and bio-fuels both domestically and internationally.*



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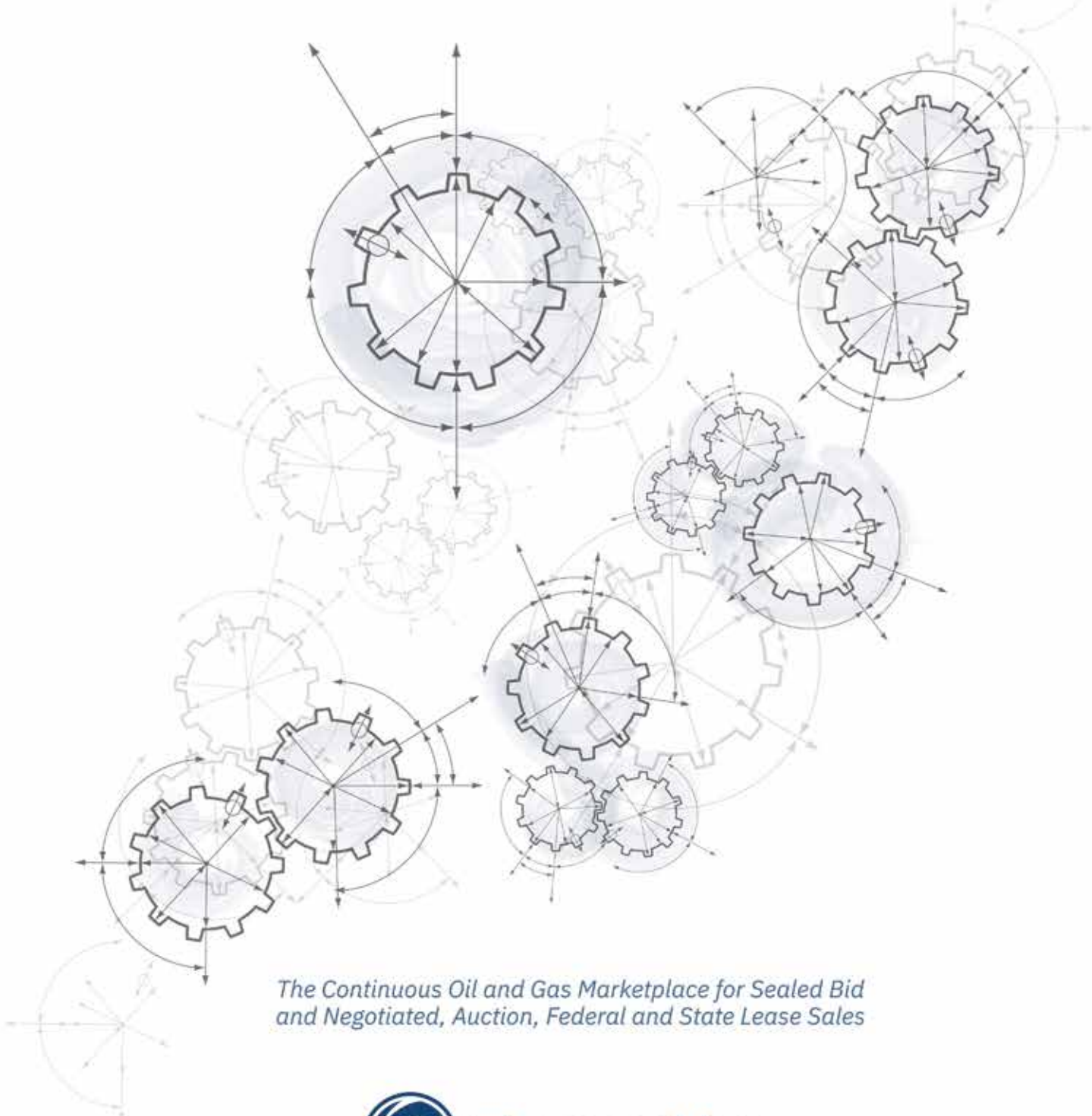

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# Alta Mesa Sells For $320 Million

**A PARTNERSHIP LED** by Tom Ward's **Mach Resources LLC** agreed in January to acquire substantially all assets of bankrupt **Alta Mesa Resources Inc.** and its midstream subsidiary for a combined purchase price of $320 million.

The deal is the latest turn in the fortunes of Alta Mesa, which sprang which sprang from a deal by a blank-check company and private-equity firms that paid roughly $1.6 billion for the public, pure-play Oklahoma Stack company's upstream assets.

Alta Mesa entered bankruptcy in September with about $871 million in debts.

The deal marks the latest partnership between Mach and Houston-based **Bayou City Energy Management LLC** (BCE) through a company called **BCE-Mach III LLC**, the companies said Jan. 28. BCE-Mach executed purchase and sale agreements as part of Alta Mesa's Chapter 11 bankruptcy and a court-supervised sale process.

"This was a unique opportunity to acquire a sizeable cash-flowing asset with the supporting midstream infrastructure, through a bankruptcy process, in an area of our team's expertise and still have an extensive inventory for future development," Ward said in a Jan. 28 new release.

Alta Mesa, a Houston-based independent that bet big on Oklahoma's Stack, joined a rash of U.S. shale producers that succumbed to bankruptcy. From September through Nov. 20, 2019, 16 companies sought protection from creditors they owed $14.7 billion in debt, according to data from **Haynes and Boone LLP**. In less than three months, the companies more than doubled the upstream sector's bad debt for the year.

Alta Mesa formed through a three-way combination in February 2018 of **Alta Mesa Holdings LP**, **Kingfisher Midstream LLC** with **Silver Run Acquisition Corp. II**—a special purpose acquisition company led by industry veteran Jim Hackett.

***Tom Ward, chairman and CEO, Mach Resources LLC***

BCE-Mach will take over production of about 30,000 barrels of oil equivalent per day (boe/d) of production (67% liquids), about 72 million boe of proved reserves, more than 900 operated wells and 130,000 net acres (90% HBP). The company will also gain Kingfisher Midstream assets:

- 350 million cubic feet per day of gas processing capacity;
- 453 miles of gas gathering pipeline;
- 157,000 bbl/d of produced water system capacity;
- 224 miles of water disposal pipeline;
- 108 miles of oil gathering pipeline; and
- 50,000 barrels oil storage capacity.

Ward, an industry veteran, has formed and led several oil and gas companies throughout his career, including shale pioneer **Chesapeake Energy Corp.**, which he co-founded in 1989 alongside Aubrey K. McClendon. Ward subsequently started **SandRidge Energy Inc.** in 2006 and **Tapstone Energy LLC** in 2013.

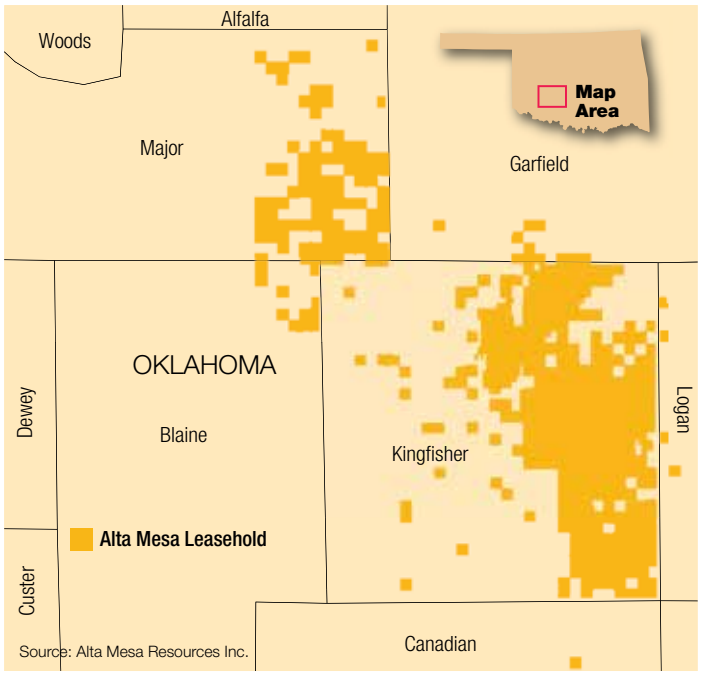
"Our strategic aim in partnership with BCE has been to aggressively consolidate and maximize underdeveloped, undercapitalized or otherwise distressed areas in the Midcontinent," Ward said. "We have been successful in buying assets at a discount, increasing production in a cost-effective manner and avoiding overspending. In a lot of ways, we have gone back to the fundamentals that were true when I began my career."

Following the close of the Alta Mesa deal, which was expected in February, the BCE-Mach partnerships will have net daily production of about 58,000 boe/d and interests in about 5,700 wells and roughly 500,000 net acres across the Midcontinent.

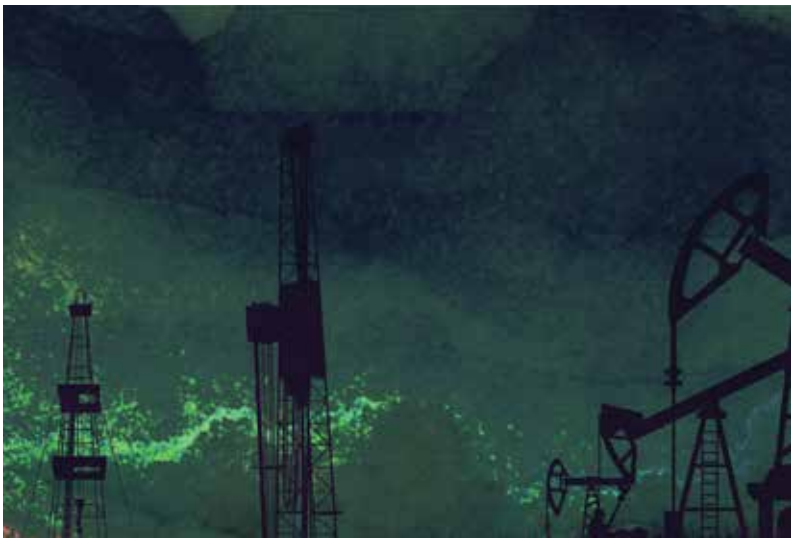
BCE-Mach III is being represented by **Kirkland & Ellis LLP** as the legal adviser and **UBS Securities LLC** as the financial adviser. The transaction will have a Jan. 1 effective date.

*—Emily Patsy and Darren Barbee*

**Alta Mesa's Divested Assets**



# Lilis Energy Receives Take-Private Offer



**STRUGGLING PERMIAN** Basin operator **Lilis Energy Inc.** said Jan. 13 it has received a nonbinding cash take-private offer from a major shareholder.

The offer, made by Minneapolis-based alternative investment firm **Värde Partners Inc.**, continues a trend of take-private offers for public oil and gas companies that began to emerge last year.

Värde Partners proposed to acquire the roughly 75% of outstanding shares of Lilis common stock it doesn't already own in a cash merger transaction for $0.25 per common share. The nonbinding cash offer is expected to expire Feb 17.

Fellow publicly traded E&P **Roan Resources Inc.** received a similar offer from private-equity-backed **Citizen Energy LLC** in October. Other recent take-private offers include a deal by **IFM Global Infrastructure Fund** that closed in November to take **Buckeye Partners LP** private. **Tallgrass Energy LP** also agreed to a sweetened take-private offer in December from a group led by **Blackstone Infrastructure Partners**.

Lilis Energy is a publicly traded E&P with roughly 20,000 net acres in the Permian's Delaware Basin. Within the past year, the Fort Worth, Texas-based company has struggled to generate returns and even temporarily suspended drilling and completion operations toward the end of second-quarter 2019 to focus on cost reductions and overall efficiencies.

Despite reporting improved operational efficiencies and general and administrative cost savings in its third-quarter results, Lilis said in November it had hired **Barclays Capital Inc.** as the financial adviser to explore strategic alternatives. The company also recently received a deficiency letter for its common stock.

"The special committee of the board of directors of the company, which was formed last November, will evaluate the recent Värde offer as it continues its process of evaluating the potential for other strategic alternatives with the assistance of its financial adviser, Barclays Capital Inc.," Lilis Energy said in its news release. **BMO Capital Markets** also serves as the financial adviser to the company.

Värde holds about 23.6 million of the 91.7 million outstanding shares of Lilis Energy's common stock and all of the outstanding preferred stock of the company. Holdings also include all of the company's Series E convertible participating preferred stock that votes with the common shares at a roughly 25.7 million converted share basis.

Lilis operates a contiguous acreage block in Loving and Winkler counties, Texas, with additional acreage in New Mexico's Lea County. The company is focused on delineating primarily the Wolfcamp, Bone Spring and Avalon formations, according to its website.

*—Emily Patsy*

# Blackstone E&P Mulling Permian Sale

**GUIDON ENERGY,** an E&P company majority-owned by private-equity firm **The Blackstone Group LP**, is exploring a sale that could value the Permian Basin operator at more than $2.5 billion, including debt, according to people familiar with the matter.

Guidon is engaged in deal discussions with a small number of parties after receiving acquisition interest from energy companies seeking to expand their presence in the Midland Basin portion of the Permian, in which it operates, the sources said. The sources spoke on condition of anonymity because the information is not public.

**Exxon Mobil Corp.** and **Diamondback Energy Inc.** are among the companies studying a possible acquisition of Guidon, three sources said, cautioning that no deal is certain. Blackstone declined to comment. Guidon, Exxon Mobil and Diamondback did not respond to a request for comment.

Guidon holds about 34,000 net acres, primarily in Martin County, Texas. The company's website says it has about 1,200 "drill ready" wells in its inventory.

Dealmaking in the oil and gas sector has slowed in recent months, as companies eschew growth to focus on cost-cutting and returning more cash to shareholders.

Of the few deals consummated, most have been among producers focused on the Permian Basin, an area spanning West Texas and Southeast New Mexico that has been at the heart of the U.S. shale revolution.

One transaction announced in mid-December was **WPX Energy Inc.**'s $2.5 billion purchase of Delaware Basin producer **Felix Energy** from buyout firm **EnCap Investments LP**. The positive reception from WPX shareholders for the Felix deal has resulted in other public operators seeking out similar deals involving privately held Permian players, including Guidon, three of the sources said.

Blackstone helped launch Guidon in 2016 with a $500 million investment. Guidon built its position through more than 150 acquisitions and land swaps, according to its website.

*—David French, Reuters*

# Report: SM Energy Weighs Eagle Ford Exit

**SM ENERGY CO.** is reportedly considering the sale of its Eagle Ford Shale assets for $500 million as the Denver-based oil and gas company seeks to pay down debt.

According to a Bloomberg report on Feb. 5 citing unnamed sources, SM Energy is reportedly working with an adviser on an auction for the assets and will likely draw interest from private-equity firms and other explorers in the region.

"We think the deal looks solid based on SM's [fourth-quarter 2019] Eagle Ford production and would make SM a pure-play Permian producer," **KeyBanc Capital Markets** analysts wrote in a Feb. 5 research note. They said they expected shares of SM to react positively.

The company holds about 163,000 net acres in the South Texas shale play. The company's South Texas 2019 program concluded with 19 net completions for the year, according to its website.

Based on estimated fourth-quarter 2019 Eagle Ford production of 58,500 boe/d (5.5% oil, 36% NGL), the KeyBanc analysts said the $500 million deal value would represent around $8,600 per flowing boe, which is "solid for a gas and NGL-rich asset."

Still, the firm noted it seems a little early in the process, and no firm decision has been made on a sale.

The idea of an Eagle Ford sale by SM Energy is not new, according to Brian T. Velie, an energy equity analyst with **Capital One Securities Inc**.

"In response to the question in the past, SM management has been non-committal but allowed that 'everything is for sale,'" Velie wrote in a Feb. 6 research note. "What is perhaps more telling is the expected decline in Eagle Ford investment this year."

**SM Energy's Eagle Ford Assets**


Over the past year, SM Energy has already been shifting capital away from its Eagle Ford assets to some of the oiliest Permian wells in Howard County, Texas. In 2019, SM Energy spent roughly $200 million on the asset last year or roughly 20% of its total budget, according to Velie. As of October, SM had one rig running on its South Texas position. Meanwhile, six rigs and two completion crews were running on its 81,500 net-acre position in the Permian's Midland Basin.

Additionally, SM Energy CEO Jay Ottoson said on the company's third-quarter earnings call last October that spending on its South Texas asset is expected to be lower year-over-year. Capital One currently models $115 million of 2020 spending by SM Energy in the Eagle Ford.

Velie added the deal, as proposed, would be positive as an outright Eagle Ford sale would transform SM Energy into a Permian Basin pure play and give the company a roughly 75% oil cut, becoming overnight the oiliest Permian player in Capital One's coverage universe.

Other net positives of a sale include improved cash margins and a decline in SM's net debt to EBITDA metric for year-end 2020 to 2.3 times from 2.6 times, he said.

*—Emily Patsy*

# BlackGold Buys Midland Mineral Interests

**BLACKGOLD CAPITAL Management LP** acquired a diverse portfolio of mineral and royalty interests in the Midland Basin in West Texas, the Houston-based firm said Jan. 22. The company said it is continuing what it described as an "opportunistic approach to income-generating investments."

Founded in 2006, BlackGold is a private investment firm focusing on asset-heavy, cash-flowing investments in the energy industry—a strategy which co-founder Adam Flikerski said the firm's recent acquisition exemplifies.

BlackGold said 72% of the net royalty acres in the acquired portfolio are leased by operators in the top quartile of active horizontal rig counts in the Midland Basin. Further, the firm added that 99% of the acquired net royalty acreage is leased by operators in the top half. The seller of the assets was not disclosed.

Erik Dybesland, co-founder of BlackGold, also added in a statement: "BlackGold continues to acquire mineral and royalty interests in the core of low-cost basins under best-in-class operators."

Though it did not disclose the financial terms of this most recent transaction, BlackGold said it has completed acquisitions of mineral and royalty interests totaling roughly $150 million in the past 12 months.

**KKR & Co. Inc.** holds a 24.9% passive minority interest in BlackGold, according to the company release.

# TRANSACTION HIGHLIGHTS

## NORTH AMERICA

■ Canada's **Frac Shack Inc.** acquired all the operating assets of the Sandtinel group of companies for an undisclosed amount, the global energy technology company said in a Jan. 23 release.

Established in 2014 and based in Grande Prairie, Alberta, Sandtinel provides sand separation technology in Western Canada and the U.S. The company's technology is being deployed to more than 40 companies across North America, including top shale producers such as **Pioneer Natural Resources Co.**, **Devon Energy Inc.** and **XTO Energy Inc.**, according to Sandtinel's website.

Frac Shack's acquisition of what CEO Todd Van Vliet described as a world-leading sand separation system allows the company to expand and diversify its services to new and existing customers in the flowback and production industry. "Bringing these companies together allows us to continue on our journey to change the world of energy," Van Vliet said in press release.

## DENVER-JULESBURG BASIN

■ **PDC Energy Inc.** completed its acquisition of **SRC Energy Inc.** on Jan. 14 through an all-stock merger worth about $1.7 billion, including the assumption of debt.

The two Denver-based independent E&Ps announced the merger agreement last August. PDC and SRC shareholders both approved the merger at special meetings held Jan. 13.

Upon closing, PDC now adds SRC's core area of operations in the greater Wattenberg Field of the Denver-Julesburg (D-J) Basin to its portfolio, which includes positions in the D-J Basin as well as in the Permian's Delaware sub-basin. Combined, the company is set to become the second-largest oil and gas producer in the D-J Basin.

In August, PDC said it expected the combination to generate about $800 million of free cash flow between the second half of 2019 and year-end 2021, half of which is planned to be returned to shareholders through an increased share repurchase program. PDC also agreed to assume SRC's net debt of about $685 million as of June 30.

## MIDCONTINENT

■ **Revolution Resources** completed its merger and acquisition of independent oil and gas producer **Jones Energy** on Jan. 7, the company said. Jones Energy agreed to a $201.5 million cash buyout in early December, about six months after the Austin, Texas-based company exited bankruptcy.

Jones Energy held about 185,000 net acres in the Midcontinent and other areas at the end of 2018 as well as 597 net wells and 2,017 net locations.

Revolution Resources is backed by Houston-based **Mountain Capital Partners LP**, which has about $1 billion of assets under management. The company has previously taken advantage of distressed Midcontinent companies to make acquisitions.

Jones was founded by former CEO Jonny Jones, who had a long history in the Anadarko and Arkoma basins of Texas and Oklahoma. Following closing on Jan. 7, the company, which emerged from bankruptcy as Jones Energy II Inc., became a wholly owned subsidiary of Revolution.

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# FRAC HIT VEXATION

RICHARD MASON, CHIEF TECHNICAL DIRECTOR

Vexed over frac hits?

You are not alone. Outside of low commodity prices, frac hits and well spacing are leading topics in oil and gas, and this is certainly true on the industry's technical side. Frac hits, well bashing and well interference are common terms describing the process. All convey a negative outcome. The phenomenon registers as anomalous pressure increases or an influx of water in neighboring wells during the stimulation process that can alter the arc of well productivity, gas-oil ratios or changes in reservoir pressure.

The frac hit phenomenon is complicated by terminology. Think of it as a Forrest Gump analog of shrimp, which can be barbecued, broiled, boiled, baked, pan fried, deep fried, peppered, sautéed, etc. Frac hits incorporate terms such as parent-child, sibling-sibling, up-down and, well, you get the picture.

A first step in assessing the problem involves addressing the terminology. Despite the negative slant, not all well interactions are bad. Many are neutral, and some generate positive impact, sort of like a miniature waterflood. Hence there is a move among engineers to change the technical name for the phenomenon, which is now formally addressed as frac driven interactions (FDI). Parent wells are defined as primary wells, and child wells have become infill wells—all very antiseptic, and all well and good.

Like shrimp terminology in Forrest Gump, however, there is more. While discussion at industry technical forums has been about the immediacy of the issue during completion, which has, in some cases, damaged casing and downhole infrastructure in neighboring wells, new perspectives are emerging that expand the understanding of this ubiquitous complex phenomenon.

Furthermore, FDI, as a topic, is not going away since the industry is evolving from field delineation in the tight formation plays to full field development, which will increase FDI frequency. The underlying concern involves the potential long-term production effects of the phenomenon. That said, most effort has focused solely on the event horizon of the completion process.

Denver-based Discovery Natural Resources LLC conducted a review examining FDI using production data from its Reagan County holdings spanning 15 square miles and five years of completions in the Midland Basin. If wells experienced FDI, or were knocked offline, or temporarily shut in, what happened to the production profile?

The check list of findings, which were summarized for the Society of Petroleum Engineers' Austin, Texas, chapter in early 2020, noted that FDI frequency and intensity was a function of the parent well's wellbore geometry (horizontal versus vertical), the offset direction between primary and infill wells, the presence of a horizontal buffer well and the distance between primary and infill wells.

Horizontal primary wells experienced FDIs more frequently than vertical parent wells, while vertically stacked or direct offset primary wells experienced FDIs with greater frequency and intensity than offset horizontal wells. There was nothing counterintuitive about the findings.

Rather, the impact on legacy well production profiles—and reserves—was the key finding. Of note, most impact was relegated to daily gas production on primary wells, which dropped sharply for a period of time. In contrast, FDIs posed little long-term impact to the oil production decline curve after an intervening period lasting from a few days up to a few weeks.

Discovery Natural Resources engineers attributed the process to a recharge in reservoir pressure from the stimulation job, which lifted sustained bottomhole pressure increases above the bubble point, driving natural gas back into solution. In response, Discovery now delays flow back on new stimulation jobs until offset primary wells are cleaned up.

The bottom line from the bottomhole is that FDIs, at least in Reagan County, Texas, are not a major risk to reserves. Do these findings transfer to other tight formation plays outside the southern Midland Basin? Time will tell.

Decreasing the wall of worry over FDIs on long-term legacy well performance provides rare good news in an industry facing a gauntlet of commodity price induced headwinds.

Furthermore, it frees investigation of the FDI phenomenon to focus on issues such as the degree to which infill wells cannibalize production from neighboring wells. Thus, well spacing represents the greater potential impact for reserves. In this market, the industry will take good news wherever it can find it.

## EASTERN U.S.

**1** A deep test in Vigo County, Ind., has been scheduled by ***Wabash Valley Resources LLC***. Permitted as a deep geologic structure test, #1 Wabash will be in Section 32-13n-9w, and the proposed total depth is 8,350 ft. It will be the deepest drilling in this part of Indiana. According to the permit, the venture will be a multipurpose research well designed to investigate hydrocarbon potential throughout the stratigraphic column, drilling into the Pre-Cambrian basement for knowledge about the deep Illinois Basin. In addition, the venture is designed to evaluate reservoir potential for long-term storage of $CO_2$. The #1 Wabash is being funded by the U.S. Department of Energy as part of a $CO_2$ capture and sequester initiative. Wabash Valley Resources is based in Terre Haute, Ind., and the company owns ammonia production and carbon sequestration facilities in the city. One exploratory test has been drilled in Section 32 at a 1,802-ft wildcat abandoned in 1960. To the west in Section 31 is a 1,890-ft dry hole abandoned in 1977. Nearby production is about 3 miles to the northwest at a shallow gas well in Section 17 and 4 miles to the south-southeast in Terre Haute Field.

**2** ***Pioneer Oil Co.*** has scheduled a 2,450-ft wildcat in eastern Lawrence County, Ind. According to IHS Markit, #1 Wesner is targeting oil pays in Knox. It will be drilled in Section 27-5n-2e. The planned venture straddles the Lawrence/Jackson county line. An offsetting exploratory test was drilled in 1973 at #1 Hill, which was abandoned at 2,502 ft. Also in the area is #1 Stan Pate in Section 15-5n-2e. Permitted as a 2,400-ft Knox wildcat, the well was abandoned in 1983 at 1,850 ft in Trenton Lime. Pioneer's headquarters are in Vincennes, Ind.

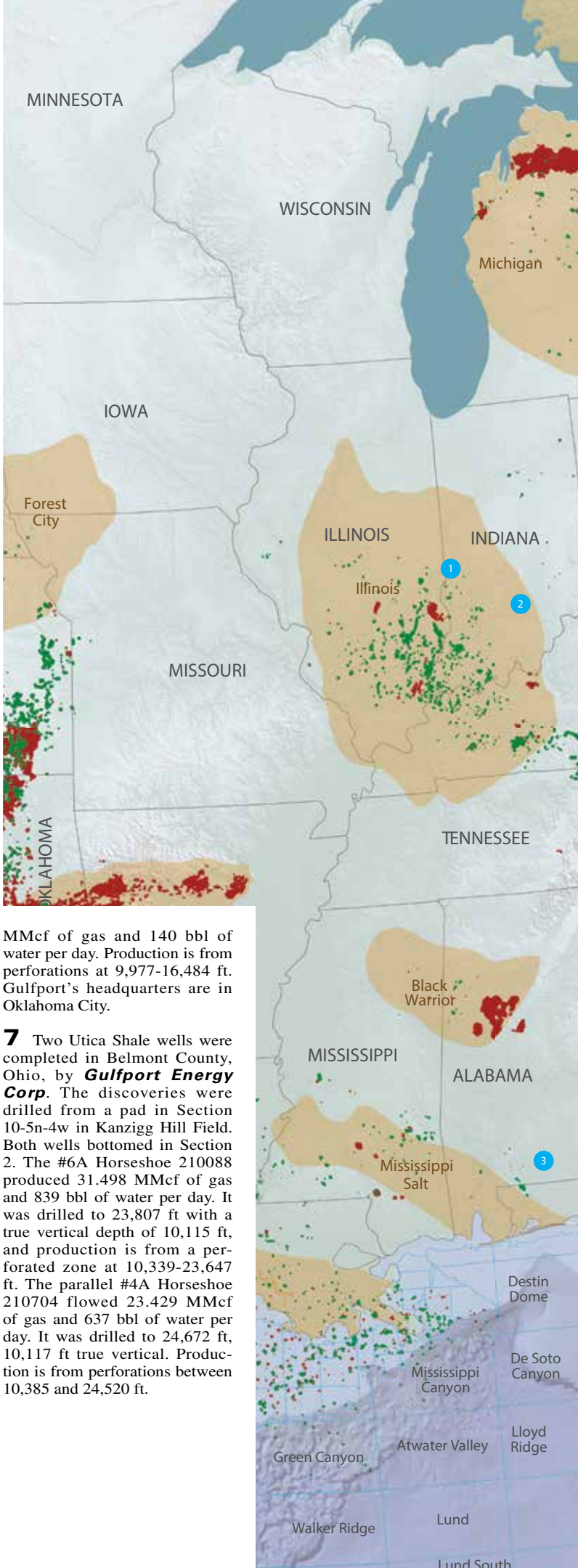
**3** ***Fletcher Petroleum*** has completed an oil well in Alabama's Brooklyn Field. According to IHS Markit, #1 Pate 10-1 was tested in a Smackover zone at 11,828-46 ft flowing an unreported amount of crude. During a few days in December, the Conecuh County well recovered 357 bbl of crude, 37 Mcf of gas and 165 bbl of water. It was drilled to 12,158 ft before being plugged back to 11,870 ft. The well is in Section 10-3n-13e. Nearby production is within 1 mile to the northwest at a Fletcher-Brooklyn Field completion, #1 Pate 3-9 in Section 3. It was tested in 2016 flowing 384 bbl of 46.5-degree-gravity crude and 359 Mcf of gas per day from Smackover at 11,654-82 ft. Fletcher is based in Fairhope, Ala.

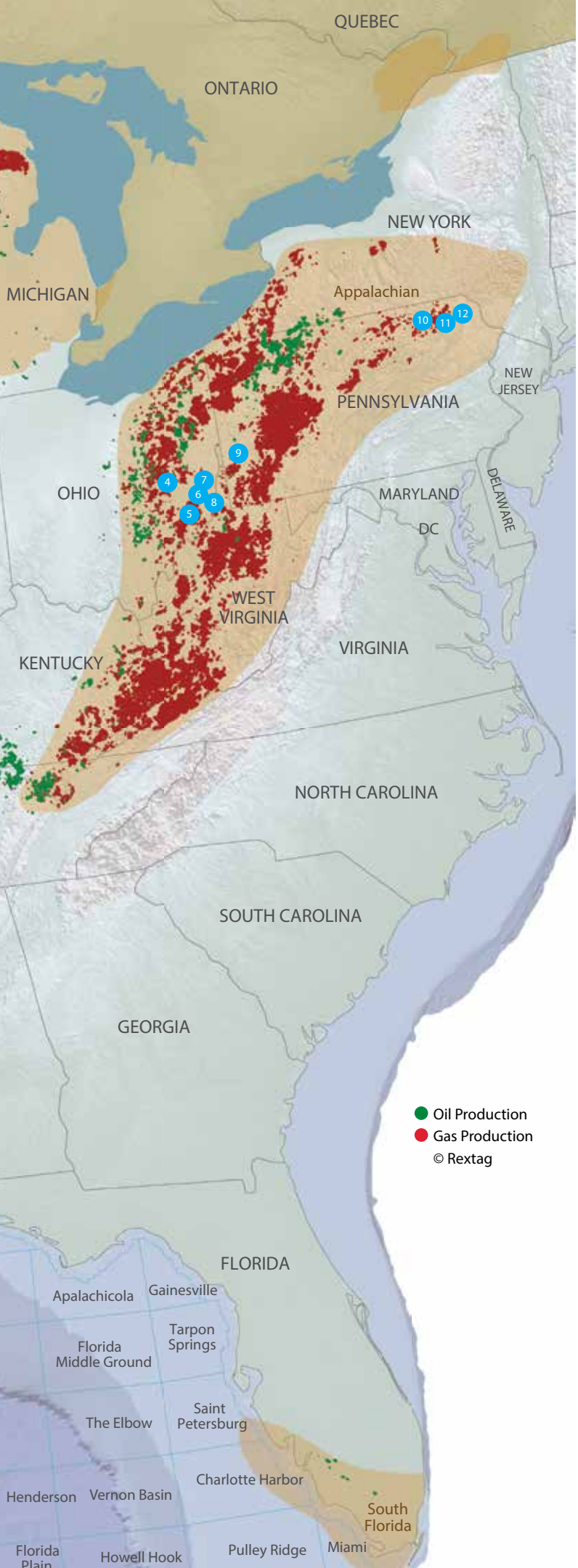
**4** In Section 34-10n-7w of Guernsey County, Ohio, ***Ascent Resources*** announced results from a Utica Shale discovery. The company's #6H Raber W LND GR flowed 899 bbl of oil, 8.949 MMcf of gas and 46 bbl of water per day. It is in Canton Consolidated Field and was drilled to 19,899 ft. The true vertical depth is 7,694 ft, and it bottomed in Section 26. Production is from perforations between 7,847 and 33,899 ft. Ascent Resources is based in Oklahoma City.

**5** A Monroe County, Ohio, Utica Shale discovery by ***Triad Hunter LLC*** produced 9.192 MMcf of gas and 424 bbl of water per day. Located in Section 29-2n-5w, #4 UH Forni was drilled to the north to 19,400 ft, 9,623 ft true vertical, and it bottomed in Section 25. Production at the Little Muskingum River Field well is from acidized and fractured perforations between 10,301 and 19,244 ft. Triad Hunter is based in Marietta, Ohio.

**6** ***Gulfport Energy Corp.*** completed three Utica Shale wells in Belmont County, Ohio, after acidizing and fracturing. The Anderson Run Field completions were drilled from a pad in irregular Section 30-5n-4w. The #2C Watkins 210085 was drilled to 16,955 ft, 9,780 ft true vertical, and flowed 13.69 MMcf of gas and 192 bbl of water per day from perforations at 10,165-16,869 ft. The #1D Watkins 210085 was drilled to 17,364 ft, 9,793 ft true vertical, and flowed 13.714 MMcf of gas and 310 bbl of water per day from perforations at 10,526-17,199 ft. The #3B Watkins 210085 was drilled to the south to 16,580 ft, 9,761 ft true vertical. It produced 14.047 MMcf of gas and 140 bbl of water per day. Production is from perforations at 9,977-16,484 ft. Gulfport's headquarters are in Oklahoma City.

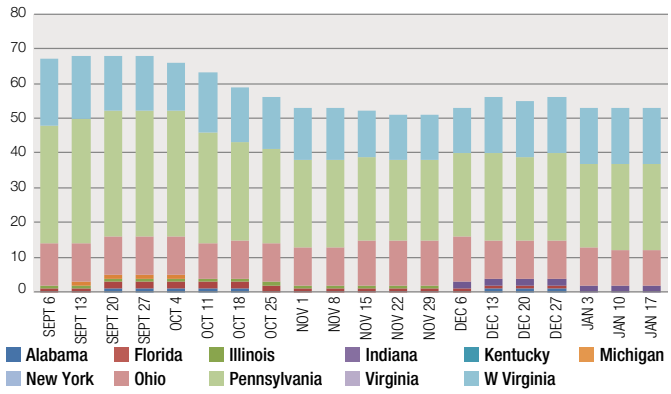
**7** Two Utica Shale wells were completed in Belmont County, Ohio, by ***Gulfport Energy Corp***. The discoveries were drilled from a pad in Section 10-5n-4w in Kanzigg Hill Field. Both wells bottomed in Section 2. The #6A Horseshoe 210088 produced 31.498 MMcf of gas and 839 bbl of water per day. It was drilled to 23,807 ft with a true vertical depth of 10,115 ft, and production is from a perforated zone at 10,339-23,647 ft. The parallel #4A Horseshoe 210704 flowed 23.429 MMcf of gas and 637 bbl of water per day. It was drilled to 24,672 ft, 10,117 ft true vertical. Production is from perforations between 10,385 and 24,520 ft.






**Eastern U.S. Rig Count**

Sept. 6, 2019-Jan. 17, 2020




Data compiled from Baker Hughes

**8** In Monroe County Ohio, Stavanger-based ***Equinor*** completed two Hannibal Field-Utica Shale wells. The ventures were drilled from a pad in Section 32-2n-3w. The #3H S U Eisenbarth was drilled to the southeast at 22,193 ft, 11,052 ft true vertical, and bottomed in Section 19. It initially flowed 29.053 MMcf of gas with 975 bbl of water per day from acidized and fractured perforations between 11,409 and 21,844 ft. The #2H S U Eisenbarth flowed at a daily rate of 30.262 MMcf of gas and 1.074 Mbbl of water. It was drilled to 23,172 ft. The true vertical depth is 11,077 ft, and it bottomed in Section 24. Equinor's headquarters are in Stavanger.

**9** Fort Worth, Texas-based ***Range Resources Corp.*** completed a Marcellus discovery in Washington County, Pa. The Candor Field well, #5H Kresic Unit, is in Section 8, Clinton 7.5 Quad, Smith Township. It was tested flowing 12.96 MMcf of gas with a shut-in casing pressure of 2,000 psi. Production is from an acidized, fractured and perforated zone at 6,335-23,240 ft. It was drilled to 23,330 ft, and the true vertical depth is 6,340 ft.

**10** In Susquehanna County, Pa., ***Cabot Oil & Gas Corp.*** announced results from a Marcellus Shale completion in Section 4, Springville 7.5 Quad, Auburn Township. The #8 Burke G is in Dimock Field and was drilled to 17,943 ft with a true vertical depth of 6,738 ft. It flowed 27.2 MMcf of gas with no reported water per day. Tested on an unreported choke size, the shut-in casing pressure was 1,225 psi, and production is from perforations between 7,470 and 17,877 ft.

**11** ***Cabot Oil & Gas Corp.*** completed a Marcellus Shale discovery that produced 41 MMcf of gas per day. The #6 Hordis C is in Section 5, Hop Bottom 7.5 Quad, Lathrop Township, in Susquehanna County, Pa. It was drilled to 12,195 ft with a true vertical depth of 7,406 ft. Production is from perforations between 7,619 and 12,120 ft, and it was tested after 15-stage fracturing. Cabot's headquarters are in Houston.

**12** Two Marcellus Shale-Dimock Field completions were reported in Susquehanna County, Pa., by ***Cabot Oil & Gas Corp.*** The wells were drilled from a pad in Section 3, Hop Bottom 7.5 Quad, Brooklyn Township. The #6 Molnar M was drilled to 13,516 ft, 7,048 ft true vertical. It was tested flowing 18.4 MMcf of gas per day after 35-stage fracturing. Production is from perforations at 8,042-13,447 ft, with a shut-in casing pressure of 500 psi. The #8 Molnar M was drilled to 18,186 ft, 6,963 ft true vertical, and was fractured in 23 stages. It was tested flowing 18.3 MMcf of gas with a shut-in casing pressure of 625 psi from perforations at 7,594-12,139 ft.

## GULF COAST

**1** An Austin Chalk discovery by Houston-based ***EOG Resources Inc.*** was completed in Webb County (RRC Dist. 4), Texas. The #4H G-B Minerals was drilled to 18,833 ft (12,843 ft true vertical) in CCSD&RGNG RR CO Survey, A-532. The well produced 11.74 MMcf of gas with 80 bbl of water per day, and it bottomed in TC RR CO Survey, A-2091. It was tested on a 20/64-in. choke with a flowing tubing pressure of 5,480 psi and a shut-in tubing pressure of 7,800 psi. Production is from perforations at 12,898-18,821 ft.

**2** London-based ***BP Plc*** announced results from two Eagle Ford Shale discoveries in Hawkville Field in McMullen County (RRC Dist. 1), Texas. The wells were drilled from a pad in Patrick McFadden Survey, A-4. The #32 Gentry flowed 173 bbl of condensate, 11.355 MMcf of gas and 148 bbl of water per day. Drilled to 21,085 ft, the true vertical depth is 12,869 ft. Production is from perforations at 13,302-20,958 ft. The #33H Gentry produced 151 bbl of condensate, 10.02 MMcf of gas and 325 bbl of water per day. It was drilled to the north to 20,695 ft, 12,930 ft true vertical, and tested on an 18/64-in. choke after acidizing and fracturing. The flowing tubing pressure was 7,185 psi, and the shut-in tubing pressure was 8,240 psi. Production is from perforations at 13,266-20,579 ft.

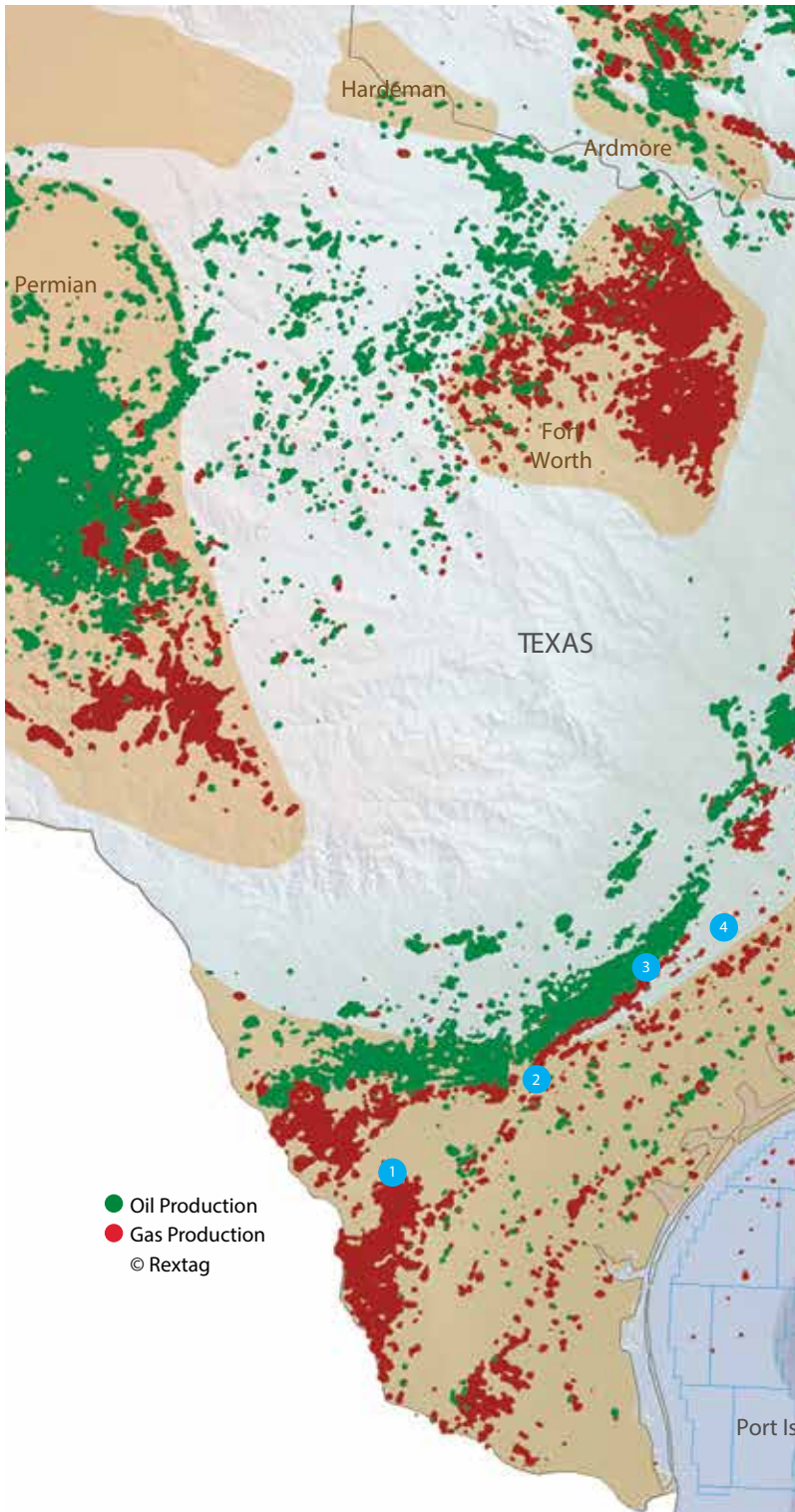
**3** ***EOG Resources Inc.*** announced results from two Eagleville Field-Eagle Ford Shale discoveries in DeWitt County (RRC Dist. 2), Texas. The wells were drilled from a pad on a 498-acre lease in Issac Baker Survey, A-89. The #20H Mccollum A Unit flowed 3.728 Mbbl of oil, 3.56 MMcf of gas and 1.482 Mbbl of water per day from perforations at 12,382-15,661 ft. It was drilled to 15,800 ft with a true vertical depth of 11,885 ft. The #21H Mccollum A Unit produced 2.635 Mbbl of oil, 2.751 MMcf of gas and 1.419 Mbbl of water per day after fracturing. It was drilled to 15,720 ft, 11,853 ft true vertical. Production is from perforations between 12,339 and 15,579 ft.

**4** According to IHS Markit, ***Rocky Creek Resources*** has completed an Eagleville Field in Lavaca County (RRC Dist. 2), Texas. The #1H Gos was tested flowing 8.005 MMcf of gas, 404 bbl of condensate and 1.628 Mbbl of water per day from fracture-treated Eagle Ford Shale perforations at 14,089-23,702 ft. Tested on a 20/64-in. choke, the flowing casing pressure was 7,278 psi, and the shut-in casing pressure was 7,650 psi. Rocky Creek's latest completion was in Elizabeth Tribble Survey, A-446. It bottomed about 2 miles to the southeast in Benjamin Whitson Survey, A-490. The venture was drilled to 23,915 ft (13,524 ft true vertical).

**5** Two Eagle Ford completions in Burleson County (RRC Dist. 3), Texas, were announced by ***Chesapeake Operating Inc.*** The Giddings Field wells were drilled from a pad in Section 8, Stephen F Austin Survey, A-65. The #1H Schoeneman C was drilled to 18,059 ft, 9,362 ft true vertical, and produced 1.332 Mbbl of oil, 581 Mcf of gas and 1.571 Mbbl of water per day. Tested on a 23/64-in. choke, the flowing tubing pressure was 923 psi, and the flowing casing pressure was 67 psi. Production is from perforations at 8,648-18,010 ft. The #3H Schoeneman C was drilled to 17,300 ft with a true vertical depth of 8,654 ft. It produced 1.143 Mbbl of oil, 521 Mcf of gas and 1.58 Mbbl of water per day from perforations at 8,594-17,248 ft. Gauged on a 25/64-in. choke, the flowing tubing pressure was 751 psi, and the flowing casing pressure was 575 psi.

**6** Two Caddo Parish, La., Haynesville Shale wells were completed by Frisco, Texas-based ***Comstock Oil & Gas*** in Greenwood Waskom Field. The #4-Alt Querbes 20-17 HC was tested flowing 26.579 MMcf of gas and 1.763 Mbbl of water per day. It was drilled to 21,034 ft, 11,013 ft true vertical. Production is from perforations at 11,219-20,921 ft. It is in Section 29-16n-16w and was tested on a 34/64-in. choke, and the flowing casing pressure was 5,880 psi. In nearby Section 17-16n-16w, #1-Alt Querbes 20-17 HC was drilled to 16,670 ft, 11,154 ft true vertical. It was tested flowing 20.512 MMcf of gas and 1.8 Mbbl of water per day, and production is from perforations at 11,291-16,570 ft. Gauged on a 32/64-in. choke, the flowing casing pressure was 5,287 psi.

**7** Two high-volume Red River Parish, La., Bracky Branch Field wells were completed by ***GEP Haynesville LLC***. The wells were drilled from a pad in Section 9-13n-10w. The #1-Alt Cecile Land 9-16 HC was drilled to 21,200 ft, 13,200 ft true vertical, and flowed 42.96 MMcf of gas and 528 bbl of water per day. It was tested on a 34/64-in. choke with a flowing casing pressure of 7,970 psi, and production is from perforations at 12,743-20,367 ft. The #2-Alt Cecile Land 9-16 HC was drilled to 20,540 ft with a true vertical depth of 12,449 ft. It flowed 40.497 MMcf of gas and



637 bbl of water per day from perforations at 12,639-20,327 ft. GEP Haynesville is based in The Woodlands, Texas.

**8** ***Anadarko Petroleum Corp.*** has permitted the first of up to 11 exploratory tests on the two-block Magnus prospect. The #1 OCS G36181 will be in the southwestern portion of Walker Ridge Block 881. Area water depth is about 7,700 ft. According to The Woodlands, Texas-based company's exploration plan, another 10 tests are planned for various surface locations on Walker Ridge Block 881 (OCS G36181) and adjacent Walker Ridge Block 925 (OCS G36475).

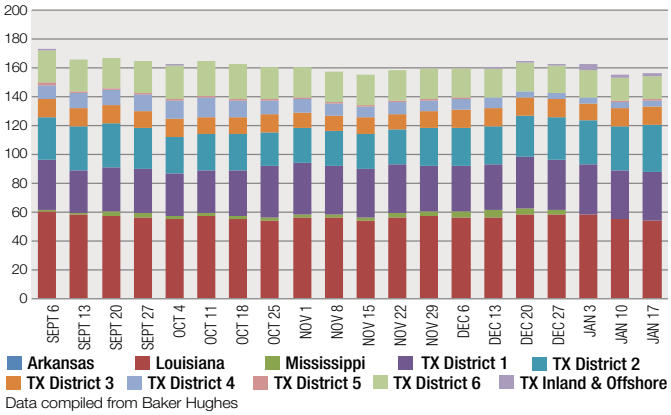
**9** ***Hilcorp Energy***, based in Refugio, Texas, has completed a second Miocene zone at a South Louisiana gas well in Lafourche Parish, La. The #1 State Lease 21782 initially flowed 30.151 MMcf of gas, 326 bbl of 42-degree-gravity crude and 18 bbl of water per day. Production is from perforations in Bigenerina 2 (Miocene) at 13,574-13,674 ft. According to IHS Markit, the Lake Raccourci Field well was originally completed in a Bigenerina 2 zone at 13,848-13,934 ft flowing 19.8 MMcf of gas and 275 bbl of crude daily. The directional gas well was drilled to 14,681 ft (14,594 ft true vertical) and is in Section 24-21s-20e.

**10** ***Shell Oil Co.***, based in Houston, has permitted a deepwater sidetrack in Appomattox Field, a Norphlet oil reservoir. According to IHS Markit, the well will be in the northeastern portion of Mississippi Canyon Block 392 at #5AE (ST) OCS G26253. According to the permit, the sidetrack will be kicked off from the original hole at 22,840 ft. The Appomattox Norphlet discovery was drilled in 2010. The #1 OCS G26253 on Mississippi Canyon Block 392 hit approximately 530 ft of oil pay. The well was drilled to 25,078 ft. First production from the field (Mississippi Canyon Block 392) and neighboring Vicksburg (Mississippi Canyon Block 393 and DeSoto Canyon Block 353) field was announced in 2019 following the start-up of the Appomattox floating production system. The Appomattox production facility on Mississippi Canyon Block 437 is the first commercial project to be brought online in the Norphlet play.

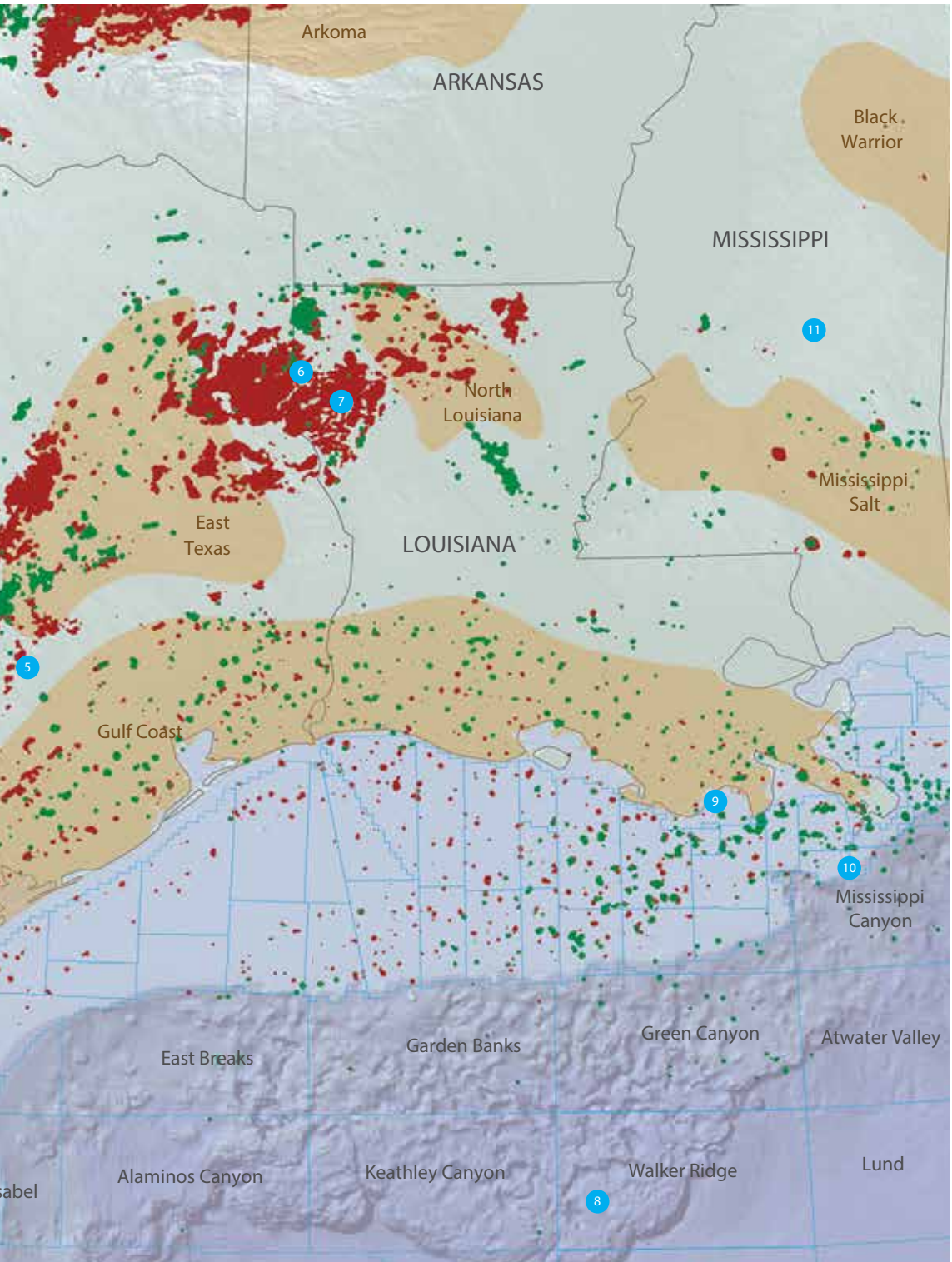
**11** A Hosston oil discovery in Mississippi's Smith County was reported by ***Spooner Petroleum***. The discovery is more than 3 miles northeast of the nearest production. The #1 Blackstone 32-10 flowed 317 bbl of 39.2-degree-gravity crude and 114 Mcf of gas per day from perforations at 12,062-74 ft. Tested on a 10/64-in. choke, the flowing tubing pressure was 1,320 psi, and the shut-in tubing pressure was 1,645 psi. The directional well was drilled to 15,350 ft (15,255 ft true vertical) in Section 32-4n-6e. Spooner is based in Ridgeland, Miss.

**Gulf Coast Rig Count**

Sept. 6, 2019-Jan. 17, 2020




Data compiled from Baker Hughes



## MIDCONTINENT & PERMIAN BASIN

**1** ***EOG Resources Inc.*** announced results from a multiwell Delaware Basin prospect in Reeves County (RRC Dist. 8), Texas. The #3H State Correa Unit produced 8.902 MMcf of gas, 1.645 Mbbl of 42.9-degree-gravity oil and 14.284 Mbbl of water per day from an acid- and fracture-stimulated Wolfcamp M interval at 11,334-21,247 ft. It was tested on a 1-in. choke with a flowing casing pressure of 1,939 psi. The extended-lateral was drilled to 21,247 ft (11,258 ft true vertical) in Section 36, Block 55 T4S, T&P RR Co Survey, A-3269, and bottomed 2 miles to the north in Section 31. The parallel #1H State Correa Unit and #2H State Correa Unit were completed in shallower Wolfcamp zones. The #1H flowed 6.716 MMcf of gas and 1.979 Mbbl of oil from perforations at 10,900-20,764 ft. The #2H flowed 7.5 MMcf of gas and 2.259 Mbbl of oil from a zone at 10,710-20,789 ft. The respective depths at the Phantom Field wells are 20,785 ft (10,657 ft true vertical) and 20,789 ft (10,656 ft true vertical). EOG's headquarters are in Houston.

**2** In Loving County (RRC Dist. 8), Texas, ***EOG Resources Inc.*** completed a Phantom Field-Wolfcamp discovery that flowed 3.871 Mbbl of oil, 8.732 MMcf of gas and 10.79 Mbbl of water per day. The #3H Yellow Rose A Unit was drilled in Section 14, Block C26, PSL Survey, A-496. It was drilled to 22,547 ft, and the true vertical depth is 12,262 ft. Tested on a 96/64-in. choke, the flowing tubing pressure was 950 psi, and the shut-in casing pressure was 964 psi. Production is from acidized and fractured perforations at 12,427-22,502 ft.

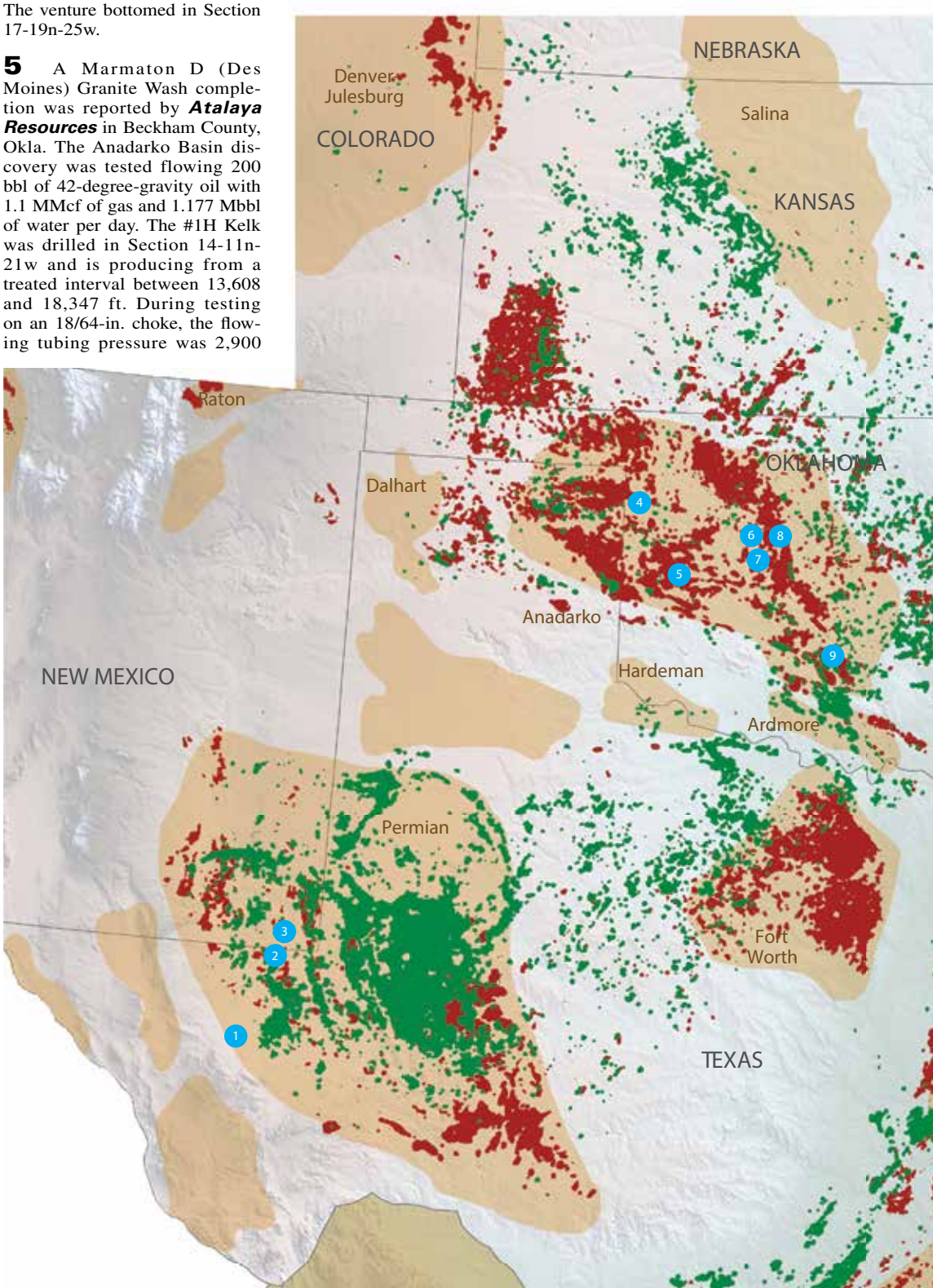
**3** A Third Bone Spring completion was reported by Houston-based ***Marathon Oil Corp.*** in Lea County, N.M. The #001H Dogie Draw 14 TB Federal Com initially flowed 1.411 Mbbl of oil, 2.07 MMcf of gas and 5.28 Mbbl of water per day. Production is from a 32-stage acidized and fractured zone at 12,392-19,791 ft. It was tested on a 48/64-in. choke, and the flowing casing pressure was 1,100 psi. The Fairview Mills Field well was drilled to 19,890 ft in Section 14-25s-34e and bottomed within 2 miles to the south in Section 23. The true vertical depth is 12,456 ft.

**4** Oklahoma City-based ***Duncan Oil*** has completed an extended-reach Anadarko Basin-Cleveland well in Ellis County, Okla. The #1-20HX DLD Farms was drilled in Section 20-19n-25w. It was tested on gas lift producing 489 bbl of 44-degree-gravity oil, 1.3 MMcf of gas and 1.230 Mbbl of water per day after acid and fracture treatment at 9,320-17,062 ft. It was drilled to the north about 1.5 miles to 17,140 ft, and the true vertical depth is 8,944 ft. The venture bottomed in Section 17-19n-25w.

**5** A Marmaton D (Des Moines) Granite Wash completion was reported by ***Atalaya Resources*** in Beckham County, Okla. The Anadarko Basin discovery was tested flowing 200 bbl of 42-degree-gravity oil with 1.1 MMcf of gas and 1.177 Mbbl of water per day. The #1H Kelk was drilled in Section 14-11n-21w and is producing from a treated interval between 13,608 and 18,347 ft. During testing on an 18/64-in. choke, the flowing tubing pressure was 2,900 psi. The well was drilled to the southwest to 18,550 ft with a true vertical depth of 13,008 ft. Atalaya's headquarters are in Tulsa, Okla.

**6** A ***Continental Resources Inc.*** discovery in Blaine County, Okla., was tested flowing 17.9 MMcf of gas, with 636 bbl of 57-degree-gravity condensate and 1.467 Mbbl of water per day from Meramec. The #2-25-36XHM Edgemere Farms was drilled in Section 25-15n-13w. It was tested on a 28/64-in. choke and produced from perforations between 12,285 and 22,034 ft after acid and fracture treatments. The Anadarko Basin venture has a south lateral that was drilled to 22,225 ft. The true vertical depth is 12,456 ft, and it bottomed in Section 36-15n-13w. Continental is based in Oklahoma City.

**7** According to IHS Markit, ***Continental Resources Inc.*** completed a high-volume Mississippian well in the Stack play. The #1-26-32XHM Donnie FIU is in Section 29-13n-12w in Blaine County, Okla. The discovery produced 16.2 MMcf of gas and 4.938 Mbbl of water per day from Meramec. It was drilled to 24,234 ft (14,521 ft true vertical)

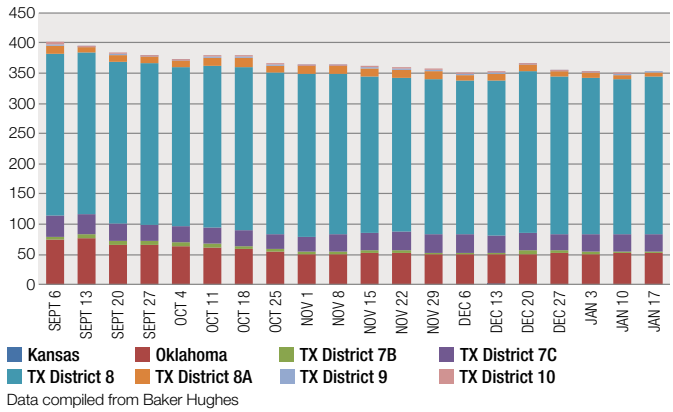


and bottomed in Section 32-13n-12w. It was drilled to the south and tested on a 40/64-in. choke after acidizing and fracturing between 14,199 and 24,067 ft. It bottomed in Section 32-13n-12w.

**8** ***Continental Resources Inc.*** announced results from three comingled Mississippian-Mississippi Lime wells in the Watonga-Chickasha Trend. The wells were drilled from a pad in Section 19-15n-10w in Blaine County, Okla. The #7-19-18XHM Schulte Federal was drilled to 21,109 ft, 10,784 ft true vertical, and produced 2.309 Mbbl of oil, 6.957 MMcf of gas and 3.81 Mbbl of water per day. It was tested on a 46/64-in. choke, and the flowing tubing pressure was 2,239 psi. Production is from Mississippian Lime at 11,094-15,716 ft and Mississippian at 15,753-21,109 ft. The #3-19-18XHM Schulte FIU was drilled to 21,339 ft, 11,045 ft true vertical, and flowed 2.424 Mbbl of oil, 7.045 MMcf of gas and 3.25 Mbbl of water per day. It was tested on a 42/64-in. choke, and the flowing tubing pressure was 2,554 psi. Production is from Mississippian Lime at 11,370-16,053 ft and Mississippian at 16,091-21,171 ft. The #4-19-18XHM Schulte FIU was drilled to 21,220 ft, 10,869 ft true vertical, and was tested on a 48/64-in. choke, flowing 2.687 Mbbl of oil, 9.444 MMcf of gas and 3.92 Mbbl of water per day from perforations in Mississippian Lime at 11,150-15,933 ft and Mississippian at 15,970-21,051 ft. The flowing tubing pressure was 2,504 psi.

**Midcontinent & Permian Basin Rig Count**

Sept. 6, 2019-Jan. 17, 2020

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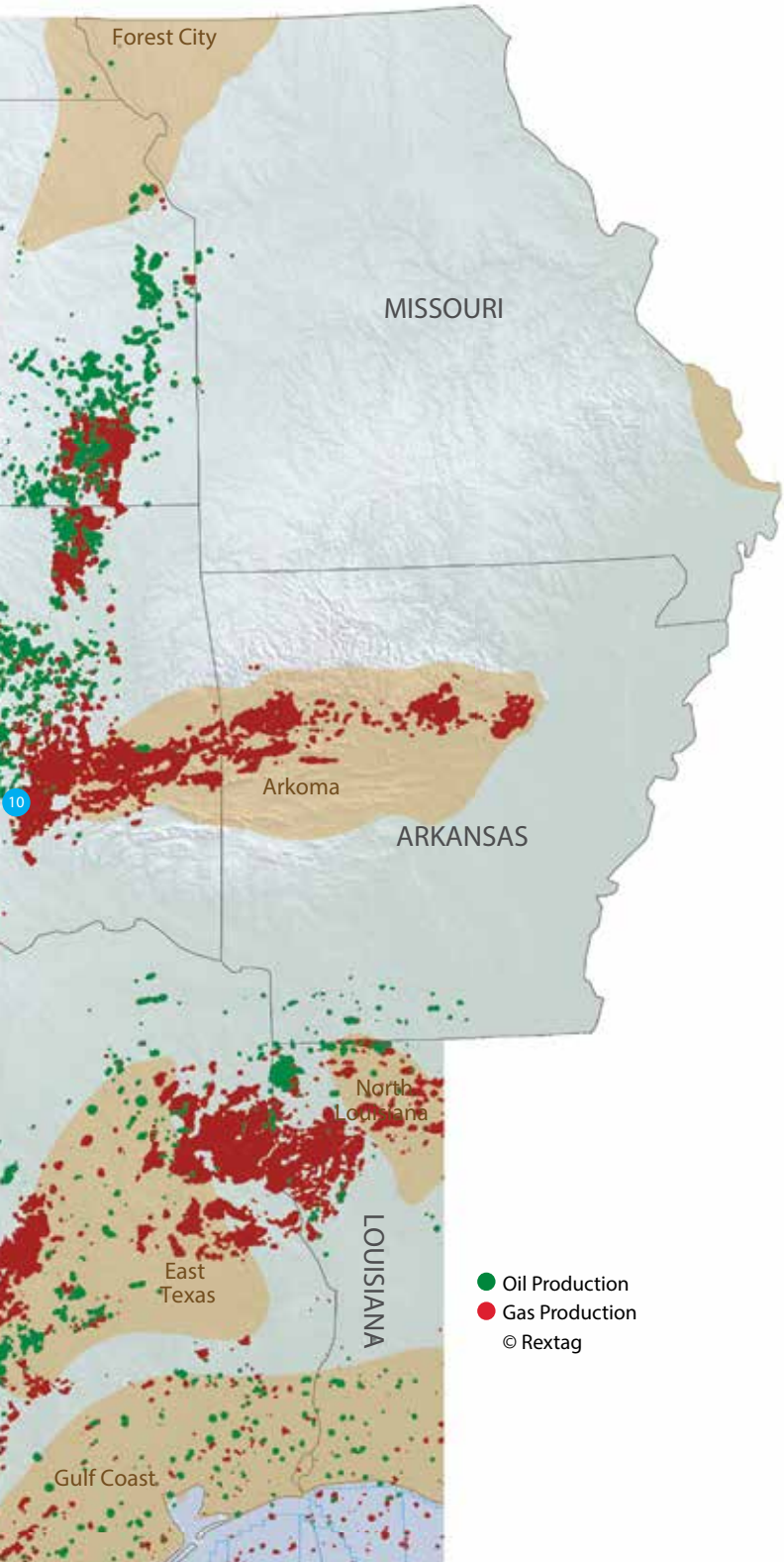



**9** ***Marathon Oil Corp.*** completed two horizontal Springer wells in Section 17-3n-4w in Garvin County, Okla. According to IHS Markit, #1-7-6SXH Starfox 0304 has the highest reported initial oil production rate in the play, flowing 3.052 Mbbl of 40-degree-gravity oil, 3.42 MMcf of gas and 2.101 Mbbl of water per day. It was tested on a 69/64-in. choke. It was drilled to the northwest into Section 7-3n-4w, then northward to 23,743 ft (12,717 ft true vertical) and bottomed in Section 6-3n-4w. The well was perforated, acidized and fractured at 13,431-23,242 ft. A second well on the pad, #3-8-5SXH Bowser 0304, initially flowed 2.122 Mbbl of oil, 2.45 MMcf of gas and 1.464 Mbbl of water per day. It was tested on a 42/64-in. choke, producing through treated perforations at 13,319-20,880 ft in a parallel north lateral. Drilled to 21,038 ft, 12,764 ft true vertical), it bottomed in Section 5-3n-4w.

**10** Three Hughes County, Okla., completions were reported by Houston-based ***Trinity Operating Inc***. The wells were drilled from a pad in Section 5-7n-12e. The #2-32/29H Mitzi initially flowed 6.33 MMcf of gas and 2.112 Mbbl of water per day from an acidized and fractured zone in Mayes at 14,226-14,422 ft. The 15,680-ft venture presumably has been perforated and treated in the Woodford as well, but little information has been released. The #4-32/29H Mitzi was drilled about 15 ft north on the pad and has been perforated, acidized and fractured in Woodford at 6,009-10,026 ft and 10,713-13,617 ft, and Mayes at 14,139-14,140 ft; however, an initial production rate was not reported. The #3-32/29H Mitzi was tested flowing 3.29 MMcf of gas and 1.584 Mbbl of water per day from Woodford between 5,096 and 15,300 ft. The flowing tubing pressure was 280 psi when tested on an open choke. The three wells were drilled with parallel laterals extending north across Section 32-8n-12e with bottomhole locations in Section 29-8n-12e. According to the company, core analysis indicates the Woodford underlying sections 29 and 32 have average net effective pay of about 80 ft, and it calculated that the two-section unit contained recoverable original gas-in-place of approximately 24.6 Bcf.

## WESTERN U.S.

**1** ***Grant Canyon Oil & Gas*** LLC has completed a Three Bar Field delineation test in Nevada. The #25-2 Three Bar-Federal is in Section 25-28n-51e of Eureka County. It produced 695 bbl of oil during three days in late 2019, its first month of reported production. No completion details have been disclosed. It was drilled to a proposed total depth of 11,500 ft, and it is the first drilling in the field area since 1997. Objectives presumably included volcanics, Humboldt and Mississippian. The discovery is within one-half mile northwest of the inactive Three Bar Field discovery, which was completed in 1989—#25-A Three Bar Unit in Section 25-28n-51e initially swabbed 120 bbl of oil and 36 bbl of water per day. It was drilled to 5,307 ft, and production is from the volcanics at 4,344-84 ft. Grant Canyon's headquarters are in Denver.

**2** ***Kebo Oil & Gas Inc.*** had filed a permit application to drill a wildcat in Nye County, Nev., which is the company's first project as operator-of-record in the state. Objectives and target depth for #1 Ragged Ridge-Federal in Section 3-9n-57e have not been released. The Railroad Valley drillsite is about 2 miles southwest of the one-well Currant Field and about 3 miles east-northeast of Trap Spring Field. The Currant Field discovery was completed in 1979 at #1 Currant in Section 26-10n-57e. It was tested pumping 34 bbl of 13-degree-gravity oil per day from untreated perforations at 7,038-80 ft. Production is in a volcanic section within the Lower Sheep Pass (Cretaceous). The 7,800-ft well was abandoned after producing less than 600 bbl of oil and 100 bbl of water. Kebo's headquarters are in Portland, Texas.

**3** Oklahoma City-based ***Renos Land & Minerals Co.*** completed a horizontal Lower Cretaceous Muddy Sand well in Converse County, Wyo. According to IHS Markit, #36-74-34-1MH Hornbeck Draw Unit is in Section 34-36n-74w. It initially produced via gas lift 523 bbl of oil and 1.334 Mbbl of water per day. The lateral in Muddy was drilled to the north to 18,700 ft with a true vertical depth of 14,170 ft. It was tested after 28-stage fracturing between 14,170 and 18,516 ft. The well was originally designed as a test of the shallower Niobrara, but Renos later changed the objective to Muddy.

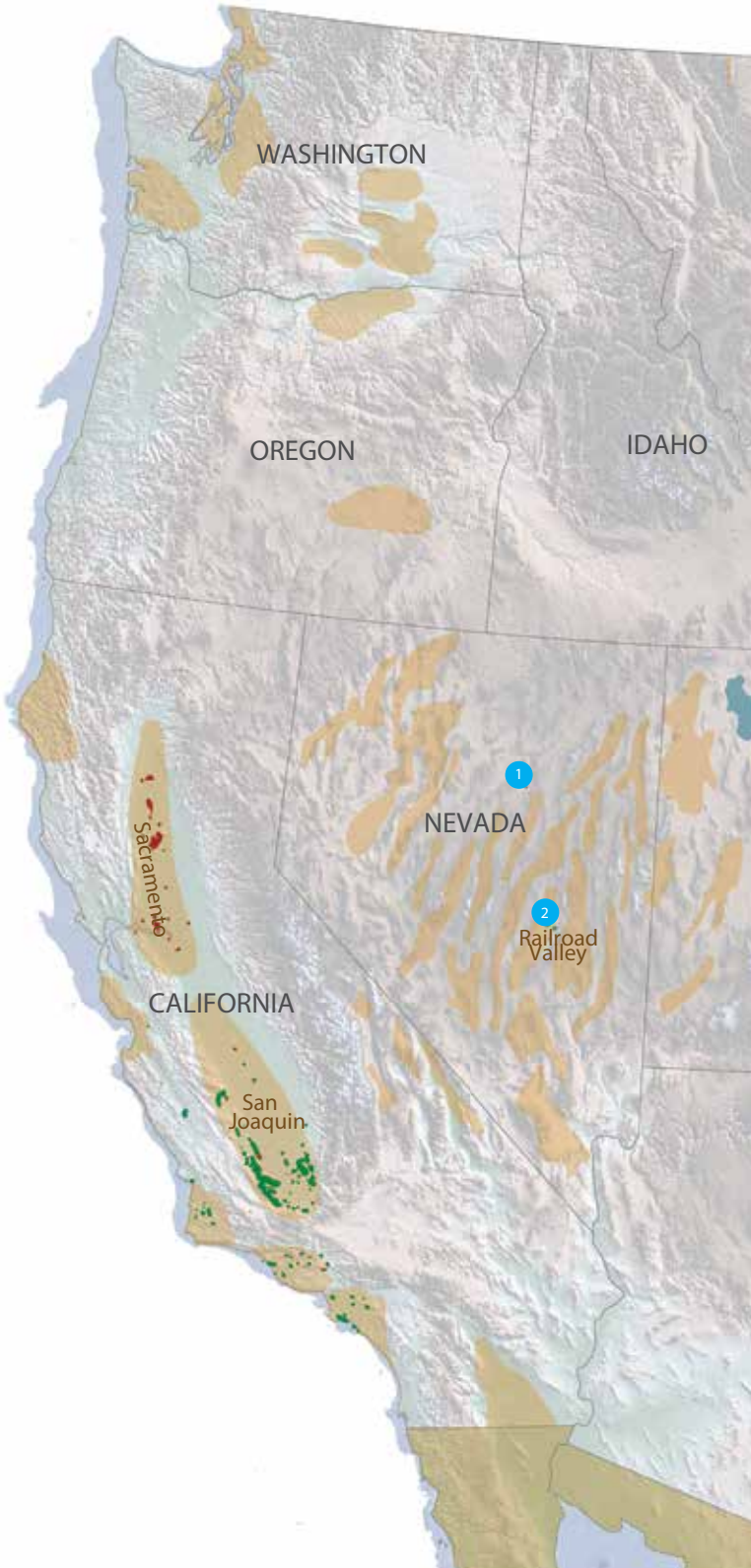
**4** According to IHS Markit, ***EOG Resources Inc.*** reported the completion of two horizontal producers—one each in Niobrara and Mowry from a common drillpad in Section 10-41n-73w of Campbell County, Wyo. The #3-1023H Ballista initially flowed 1.172 Mbbl of oil, 3.973 MMcf of gas and 1.536 Mbbl of water daily from a lateral in Niobrara. It was drilled to the southeast to 20,996 ft (10,566 ft true vertical) at a bottomhole location in Section 23-41n-73w. It was tested on a 30/64-in. choke after 43-stage fracturing between 10,953 and 20,853 ft. The #4-1023H Ballista is a Mowry producer, and it flowed 426 bbl oil, 4.4 MMcf of gas and 2.76 Mbbl of water per day. Production from a lateral also drilled to the southeast to 22,721 ft (11,960 ft true vertical) and bottomed in Section 23-41n-73w. It was tested on a 26/64-in. choke after 50-stage fracturing between 12,641 and 22,553 ft. EOG's headquarters are in Houston.

**5** ***EOG Resources Inc.*** completed two Powder River Basin-Niobrara exploratory tests from a pad in Section 3-40-73w in Converse County, Wyo. The #827-0327H Katara initially flowed 1.285 Mbbl of oil, 2.436 MMcf of gas and 2.832 Mbbl of water per day. Production is from a lateral drilled to the north to 21,401 ft (10,716 ft true vertical), and it bottomed in Section 27-41n-73w in Campbell County. It was tested on a 28/64-in. choke after 43-stage fracturing between 11,402 and 21,272 ft. The offsetting #831-0327H Katara was drilled to the north to 21,375 ft, and the true vertical depth is 10,847. It was tested after 39-stage fracturing between 11,277 and 21,101 ft. It produced 1.152 Mbbl of oil, 2.255 MMcf of gas and 2.469 Mbbl of water per day and was tested on a 26/64-in. choke, with a flowing casing pressure of 2,950 psi.

**6** Denver-based ***Anschutz Exploration Corp.*** has completed a horizontal Niobrara discovery in the Powder River Basin. The #3671-10-22-13W NH Cowboy-Federal, Section 10-36n-71w, in Converse County, Wyo., produced 672.8 bbl of oil, 523 Mcf of gas and 1.1 Mbbl of water per day. It was drilled southward to 21,271 ft and bottomed in Section 22-36n-71w. The planned true vertical depth was 11,061 ft. Anschutz has not disclosed additional completion details.

**7** Oklahoma City-based ***Devon Energy Co.*** completed an extended-reach horizontal Teapot producer in the southern Powder River Basin. The Converse County, Wyo., well, #35-263769-3XTPH-CU Downs-Federal, initially flowed 1.066 Mbbl of oil, 492 Mcf of gas and 502 bbl of water daily. The lateral was drilled about 2.5 miles to the north to 20,680 ft (6,439 ft true vertical) and bottomed in Section 23-37n-69w. It was tested on a 38/64-in. choke following 64-stage fracturing at 7,676-20,440 ft.

**8** ***Samson Exploration LLC*** has completed two horizontal



Codell discoveries from a drillpad on the northern flank of the Denver-Julesburg Basin in Section 22-15n-66w, Laramie County, Wyo. The #2734 6SH Buckaroo produced 880 bbl of oil with 402 Mcf of gas and 1.653 Mbbl of water per day. Production is from a lateral drilled to the south to 19,424 ft at a bottomhole location in Section 34-15n-66w. The true vertical depth is 9,088 ft. It was tested on a 42/64-in. choke after 42-stage fracturing between 9,604 and 19,186 ft. The #2833-12SH Buckaroo flowed 431 bbl of oil, 204 Mcf of gas and 1.612 Mbbl of water per day. It was tested on a 48/64-in. choke after 42-stage fracturing between 9,855 and 19,431 ft. It was drilled to the southwest to 19,670 ft, 9,099 ft true vertical, and bottomed in Section 33-15n-66w. Samson's headquarters are in Golden, Colo.

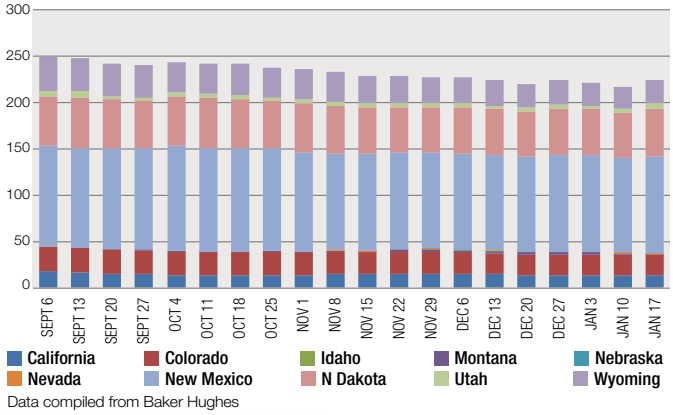
**9** ***Bruin E&P Operating*** completed a Middle Bakken venture in McKenzie County, N.D. The Antelope Field well, #152-94-14D-2-13H3 Fort Berthold, produced 2.587 Mbbl of 42-degree-gravity oil, 3.193 MMcf of gas and 2.25 Mbbl of water per day from perforations at 11,075-26953 ft. It was drilled to 27,066 ft, 10,648 ft true vertical, and is in Section 14-152n-94w. Bruin's headquarters are in Denver.

**10** A Reunion Bay Field completion in Mountrail County, N.D., was reported by Houston-based ***Marathon Oil Corp***. The Upper Three Forks well, #11-2TFH Dietrich USA, initially flowed 6.028 Mbbl of 41-degree-gravity oil, 5.644 MMcf of gas and 5.735 Mbbl of water per day. It was tested after 45-stage fracturing and is producing from 11,125-20,627 ft. The discovery was drilled in Section 2-151n-93w to 20,765 ft, and the true vertical depth is 10,655 ft. Gauged on a 64/64-in. choke, the flowing casing pressure was 1,500 psi.

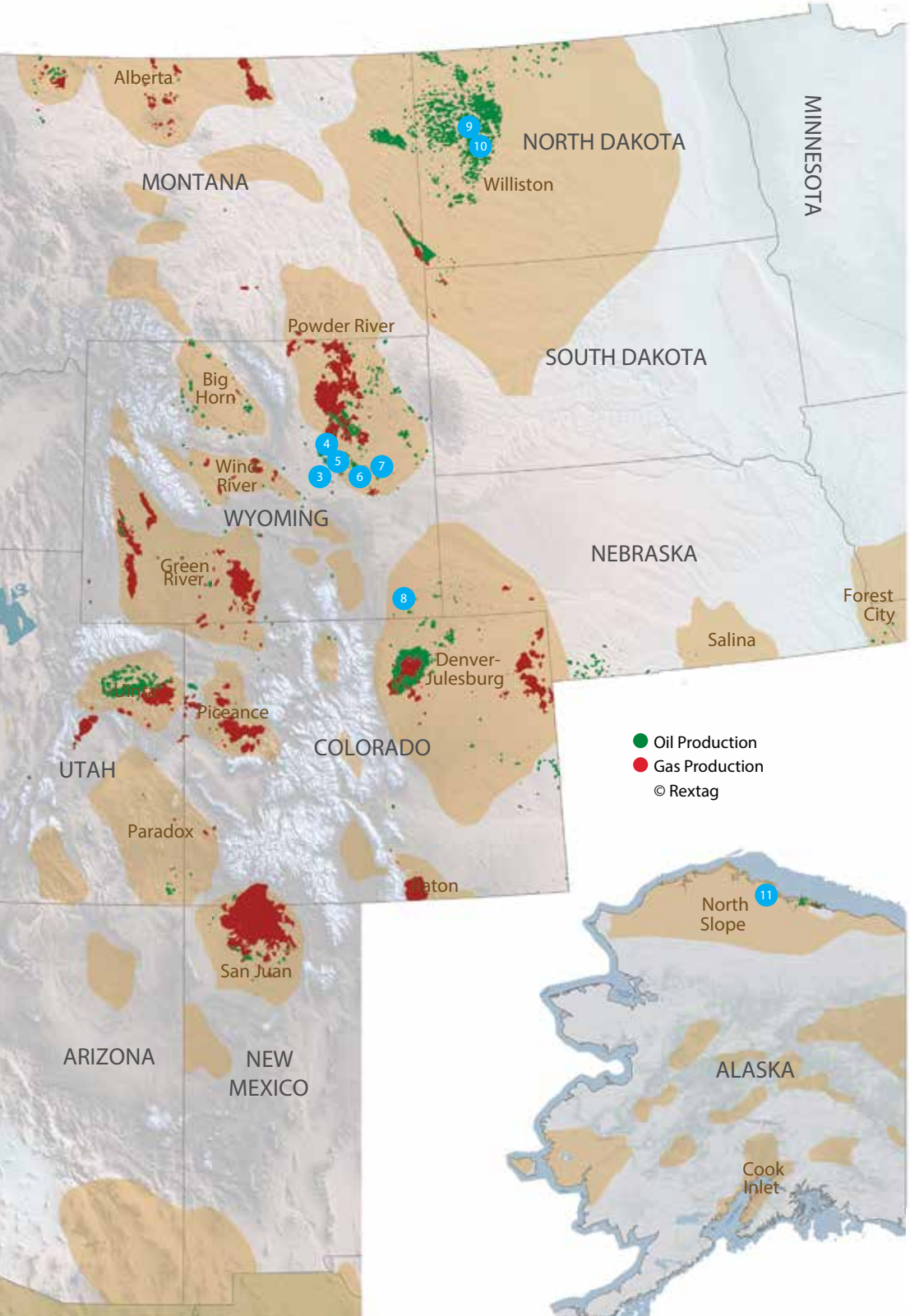
**11** A North Slope wildcat by ***Oil Search*** has been spud near the Placer Unit in Umiat Meridian, Alaska. The #1 Mitquq is in Section 3-11n-7e and is being directionally drilled approximately 3,083 ft east-southeastward to a bottomhole location in Section 2-11n-7e. It will evaluate Nanushuk oil and gas zones, and the planned true vertical depth is 7,000 ft. According to the Sydney-based company's approved lease plan of operations for the project, the well also will gain a sidetrack drilled in sections 3 and 10-11n-7e. The Mitquq drillsite is east of the Colville River on a temporary 23-acre ice pad.

**Western U.S. Rig Count**

Sept. 6, 2019-Jan. 17, 2020




Data compiled from Baker Hughes



# INTERNATIONAL HIGHLIGHTS

A U.S. drone attacked a vehicle and killed Iran's General Qasem Soleimani and Abu Mahdi al-Muhandis, the Iraqi deputy commander. Iran's religious and military leaders promised revenge.

The U.S. has already added new economic sanctions against Iran, and Iran plans to increase its nuclear activities.

Inside Iran, the economy and its citizens are already suffering. As a result of the sanctions, Iran's GDP contracted an estimated 4.8% in 2018 and is forecast to shrink another 9.5% in 2019, according to the International Monetary Fund. The unemployment rate rose from 14.5% in 2018 to 16.8% in 2019. Iran's government itself forecasts that oil export revenues will be reduced by 70% in the next Iranian fiscal year.

The sanctions have affected prices of imported, sophisticated medicines and supply, and they have sent prices for everything from staples and consumer goods to housing skyward. Home heating and water bills have increased by 30%, and rents have more than doubled since 2018. Disposable baby diapers, adult incontinence pads and sanitary towels are expensive and in short supply.

While the U.S. insists that medicines and humanitarian goods are exempt from sanctions, restrictions on trade have made many banks and companies across the world hesitant to do business with Iran, fearing punitive measures from Washington.

*—Larry Prado*


### 1 *Guyana*

Another offshore Guyana oil discovery was announced by Houston-based ***Exxon Mobil Corp.*** at #1-Mako, which is southeast of Liza Field in the Stabroek Block. The discovery adds to the previously announced estimated recoverable resource of more than 6 Bboe on the Stabroek Block. The #1-Mako encountered approximately 164 ft of a high-quality, oil bearing sandstone reservoir. Area water depth is 5,315 ft. The Stabroek Block is 6.6 million acres. Exxon Mobil is the operator and holds 45% interest in the block along with ***Hess Corp.*** (30%) and ***China National Offshore Oil*** (25%).

### 2 *Guyana*

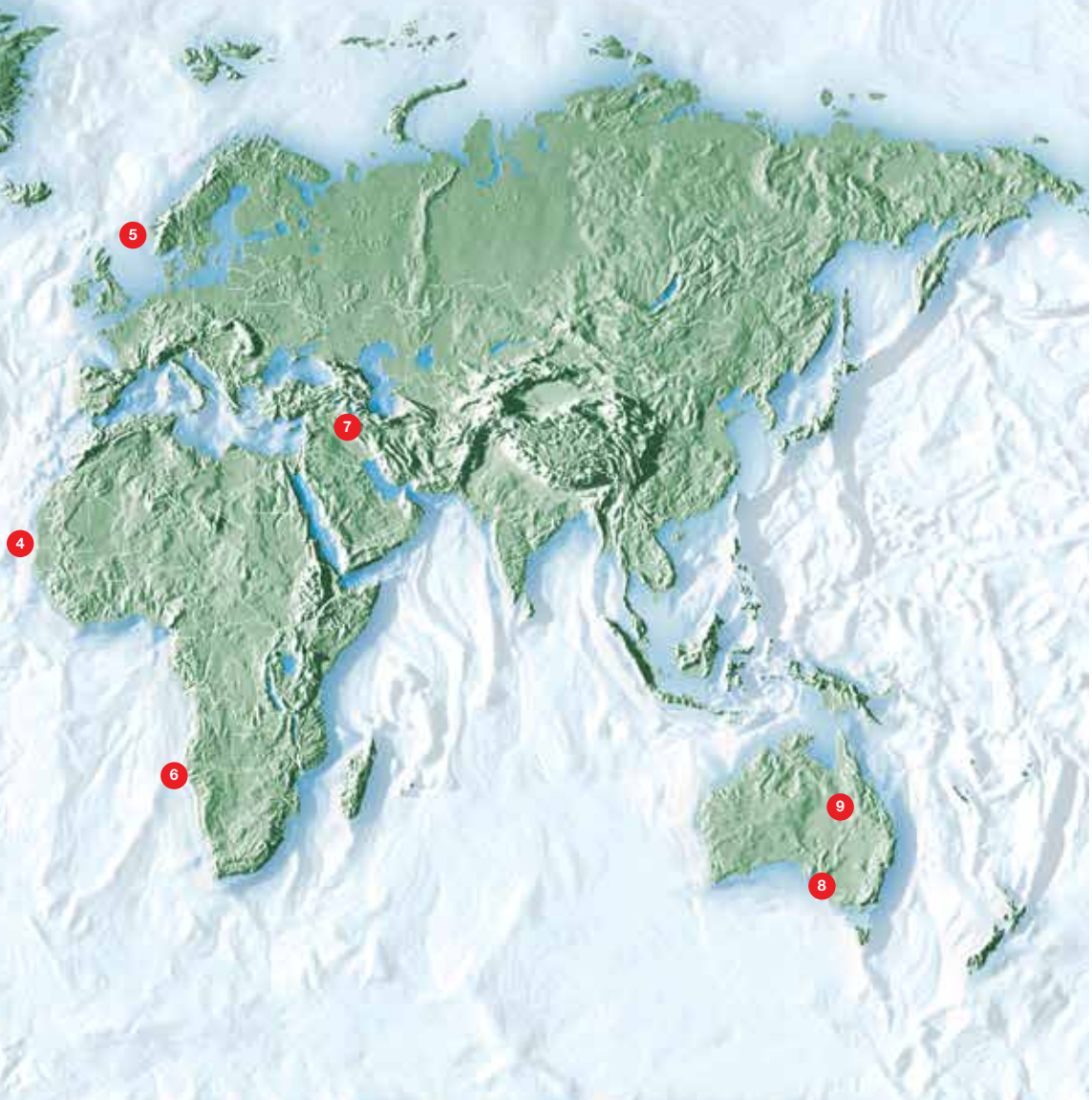
In offshore Guyana's Kanuku license, London-based ***Tullow Oil*** completed exploration well #1-Carapa. According to the company, it encountered approximately 4 m of net oil pay, and preliminary results of drilling, wireline logging, pressure testing and sampling of reservoir fluid indicate the discovery of oil in Upper Cretaceous age sandstone reservoirs. The test suggests the extension of the Cretaceous oil play from the Stabroek license southward into the Kanuku license. While net pay is lower than pre-drill forecasts, the oil quality supports the potential of the Cretaceous play on both the Kanuku and adjacent Orinduik licenses. The well was drilled to 3,290 m and is in 68 m of water. It will be plugged and abandoned. ***Repsol*** and Tullow both hold a 75% stake in the block, and ***Total SA*** holds the remaining 25%.

### 3 *Suriname*

***Apache Corp.*** and ***Total SA*** announced a significant offshore Suriname oil discovery at #1-Maka Central. The discovery is on-trend with the adjacent Stabroek block in Guyana. The discovery was drilled in approximately 1,000 m of water and hit more than 123 m net pay of high-quality, light oil and gas-rich condensate net pay in multiple stacked reservoirs in Upper Cretaceous Campanian and Santonian. The shallower Campanian interval contains 50 m of net hydrocarbon-bearing reservoir. The deeper Santonian interval contains 73 m of net oil-bearing reservoir. The #1-Maka Central also targeted a third interval (Turonian), which is a geologic analog to West Africa offshore oil discoveries. Before reaching this interval, the well encountered significantly overpressured, oil-bearing reservoirs in Lower Santonian, and drilling stopped at approximately 6,300 m. The pressures encountered in Lower Santonian are a positive sign for the Turonian, and future drilling will test this interval. The next exploration well will be drilled at the #1-Sapaka West prospect. Houston-based operator Apache holds a 50% working interest with Total.

### 4 *Mauritania*

***BP Plc*** completed a three-well offshore drilling campaign in Mauritania and Senegal with three appraisal wells, #1-GTA, #2-Yakaar and #1-Orca. The Tortue Field wells encountered gas in high-quality reservoirs in all nine zones. The results indicate a possible new development in Yakaar-Teranga in Senegal and in the Bir Allah/Orca area in southern Mauritania Block C8. In total, the wells encountered 160 m of net pay. The most recent completion, #1-Orca in Block C8 in offshore Mauritania, successfully encountered all five of the targeted gas sands. The well was then further deepened to reach an additional target, which also encountered gas. Tortue Field is located on the maritime border between Mauritania and Senegal and is being developed as the Greater Tortue Ahmeyim project. BP's partners in the offshore Mauritania blocks are ***Kosmos Energy*** and ***SMHPM***. In the offshore Senegal blocks, BP's partners are Kosmos Energy and ***Petrosen***.






**5 *Norway***

***ConocoPhillips Co.***, based in Houston, has concluded the drilling of wildcat #25/7-8 S in offshore Norway's production license PL 917. The well is northwest of Balder Field. The exploratory was designed to prove petroleum in Lower Jurassic and Upper Triassic reservoir (Nansen, Eiriksson and Skagerrak) and secondarily in Middle Jurassic reservoir (Hugin and Sleipner). In the primary exploration target, the well encountered several oil and gas-bearing intervals with independent columns. It hit 28 m of Nansen Sandstone with good reservoir quality with a 5-m, oil-bearing interval. About 11 m of Eiriksson Sandstone was found with a 6-m, oil and gas-bearing interval. In Skagerrak, there is a total of 13 m of sandstone with an 8-m, gas-bearing zone. In the secondary exploration target, it hit three thin gas-bearing sandstone layers totaling 3 m in Sleipner. In Hugin, sandstone layers were encountered with a total thickness of 25 m. Preliminary estimates indicate that discovery volumes are 1-5 MMcm of recoverable oil equivalent. The venture was drilled to 3,225 m and was terminated in the Skagerrak in Upper Triassic. Water depth in the area is 126 m.

**6 *Namibia***

***Global Petroleum*** has announced its estimate of prospective resources for offshore Namibia PEL0094 (Block 2011A). A total of 964 MMbbl of unrisked gross technical prospective resources have been estimated for the block, including the Albian carbonate reservoir at Welwitschia Deep with a best estimate unrisked gross prospective resources of 772 MMbbl of oil. The prospective resources relate to the Welwitschia Deep and Marula prospects and are based on 2-D seismic data and geological information. Additional prospects will be identified after licensing and additional 2-D and 3-D seismic interpretation. The Welwitschia Deep prospect is a fault and dip-closed structural trap, as are the Gemsbok, Lion and Dik Dik prospects in the company's PEL0029 license. The Marula prospect is a stratigraphic trap, where the Upper Cretaceous sandstones pinch out to the west onto the Welwitschia structure. The reservoir for Marula was proven at #2012/13-1, which is about 100 km to the southeast, where light and heavy oil was extracted from well samples. Melbourne-based Global holds a working interest of 85% and is operator of the license.

**7 *Iraq***

***Genel Energy*** tested well #34-TT in Iraq's Taq Taq Field in the Kurdistan region. According to the company, it produced from all zones tested at a maximum combined flowrate of about 3.9 Mbbl of oil per day during testing on a 28/64-in. choke. With the inclusion of test production, gross production from Taq Taq Field is currently about 13.65 Mbbl per day. Individual zone testing is now underway, which will determine the long-term production strategy. It expects the well to be placed on production at an initial flowrate of 1.5-2 Mbbl per day. The London-based company now plans to move the rig to drill #35-TT, which is also on the northern flank of the field. Genel and ***Sinopec*** jointly operate the field and its license area with 44% and 36% interest respectively, with the Kurdistan Regional Government holding the remaining 20%.

**8 *Australia***

***Otway Energy Ltd.*** completed a Penola Trough well at #1-Nangwarry and is a new field gas discovery in South Australia. The well was drilled to 4,300 m in Pretty Hill Sandstone and encountered a gross gas column at 65 m as well as gas shows through the interval. This is the third successive discovery within this region over the past two years, including #1-Nangwarry, #3ST1-Haselgrove (***Beach Energy***) and #1 DW1 Dombey (Beach/***Cooper Energy***). These wells indicate the potential of this part of the onshore Otway Basin, both in South Australia as well a larger license area in Victoria. Additional testing is planned to further define and production test the reservoir sections. Otway's headquarters are in Sydney.

**9 *Australia***

Results were announced from a Cooper/Eromanga Basin exploratory test in Queensland's ATP2021 license area. Adelaide-based operator ***Vintage Energy*** reported that #1ST1 encountered 35 m of interpreted log net gas pay over a gross 312-m interval in the targeted Patchawarra. Gas was also recovered in the Nappamerri group. Additional gas and oil shows were found in Toolachee, Birkhead and Westbourne. The venture was drilled to 3,217 m, and wireline logging and data analysis is underway. The gas saturation has been calculated in the upper section of Patchawarra, above the VC50 Coal. Log data across the section below VC50 Coal is planned to be acquired after well conditioning. The well will be cased and suspended.

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**DUG Bakken and Rockies** — Conference & Exhibition
**Feb. 18-19**
Denver, CO
Colorado Convention Center

**energy capital conference**
**March 2**
Dallas, TX
Fairmont Hotel – Dallas

**25 Influential Women in Energy**
**March 4**
Houston, TX
Hilton Americas – Houston

**DUG Permian Basin** — Conference & Exhibition
**April 6-8**
Fort Worth, TX
Fort Worth Convention Center
**Permian Water & Sand Forum:** April 6
**A&D Forum:** April 6

**DUG Haynesville** — Conference & Exhibition
**May 19-20**
Shreveport, LA
Shreveport Convention Center

**Midstream Texas** — Conference & Exhibition
**June 2-3**
Midland, TX
Midland County Horseshoe Pavilion
**Pipeline Construction Forum:** June 2

**Energy ESG Conference**
**June 9**
Houston, TX
The Petroleum Club

**CO-LOCATED**
**DUG East** — Conference & Exhibition
**Marcellus-Utica Midstream** — Conference & Exhibition
**June 16-18**
Pittsburgh, PA
David L. Lawrence Convention Center

**Well Interference Forum**
**Sept. 1**
Houston, TX
The Omni – Galleria

**DUG Eagle Ford** — Conference & Exhibition
**Sept. 9-11**
San Antonio, TX
Henry B. Gonzalez Convention Center
**DUG *Eagle Ford* Forum:** September 9

**DUG Midcontinent** — Conference & Exhibition
**Sept. 22-24**
Oklahoma City, OK
Cox Convention Center

**A&D Strategies and Opportunities Conference**
**Oct. 27-28**
Dallas, TX
Fairmont Hotel – Dallas

**Executive Oil Conference & Exhibition**
**Nov. 3-4**
Midland, TX
Midland County Horseshoe Pavilion
**Folds of Honor Golf Tournament:** November 2
**Permian Basin Water Forum:** November 3

**25 Impactful Veterans in Energy**
**Dec. 3**
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The Westin Memorial City

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# HIGH-YIELD HOPES QUASHED

Hopes of high yield in energy healing were dashed when the outbreak of the coronavirus occurred in China, driving debt markets back to a bifurcated status. The debt market door remains open for higher-rated issuers, but it slammed shut for lower-rated names, as WTI prices slumped from north of $60/bbl at year-end to barely $50/bbl by late January.

Fortunate were those that dashed through the door late last year, before fears emerged that crude demand was collapsing in China and elsewhere due to the coronavirus outbreak. Energy companies that managed to close high-yield deals saw, in several cases, their issues trade down to low double-digit discounts to par as sentiment in the energy sector swooned.

Range Resources Corp.'s senior notes, for example, were priced to yield 9.25% and traded down to yield about 12% by the end of January, according to Tudor, Pickering, Holt & Co.

Energy Transfer Operating LP (formerly Energy Transfer Partners) exemplified the higher-rated issuers' access to inexpensive credit via three senior note offerings in early January—before the coronavirus news broke. It also closed two issues of perpetual preferred units.

In addition, Energy Transfer closed two issues of fixed-rate reset cumulative redeemable perpetual preferred units: 500,000 units yielding 6.75% (Series F) and 1.1 million units yielding 7.125% (Series G). Both series offered units of $1,000 apiece.

Enterprise Products Partners LP (NYSE: EPD) offered $3 billion of senior notes in three tranches: $1 billion of 2.8% notes due 2030 priced at 99.921% to yield 2.809%; $1 billion of 3.7% notes due 2051 priced at 99.413% to yield 3.732%; and $1 billion of 3.950% notes due 2060 priced at 99.36% to yield 3.982%. Proceeds are to repay maturing debt issues.

*—Chris Sheehan, CFA*

## DEBT

| Company | Exchange/ Symbol | Headquarters | Amount | Comments |
|---|---|---|---|---|
| Energy Transfer Operating LP | NYSE: ET | Dallas | $4.5 billion | A subsidiary of **Energy Transfer LP** announced that it has priced a public offering of $1 billion aggregate principal amount of its 2.9% senior notes due 2025, $1.5 billion aggregate principal amount of its 3.75% senior notes due 2030 and $2 billion aggregate principal amount of its 5% senior notes due 2050, at a price of 99.924%, 99.843% and 99.914%, respectively, of their face value. |
| Western Midstream Partners | NYSE: WES | Houston | $3.5 billion | Announced that its wholly owned subsidiary, **Western Midstream Operating LP**, has priced an offering of $300 million in aggregate principal amount of floating rate senior notes due 2023; $1 billion in aggregate principal amount of 3.1% senior notes due 2025 at a price to the public of 99.962% of their face value; $1.2 billion in aggregate principal amount of 4.05% senior notes due 2030 at a price to the public of 99.90% of their face value; and $1 billion in aggregate principal amount of 5.25% senior notes due 2050 at a price to the public of 99.442% of their face value. Net proceeds from the offering are expected to be used to repay and terminate WES Operating's $3 billion term loan credit facility. WES Operating will use the remaining net proceeds for general partnership purposes, including repayment of borrowings under its revolving credit facility. **Barclays Capital Inc.**, **Citigroup Global Markets Inc.**, **Deutsche Bank Securities Inc.** and **PNC Capital Markets LLC** are acting as joint book-running managers for the offering. |
| Enterprise Products Partners LP | NYSE: EPD | Houston | $3 billion | Announced that its operating subsidiary, **Enterprise Products Operating LLC**, priced a public offering of $3 billion aggregate principal amount of notes comprised of $1 billion principal amount of senior notes due Jan. 31, 2030; $1 billion principal amount of senior notes due Jan. 31, 2051; and $1 billion principal amount of senior notes due Jan. 31, 2060. Net proceeds of this offering will be used for the repayment of debt (including repayment of amounts outstanding under its commercial paper program and payment of $500 million principal amount of senior notes Q due January 2020 and $1 billion principal amount of senior notes Y due September 2020, at their respective maturities); and for general company purposes, including for organic growth capex. Senior notes AAA will be issued at 99.921% of their principal amount and will have a fixed-rate interest coupon of 2.8%. Senior notes BBB will be issued at 99.413% of their principal amount and will have a fixed-rate interest coupon of 3.7%. Senior notes CCC will be issued at 99.360% of their principal amount and will have a fixed-rate interest coupon of 3.95%. **Citigroup Global Markets Inc.**, **Barclays Capital Inc.**, **SunTrust Robinson Humphrey Inc.** and **Wells Fargo Securities LLC** acted as joint book-running managers for the offering. |
| EQT Corp. | NYSE: EQT | Pittsburgh | $3 billion | Priced an offering of $1 billion in aggregate principal amount of its 6.125% senior notes due Feb. 1, 2025, and $750 million in aggregate principal amount of its 7% senior notes due Feb. 1, 2030. **EQT** expects to use the net proceeds from the sale of the notes to redeem all of its outstanding floating rate notes due 2020 and all of its outstanding 2% senior notes due 2020. The remaining proceeds will be used to repay or redeem other indebtedness of the company, including |

| Company | Exchange/ Symbol | Headquarters | Amount | Comments |
|---|---|---|---|---|
| | | | | all or a portion of its outstanding 4.875% senior notes due 2021. BofA Securities Inc. and J.P. Morgan Securities LLC are acting as joint book-running managers for the offering. |
| Energy Transfer Operating LP | NYSE: ET | Dallas | $1.6 billion | Priced an underwritten public offering of 500,000 of its 6.75% Series F fixed-rate reset cumulative redeemable perpetual preferred units at a price of $1,000 each and 1.1 million of its 7.125% Series G fixed-rate reset cumulative redeemable perpetual preferred units at a price of $1,000 each. The offering of senior notes and the offering of preferred units are being conducted as separate offerings pursuant to separate prospectus supplements, and neither offering is contingent upon the other. The company intends to use the aggregate net proceeds of about $6.04 billion (before offering expenses) from both of the offerings to repay certain of its outstanding indebtedness, including prepayment of certain senior indebtedness, and for general partnership purposes. Citigroup Global Markets Inc., Deutsche Bank Securities Inc., MUFG Securities Americas Inc., Natixis Securities Americas LLC and TD Securities (USA) LLC are acting as joint book-running managers for both of the offerings. |
| PBF Energy Inc. | NYSE: PBF | Parsippany, N.J. | $1 billion | Priced $1 billion in aggregate principal amount of 6% senior unsecured notes due 2028 in a private offering. The notes will be co-issued by PBF Finance Corp., a wholly owned subsidiary of PBF Holding. PBF Holding intends to use the net proceeds from the offering to fund the redemption of its outstanding 7% senior notes due 2023 and for general corporate purposes, including to pay a portion of the cash consideration in the pending acquisition of the Martinez refinery and related logistics assets. The offering is not contingent on the completion of the Martinez acquisition. |
| Rockies Express Pipeline | N/A | Leawood, Kan. | $750 million | Offered $750 million of senior notes in two tranches: $400 million of 3.6% notes due 2025 at 99.88 to yield 3.626%; and $350 million of 4.8 notes due 2030 priced at 99.934 to yield 4.809%. |

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# FORCE MAJEURE

LESLIE HAINES, EXECUTIVE EDITOR-AT-LARGE

If the cure for low natural gas prices is low gas prices, then things should be looking pretty good soon—but alas, that would be just in time to find ourselves in the shoulder season before air conditioning takes over U.S. demand, so it may be time to retire that old belief. Too many factors are in play.

Bad news on the demand side and persistently rising supply make natural gas an unwelcome hydrocarbon. Combine gas storage above the five-year average in the middle of a warm winter, and the surprise hit from the coronavirus, and you could not make up a worse "perfect storm."

With spring just around the corner, we hope the coronavirus has begun fading away, but it may take several more months for the global economic disruptions it has caused to right themselves.

IHS Markit said, "If the current and unprecedented confinement measures in China stay in place until the end of February, and are lifted progressively beginning in March, the resulting economic impact will be concentrated in the first half of 2020, with a reduction of global real GDP of 0.8% in 1Q and 0.5% in 2Q."

There is no "gas-OPEC" to render a supply agreement to restore decent prices. But some companies have taken matters into their own hands. Blackstone Minerals cut its dividend in response to falling gas income. Companies with gassy holdings in noncore parts of their portfolio were evaluating their next move—SM Energy Co. was rumored to sell its gas-weighted Eagle Ford assets for an estimated $500 million. Cabot Oil & Gas Corp. said it will only spend enough on drilling in the Marcellus this year to keep its gas production volumes flat—no growth. That's a good thing—and inevitable for most gas producers, especially in the Northeast. Total U.S. production continues to rise, aided and abetted by Permian gas output.

For now, we cannot depend on LNG exports to save the price of gas, which at press time was a paltry $1.86 per MMBtu at Henry Hub, near a 12-month low. Benchmark LNG prices across the U.S., Europe and Asia have fallen by an average of about 30% since January, sources said.

LNG shipments have been disrupted by the Chinese economic slowdown. Consulting firm Poten & Partners said CNOOC declared force majeure to turn away LNG shipments, even as China reached an accord with the U.S. to reduce its tariffs on LNG imported from the U.S.

"CNOOC's suppliers are assessing other options such as cargo deferments and diversions to other terminals while they consider whether to accept the force majeure declaration," Poten & Partners said. "Suppliers already are in discussions with CNOOC about deferring deliveries as far out as April. Demand at the Guangdong Dapeng and Zhuhai LNG terminals is reportedly down by as much as a third because of factory closures."

In addition, China's workforce has been disrupted by quarantines, and dock workers could not report to work to unload any LNG cargoes.

The epidemic in China has reduced business and industrial activity, with January's LNG imports dropping by about 10% year on year, said Rystad Energy. "Calculating the impact of the virus, Rystad Energy has revised its growth estimate for Chinese LNG demand this year, limiting it to 4.7% compared to 2019. Previously, Rystad expected Chinese demand to rise 10% to 13% year on year."

It said it expected summer prices to remain at $3.30 per MMBtu, "as this enables LNG producers to cover the operational costs for more than 80% of exported volumes, helped by associated liquids production."

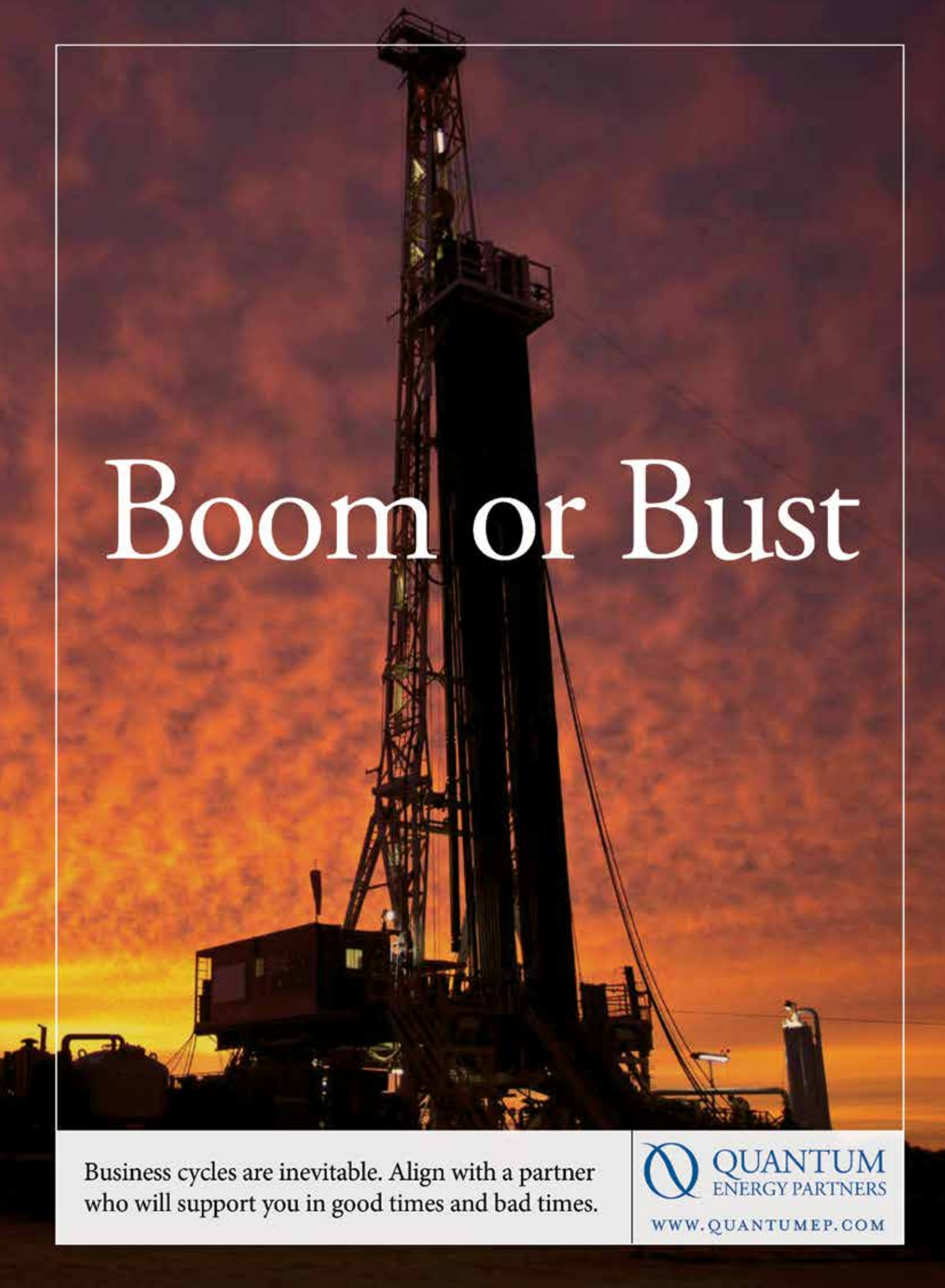
However, if Asian demand falls further due to slower economic growth and if effects of the coronavirus continue, "we could see prices hit a hard floor at $2.30 per MMBtu, assuming a Henry Hub price of $2 per MMBtu and sunk transportation costs."

In early February, Cheniere Energy Inc.'s stock (NYSE: LNG) took it on the chin, even though it sells directly to PetroChina and not CNOOC. But analyst Jason Gabelman of Cowen & Co. said that was an overreaction and he saw a buying opportunity.

"LNG has not exported product to China since March 2019, likely due to tariffs on U.S. LNG being raised from 10% to 25%. True, LNG has a 1.2 million tonnes per annum (mtpa) offtake agreement with PetroChina, with part of the volume effective today and part when its Corpus Christi Train 3 starts up in 2021."

Aside from Chinese woes, there is a global LNG oversupply. Morgan Stanley's Devin McDermott noted that the 2020 oversupply "looks materially worse than 2019, with nearly 50 mtpa of excess LNG that needs to find a home—before accounting for any demand loss from the coronavirus in China.

"We expect coal-to-gas switching (mostly in Europe) to remove about half of this oversupply, still leaving an excess of 23 metric tons (about 3.1 Bcf/d). Without meaningful storage capacity in Asia, Europe is the only outlet for this excess gas and already has storage levels well above normal."

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