

# Oil and Gas Investor



HART ENERGY'S  
*Hall of Fame*  
2023

DECEMBER 2023

**50**  
YEARS  
HART ENERGY  
SINCE 1973

COMMEMORATIVE

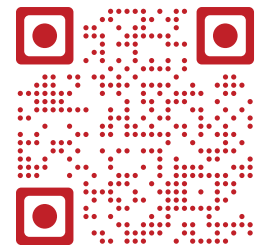
(from left to right) Mohamed Soliman, Cindy Yeilding, Archie Dunham, Harold Hamm, Lyndal Cissell, Tom Petrie (seated), Scott Rees, Dick Stoneburner, James Parkman, Chris Kendall, Tim Duncan, Reg Manhas, Dan Pickering

Daniel Ortiz/Hart Energy



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**50 YEARS**  
HART ENERGY  
SINCE 1973

**Oil and Gas Investor**  
by HART ENERGY

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Daniel Ortiz captured the image of 13 Hall of Fame and Agents of Change in Energy honorees for the foldout cover. The photograph was taken at the Hotel ICON in Houston in November.



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*Longtime Hart Energy photographer Lowell Georgia captured this image of a crew drilling shot holes for 3-D seismic shoots in the Lodgepole play near Dickinson, N.D. The picture illustrated a story in Oil and Gas Investor in November 1995. (Lowell Georgia/Hart Energy)*



# 50 Years of Telling Your Story



**Jordan Blum**  
Editorial Director

In October 1973, Egypt and Syria led the Yom Kippur War against Israel, and the broader global implications that would reverberate for decades quickly became apparent.

With the dominance of the so-called Seven Sisters cartel now in decline, the five-year-old Organization of Arab Petroleum Exporting Countries (OAPEC), essentially led by Saudi Arabia, launched an oil embargo crisis that same month to punish Western nations supporting Israel. The spiked gasoline prices, fuel shortages and miles-long lines of cars are seared into the memories of those who experienced them.

It was during this first oil shock period in late 1973 when Don Hart quietly founded Hart Publications in Denver. He started with buying the Western Oil Reporter and Rocky Mountain Oil & Gas Directory publications.

Fast forward 50 years, and Israel is again at war and Saudi Arabia is still playing a major role in crude oil controls, currently holding back production to keep barrels priced higher.

But, as the infamous phrase goes in the energy sector, “This time it’s different.”

In 1973, U.S. production was in a steady decline after peaking in 1970 at 10 MMbbl/d, unable to keep pace with rising demand and population growth, forcing greater reliance on Middle Eastern supplies. U.S. crude imports had almost doubled from 1970 to 1973, making the U.S. more vulnerable to embargoes.

U.S. production would eventually bottom out at less than 4 MMbbl/d during the 2008 Great Recession. But, in the background, the shale revolution had already begun—led by George Mitchell, the “father of fracking,” and others—first with natural gas in the Barnett Shale before moving to tight oil and, eventually, the powerful Permian Basin.

Today, the industry has recovered from the COVID-19 pandemic and is now churning out record volumes of oil and gas, with crude hitting an all-time high of 13.2 MMbbl/d this fall, according to the U.S. Energy Information Administration.

Now, the U.S. is exporting roughly 4 MMbbl/d—nearly the same as overall output 15 years ago.

As for Hart Energy, the flagship *Oil and Gas Investor* magazine was founded in 1981 and continued to grow. Don Hart conceived the magazine as the “National Geographic of the oil and gas industry”—essentially a coffee table-friendly

trade magazine that didn’t read like a technical journal. In fact, he developed the plans with former National Geographic photographer Lowell Georgia, who stuck with Hart and didn’t retire until 2011.

Hart Energy expanded both nationwide and internationally with magazines and conferences, eventually opening a satellite branch as far off as Australia, and moving the headquarters to Houston. But, while Hart Energy maintains strong international coverage, the bread and butter has always been U.S. oil and gas. And that’s not changing, even as the company chronicles the energy evolution and decarbonization efforts.

In the past 50 years, Hart Energy chronicled the recoveries from the 1970s-era oil embargoes through the growth and ingenuity of U.S. wildcatters and offshore explorers. More recently, the focus is on the shale pioneers from Appalachia to the Permian.

It is in that spirit that Hart Energy takes the opportunity provided by its 50th anniversary to introduce its inaugural Hall of Fame class, showcasing 50 initial icons of the industry, ordered A to Z—from famed oil well firefighter “Red” Adair to former Range Resources chief geologist, Bill Zagorski, the “father of the Marcellus.”

Hart Energy is recognizing the people and companies who helped craft the last 50 years of the industry and, thus, the world. The Hall of Fame will continue to grow each year.

Looking forward, Hart Energy also is honoring more than 19 ACEs—Agents of Change in Energy—who are shaping both the present and the future of the energy sector. They are leading the next iterations of the shale boom, finance, carbon management and much more to make the industry viable and sustainable for the long term. From carbon capture and sequestration to literally sucking carbon of the sky with direct air capture, there are plenty of exciting innovations occurring now and in the near future.

This issue also will trace the history of the industry since 1973, examining the key events, trends, mergers and technological advancements that paved the way to today.

Hart Energy is incredibly proud to have played a role in chronicling this history, and we all are excited to participate in the growth and advancements going forward for the next 50 years.

Thanks so much for reading, and please enjoy. ■





CONGRATULATIONS TO

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# TOM PETRIE

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HART ENERGY HALL OF FAME  
INAUGURAL CLASS

## Five Decades of Insight, Intuition and Integrity

In an illustrious career spanning over 50 years, Tom Petrie has been a thoughtful, consistent and measured voice within the energy industry. Across super-spikes and super-cycles, geopolitical and geological revolutions, clients, colleagues and friends have trusted Tom's unique insights and expert advice to help shape one of the world's most important industries. In honor of his well-deserved induction into the Hart Energy Hall of Fame, all of us at Petrie Partners congratulate Tom and thank him for his unmatched vision, unwavering integrity and unparalleled mentorship. We are all incredibly fortunate to be associated with his storied career and substantial legacy.

**Thank You and Best Wishes, Tom.**

**— Your Grateful Partners and Lifelong Friends**



# The Future of US Energy Policy



**Deon Daugherty**  
Editor-in-Chief

The 1973 Arab oil embargo heightened U.S. concerns about energy security. Oil security in particular was something of an obsession for countries that relied on imported oil. But it was especially alarming for the U.S. because then—and now—the country is the world’s largest consumer of oil.

“Right now, we’re consuming about a fifth of global oil. We’ve got about 4% of the global population,” said Jim Krane, the Wallace S. Wilson Fellow for Energy Studies at Rice University’s Baker Institute for Public Policy. “We are a disproportionate oil consumer, which means we’re disproportionately exposed to political risks in the oil market.”

A key difference between now and then is that the U.S. is now a net exporter of oil—achieving the status in 2020 for the first time since 1949, according to the Energy Information Administration (EIA). But that doesn’t remove the risk. In the global oil market, the biggest exporting countries exert the most control over prices.

“That means the U.S. exposes itself seemingly willingly to political risk in the oil markets because we drive really big and inefficient vehicles and have much longer average commutes than just about everybody else in the world,” Krane told me. “In other countries, they don’t drive an hour each way to work in a Chevy Suburban.”

Indeed, U.S. growth in the SUV market from 1990 to 2021 raised the weight of the average new vehicle 25%, increased horsepower by 87% and acceleration by 33%, according to a report from the Center for Sustainable Systems at the University of Michigan.

## What’s next?

But might the energy transition—and more specifically, the Inflation Reduction Act’s (IRA) multi-billion-dollar decarbonization roadmap—switch things up? Or, is a carbon tax the answer to “What’s next for domestic energy policy?”

One aspect of the IRA is a consumer tax credit for the purchase of electric vehicles (EVs). That’s one way consumers could protect themselves from swinging gasoline prices, Krane said.

The EIA reported in September that the number of light-duty electric vehicles on the

road in 2021 surpassed 2 million—a dramatic increase from the 100,000 EVs registered in 2012.

Still, Krane said, that might knock off up to 2 MMbbl/d worth of oil demand in the U.S.

“That might be a pessimistic outlook, but less than 10%, I think it’s probably safe to say, by 2030,” he said.

Diminishing the U.S. exposure to volatility in global markets comes down to policy promulgated by the people, i.e., the voters and consumers who actually drive demand.

“If you see more U.S. voters choosing to drive electric vehicles, they’re going to be insulating themselves from gasoline prices and insulating themselves from oil market risk. So, if enough American voters are driving electric vehicles, the president might have a little bit more freedom of action to deal with Saudi Arabia and company when they are behaving in ways that the U.S. doesn’t appreciate,” Krane said.

## Carbon tax

Despite its often audible, occasionally bipartisan support, a carbon tax has yet to fully capture policymakers’ attention.

“We’re kind of lurching, if you will, to a lower-carbon energy profile for consumption. None of that’s going to change until it confronts the consumer every day,” Ed Hirs, University of Houston lecturer and energy economist, told me.

“I have fond hopes that, if this really is a national prerogative, we’ll get it passed in the next five, 10 years.”

Several top U.S. producers, including Exxon Mobil, ConocoPhillips and Chevron, have endorsed the idea of a carbon tax to varying degrees. A 2020 Pew Research Center survey of 10,957 U.S. adults found that 73% favored taxing corporations based on their carbon emissions.

So, what’s the problem?

“Every politician I’ve ever spoken to says that, ‘If the price goes up at the pump or the price goes up at the meter, we don’t get re-elected,’” Hirs said.

“It all comes down to the consumer making a choice at the checkout counter, at the car dealership. Until the price of carbon, the price of methane, gets reflected in that decision calculus, it’s going to be kind of slow.” ■



# Leslie Haines

(1952-2022)



*Longtime editor of Oil and Gas Investor magazine and our own “Queen of the Oilpatch,” Leslie Haines has been named to Hart Energy’s Hall of Fame in celebration of its 50<sup>th</sup> anniversary.*

*From the 1980s boom to America’s renaissance during “the shale revolution,” her life’s work captured the industry’s essence through its most formative years. Her probing questions, kind humor, and sharp eye for detail was welcomed in C-suites wherever oil and gas is found.*

*All of us who had the honor of working with and knowing Leslie applaud this recognition of her unmatched professionalism.*

HARTENERGY 







*This image of a lone Williston Basin oil well in the midst of The Badlands in North Dakota appeared in the first issue of Oil and Gas Investor in August 1981. (Lowell Georgia/Hart Energy)*





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# How We've Grown

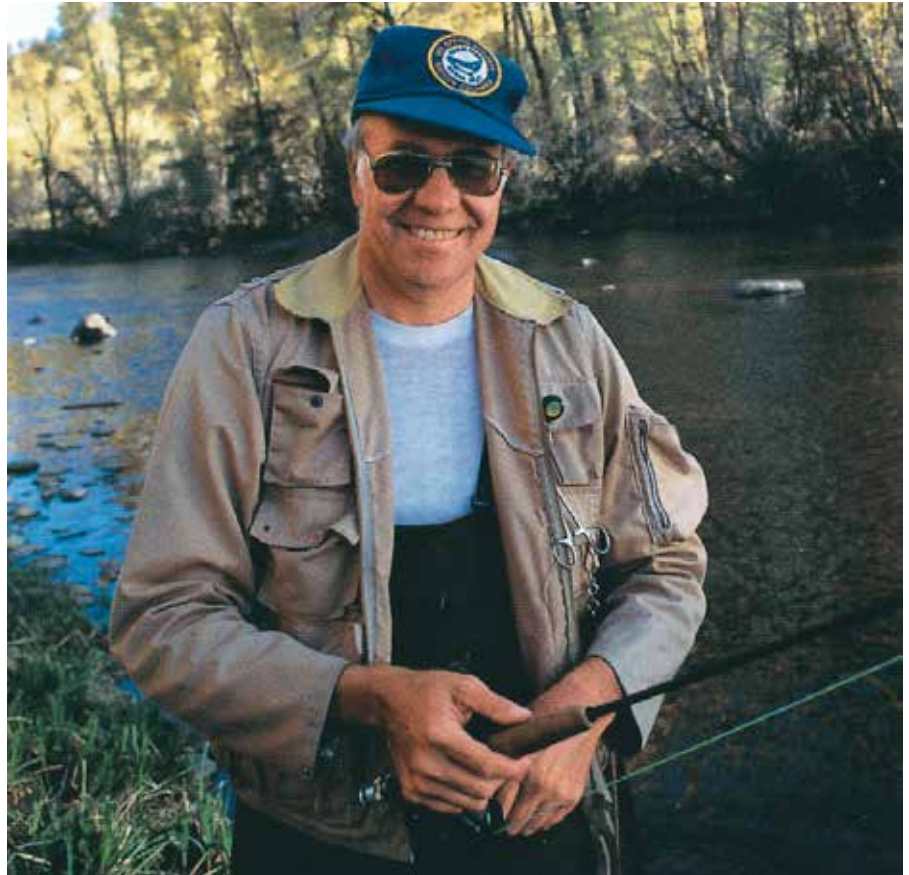
Founded in 1973 with a Rockies-focused magazine and a directory, Hart Energy today is the go-to source of internationally recognized print, digital, in-person conference, mapping and databases of market intelligence for U.S. and global energy leaders.

**T**he young sales rep for Western Oil Reporter magazine found himself in a quandary. Ads were a tough sell for a magazine that nobody wanted to read, Don Hart realized. So, to get better articles into print, he started writing them himself.

"We went to the field," he said in a 1984 interview. "We got to know oil readers personally. They told us what a regional magazine like Western Oil Reporter could do for them. We tried to do it."

This was in 1967. The 24-year-old graduate of Colorado State University, fresh from serving in the U.S. Army Reserve, soon found plenty to write about. Shell's discovery in Utah's Uinta Basin in 1970 sparked a deep drilling boom. Then, Amoco signed a 7.5-million-acre land deal with Union Pacific that effectively opened more than twice as many acres to exploration. From that agreement, discoveries of new fields were quick and numerous—Peoria, Wattenberg and Spindle to name a few in Colorado, and the Overthrust fields of Wyoming and Utah.

When Hart wasn't busy writing articles or selling ads, he was thinking about what he would do if he owned



Hart Energy

**When Don Hart sold the company, he retired to pursue his Rockies ranching and fishing businesses.**

## THROUGH THE YEARS

### ▶ 1973



- In October, Arab members of OPEC cut off oil shipments to the U.S. and Western Europe to retaliate for support of Israel during the October War.
- In November, President Richard Nixon announces Project Independence, aimed at eliminating oil imports by 1980. The focus is on bolstering domestic oil and gas production, nuclear energy and technology.
- Don Hart, wife Jane and brother Bob found Hart Publications. The first two products are Western Oil Reporter and Rocky Mountain Petroleum Directory, purchased from a publisher in Colorado.



### ▶ 1974



Construction begins on the Trans-Alaska Pipeline System.

### ▶ 1977

Trans-Alaska Pipeline is completed and transports first oil to market from the North Slope.



the magazine instead of working for it. So, in 1973, with wife Jane and brother Bob, he bought Western Oil Reporter and Rocky Mountain Petroleum Directory. They named the new Denver-based company Hart Publications.

Over the last 50 years, as the energy industry has been buffeted by market madness, volatile geopolitics, a shale revolution and an energy transition, the company now known as Hart Energy has been there with and for our readers. We've grown and prospered when, and because, oil and gas grew and prospered. And when the industry struggled through tough times, so did we.

And just as technological innovation revolutionized the oil patch, technology has transformed the news business. Once a magazine and directory publisher, Hart Energy is now a multimedia powerhouse, delivering data and information across a variety of platforms.

This is our story.

**'National Geographic of oil and gas'**

In the wake of the oil embargo by Arab oil-producing countries in 1973, the U.S. focused on growing energy production. Accomplishing that required capital.

"Basically, I recognized there was a real need for the oil industry to communicate with the financial community," Hart said in 2006. "So, on a flight to Houston, I sketched in my notebook an idea of what *Oil and Gas Investor* should be.

"I saw an opportunity to focus in a high-level way on the people in both the oil companies and on the financial

end. The other publications in the industry at that time were so nuts-and-bolts, only about technology."

Hart wanted a sophisticated aesthetic for the new publication that he envisioned as the "National Geographic for the oil and gas industry." He contracted a San Francisco design firm to create the



**Marc Conly designed every issue of Oil and Gas Investor for 35 years.**

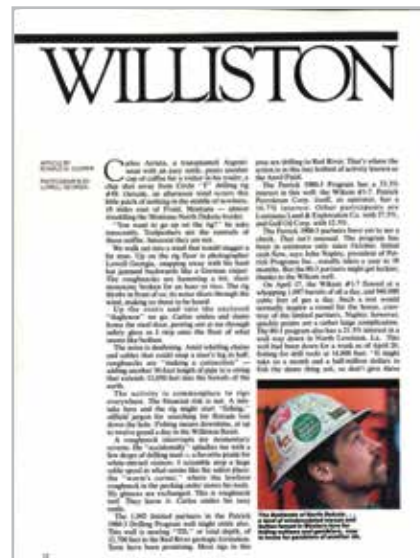
look for the first issue and hired Denver publication designer Marc Conly as art director. For photography, he turned to National Geographic itself, hiring its former picture editor

and award-winning photographer, Lowell Georgia, as photo editor. The pair would set the standard for visual journalism in the energy industry for the next three decades.

They would not be the magazine's only iconic presence on the masthead.



**Lowell Georgia traveled the world to visually record the oil industry.**



Hart Energy

**The first issue of Oil and Gas Investor in August 1981 featured the Williston Basin.**

Leslie Haines joined Hart Energy in 1983 and became the magazine's editor-in-chief in 1992, a position she would hold until 2016.

*Oil and Gas Investor* featured the Williston Basin on its first cover in August 1981. The magazine took E&P executives and investors to every corner of the oil patch each month. Paid circulation soared to more than 10,000.

But the rig count had plummeted from 4,521 in December 1981 to 1,846 in April 1983, and both the oil business and Hart struggled.

**Hart gets Rich**

Fortunately, help was on the way. It would come in the form of a young landman named Rich Eichler, who joined Hart as advertising sales manager in 1986 and was soon

**1978**

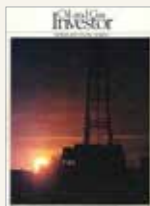


First offshore platform in more than 1,000 feet of water, *Cognac*, in the Gulf of Mexico, begins operations.

**1980**

George P. Mitchell first experiments with hydraulic fracturing in the Barnett Shale.

**1981**



the Williston Basin.

Hart founds *Oil and Gas Investor*, a "National Geographic for the oil and gas industry." The first issue focuses on

**1982**

Veritas begins 3-D seismic processing.

**1983**

T. Boone Pickens targets Gulf Oil in a "corporate raid" and agitates the board until Chevron acquires the company for \$13 billion.



**Rich Eichler**  
spearheaded the  
management-led  
buyout.

promoted to magazine publisher. He redirected *Oil and Gas Investor* to focus more on business opportunities for E&P executives and public investors.

“We brought in Wall Street as

a big component of the readership in 1988 and began to develop an advertising strategy for the investment banks to reach their oil industry clientele, where they had previously only placed ads in *The Wall Street Journal*,” Eichler said.

In addition to oil and gas basins and plays, the magazine turned its attention to the energy finance communities in New York, Houston, Boston, Dallas, Oklahoma City, Denver, London and Calgary. Coverage now included the oil and gas business in China, Australia, New Zealand, North Africa, West Africa, Russia, Kazakhstan and South America.

In 1991, Don Hart sold Hart Publications to Phillips International in Potomac, Md., and retired to pursue his Rockies ranching and fishing businesses. Veronis Suhler & Associates’ VS&A Communications Partners III bought Phillips Business Information in 2000 and placed the Hart Publications division, now based in Houston, in its Chemical Week Associates unit.

In spring 2004, Chemical Week Associates was put up for sale and Eichler engineered a management-



Hart Energy

**A packed house at the David Lawrence Convention Center in Pittsburgh for DUG East in 2013.**

led buyout to form Hart Energy Publishing. George Wieggers, then principal of Wieggers Capital Management in Denver, and Bob Israel, a partner with New York M&A and investment advisory firm Compass Advisers, signed on to be the lead investors, with Wieggers as chairman.

Eichler said, “We created a new culture for private oil and gas companies to seek partners, sell or buy deals, and present a strong, positive image to the market.”

**Eventful history**

Two years prior to the sale, Hart Energy had ventured into the conference arena, a business venture that would grow in spectacular fashion during the shale boom and continues to be a valuable source of insight and networking opportunities



Hart Energy

**Signage heralding the leading shale conference series.**

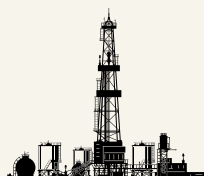
to industry players.

A&D Strategies and Opportunities, which began in 2002 in Dallas, is Hart Energy’s longest-running organic event, drawing an annual who’s who of asset buyers, sellers, builders, brokers, investors and financiers.

But it is the DUG series, built out of an initial event, Developing

**▶ 1986**

Mitchell Energy employs the first large hydraulic frac in a vertical well in the Barnett Shale.



**▶ 1988**



An explosion and fire at the *Piper Alpha* platform in the North Sea causes history’s most lethal offshore disaster when 167 die.

**▶ 1989**



The *Exxon Valdez* tanker strikes the Bligh Reef and spills 260,000 bbl of crude into Prince

William Sound, Alaska. It is the second-worst marine spill in U.S. waters.





Hart Energy

**Hart Energy's former technical director, Richard Mason, onstage with former President George W. Bush at DUG East in 2013.**

Unconventional Gas, in 2006 in Fort Worth, that cemented Hart Energy's position as the leader in shale conferences. The first DUG was a response to customers' eagerness for in-depth details about what appeared to be a promising new U.S. play: the Barnett Shale.

Hart Energy was the first media organization to have an inkling that Barnett geologists and investors were onto something revolutionary. Initial attendance in 2006 was expected to be modest, but a crowd of several hundred filled the venue, resulting in a standing room-only event. A larger venue was secured in 2007 and, again, the event sold out.

By spring 2008, two more shale gas plays—the Marcellus and the Fayetteville—had been discovered. Reports emerged of another: the Haynesville. Later, in 2008, yet

another: the Eagle Ford.

As the shale boom accelerated, Hart Energy was all over it, and not just with live events. Extensive coverage filled its monthly magazines—*Oil and Gas Investor*, *E&P* and, beginning in 2011, *Midstream Business*. A slew of playbooks kept customers up to date on shale plays from the Powder River Basin to the Granite Wash to the Bakken; and topics including hydraulic fracturing, artificial lift and water management.

In 2009, more than 2,500 geologists, petroleum engineers, upstream and midstream executives, investors and financiers gathered for the inaugural DUG East in Pittsburgh, covering the burgeoning Marcellus and Utica gas plays. The first DUG Eagle Ford conference in San Antonio in 2010 drew more than 2,500. DUG Bakken & Rockies began its run in



Hart Energy

**Former Navy SEAL Marcus Luttrell, whose story was depicted in the film, "Lone Survivor," speaks at DUG Eagle Ford in 2014.**

Denver in 2011.

The success of the events attracted not just industry participants but in-demand speakers, including former President George W. Bush, Secretaries of State Condoleezza Rice and Colin Powell, Speaker of the House Newt Gingrich, Secretary of Defense Robert Gates, and celebrated Navy SEALs Robert J. O'Neill and Marcus Luttrell.

**Taking on the world**

Hart Energy expanded in other ways following its buyout. Fred Potter, one of Washington's leading experts on motor fuels, refining and air quality issues, joined as executive vice president and incorporated his firm, Information Resources Inc. (IRI), into the company as Hart Energy Consulting (later rebranded Stratas Advisors).

Potter, who had chaired the

▶ **1990**

The first sub-salt discovery in the U.S. Gulf of Mexico is made at Exxon's Mississippi Canyon 211 No. 1.

▶ **1991**



Iraqi troops set fire to oil wells when they retreat from Kuwait during the Gulf War. It would take 16 firefighting teams eight months to cap 732 wells.

▶ **1999**

• Thunder Horse Field was discovered in more than 6,000 feet of water in the Gulf of Mexico's Mississippi Canyon, Block 778.

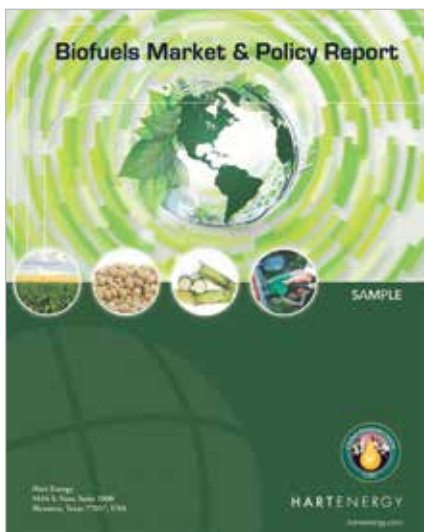


• Exxon and Mobil merge to create Exxon Mobil.

▶ **2002**



Hart Energy's longest-running organic conference, A&D Strategies & Opportunities, begins in Dallas.



Hart Energy

**Hart Energy Consulting produced a myriad of reports for its clients, including the Biofuels Market and Policy report by the Global Biofuels Center.**

United Nations Alternative Octane Working Group for worldwide lead phase-down and sulfur reduction, established Hart Energy as a downstream consulting player with services such as the International Fuel Quality Center, Global Biofuels Center and World Refining & Fuels Service.

Experts provided consulting services and reports to clients that included governments and the world's largest oil and automotive companies. They were based in Hart Energy's offices in Houston, Washington, Brussels and Singapore, as well as in cities around the world, including London, Mexico City, New Delhi and São Paulo.

Rextag Strategies, a San Diego-based mapping and GIS database

services provider, was acquired in 2010. Built by Reinhold Tagle, the platform added midstream research and data capabilities to Hart Energy's portfolio. Rextag brought with it digital GIS databases, pipeline flow and capacity data, energy infrastructure maps and reference data covering oil, gas and other pipeline operations throughout the U.S., with capabilities that can be applied worldwide.

**Today and tomorrow**

The COVID-19 pandemic did not leave Hart Energy unscathed. Planned in-person events, including DUG Permian, were canceled and print magazines were delivered to empty office buildings because readers were now working from home.

Hart Energy responded by moving conferences online until venues reopened, and delivering PDF versions of print magazines until offices reopened and the presses could run again.

But those were not the only changes. It was the start of a new era for Hart Energy, and the biggest change would be at the top. Rich Eichler retired as CEO in November 2021 and John Hartig, a media veteran with experience in senior positions at Time Inc. and the Hearst Corp., took over.

Hartig accelerated Hart Energy's move into the digital space, revamping the HartEnergy.com website and engineering the acquisition of video producer Gotham Image Works in 2022, which brought its founder David Skalsky into the fold. He brought in



Hart Energy

**John Hartig welcomes attendees to Hart Energy's 2023 Energy Capital Conference in Dallas.**

Stacy Eisner, another media veteran with leadership roles at NBC News, Refinery 29 and HBO, to lead the effort as chief digital officer.

He also brought in Hadley McClellan, former director of the Offshore Technology Conference, in 2022 as vice president and general manager of conference operations, now rebranded as Hart Energy LIVE.

Among the changes implemented was a new event, Super DUG, which combined coverage of the Permian Basin, Eagle Ford, Midcontinent and Bakken/Rockies. It debuted to a packed house in Fort Worth in May 2023. In 2024, three new events will join the lineup:

- DUG Gas+ in Shreveport, La., in March will combine DUG East, DUG Haynesville and America's Natural Gas into one event; and
- The New Energies Summit & Expo in June will explore the changing energy landscape, with emphasis on the latest technology in decarbonization of fossil fuels, carbon management, hydrogen, wind, solar and energy storage; and

▶ **2005**

Natural gas sets record of \$15.65/MMBtu on Dec. 13.

**2008**

Crude oil sets record of \$147.27/bbl on July 11, falls below \$50/bbl on Nov. 20.

▶ **2010**

• A blowout at the *Deepwater Horizon* platform in the Gulf of Mexico results in 11 deaths and the worst marine oil spill in history.

• Hart Energy acquires Rextag Strategies, a mapping and GIS database services provider.



▶ **2015**



• In December, Congress repeals the crude oil export ban.

• Royal Dutch Shell acquires BG Group for \$81 billion.





Hart Energy

**Leslie Haines, OGI Editor-In-Chief from 1992 to 2016.**



Hart Energy

**Steve Toon, OGI Editor-In-Chief from 2016 to 2021.**



Hart Energy

**Nissa Darbonne, Executive Editor-At-Large and Deon Daugherty, OGI Editor-In-Chief, present.**

- DUG Tech in Houston in November will focus on the advanced technology and science that drives efficient production and distribution of oil and gas resources.

Hart Energy's legacy editorial content also experienced major changes. Steve Toon, who succeeded Leslie Haines as editor-in-chief of *Oil and Gas Investor*, died suddenly in late 2021. Just four months later, Haines passed after a long illness.

Hartig selected veteran journalist Jordan Blum to be editorial director and execute the digital-first news strategy. Deon Daugherty returned to Hart Energy to succeed Toon as editor-in-chief of *Oil and Gas Investor*, and Nissa Darbonne assumed the role of executive editor-at-large, the title held by Haines.

The extensive coverage of oil and gas continues, but Hart Energy's editors also are providing the insight necessary for readers to thrive in the current energy transition. Topics never touched on by earlier generations of writers, such as

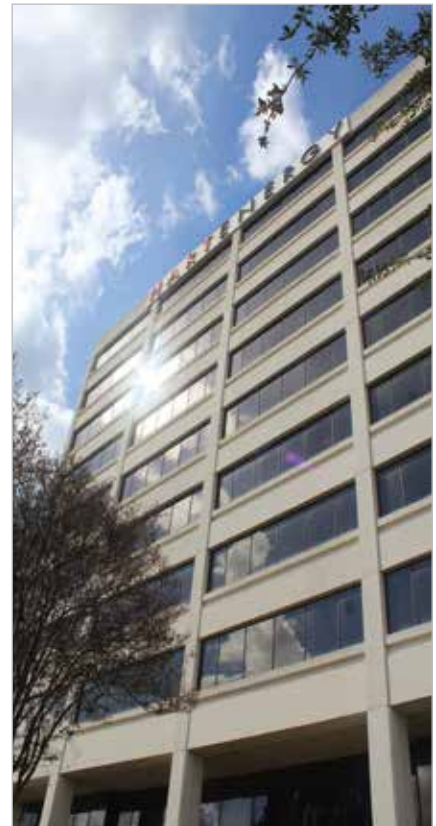
carbon management and ESG, get prominent play on the website, in print and onstage at conferences. Transactions have always captured the interest of industry executives, but Hart Energy now adds to its presentation of this content with "A&D Minute," a weekly video series that quickly covers the seemingly endless stream of deals.

The HartEnergy.com website delivers breaking news to readers, allowing the print version of *Oil and Gas Investor* to focus on long-form journalism and analysis. Readers have access to exclusive video interviews with CEOs of the industry's leading companies, and newsletters ensure that they don't miss the news that affects them most.

Don Hart went to the field to find his readers. He listened when they told him what they wanted. And then he did his best to deliver it.

The company he founded in 1973 has changed profoundly, but the essence of what Don Hart was determined to accomplish has not changed. And it never will. ■

—Hart Energy Staff



Hart Energy

**Hart Energy's headquarters in Houston.**

▶ **2019**

U.S. becomes the top petroleum producer in the world.



▶ **2020**



Oil price briefly goes negative during the COVID-19 pandemic economic slowdown.

▶ **2023**



Exxon Mobil announces acquisition of Pioneer Natural Resources for \$66 billion.





*Welder Douglas Girod builds a section of pipe on the drilling rig Ensco 99 offshore Louisiana in May 2012.  
(P.C. Piazza/Hart Energy)*





*Congratulations,*

**HAROLD HAMM**

ON BEING PART OF THE INAUGURAL  
CLASS OF HART'S HALL OF FAME AND  
AGENTS OF CHANGE IN ENERGY  
LEADING THE ENERGY EVOLUTION.



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*The sun rises on a Permian Basin horizontal drilling rig north of Midland, Texas, in March 2014. (Tom Fox/Hart Energy)*





# STRONG ALONE, POWERFUL TOGETHER.

Detection's compressor monitoring, data capture, and digital twin technologies derive actionable insights with real-time data directly from your fleet.

Unlock the power of digitalization to improve efficiency and even save millions for your bottom line.\*

 **DETECHTION**

\*Case studies show Detection's compressor monitoring, data capture, and digital twin technologies enable our customers to avoid catastrophic failure, free production and revenue, and increase reliability of an operations, valued at \$225,000-10M.











*A rig hand for Helmerich & Payne works on a joint connection during drilling for a Pioneer Natural Resources well in the Eagle Ford in February 2010. (Lowell Georgia/Hart Energy)*



## Trailblazing Wild Well Firefighter

# RED ADAIR

## THE RED ADAIR CO.

**O**n a bitter cold December night in eastern Alberta, the ground shook from the force of a gas well fire blowing out of control. Paul (Red) Adair (1915-2004), however, was very much in control.

“Like a military field officer literally in the heat of battle, Adair was shouting commands like a machine gun: ‘Pull those water lines closer! Get on the phone to Houston and get bigger pumps! Get a ‘dozer up here; I need some elevation to look at the wellhead!’ Adair was a man in charge and everyone knew it.”

That description came from longtime *Oil and Gas Investor* photo editor Lowell Georgia, who photographed the legendary well control specialist in his element, a force of nature taking on and defeating a force of nature. Adair’s strategy was to attack fire with fire—a nitroglycerine explosion that snuffed it out by depriving it of oxygen—then capping the well.

It was a method he learned from his boss and mentor, Myron Kinley, and honed during World War II as a member of a U.S. Army bomb disposal team. Adair’s unit was dispatched to the heights overlooking Tokyo Harbor in the early morning of Sept. 1, 1945, where he disarmed and blew up two 16-inch guns aimed at the *USS Missouri*. The guns were unattended but the squad had been briefed that dissidents planned to disrupt the surrender ceremonies later that day.

Adair’s unit would continue to hunt the Japanese countryside for bombs and hidden munitions after the war. In 2023, he was inducted posthumously into the U.S. Army Ordnance Corps Hall of Fame.

It was a gas well blowout in Smackover, Ark., in 1940 that launched Adair’s well-control career. The deafening roar from the blown well sent his fellow roughnecks racing for cover, but Adair “stayed right where he was, beside the wellhead, two feet from a stream of gas loud enough to re-program the beating of his heart; forceful enough, should he stumble or lean into its flow, to cut him into little pieces and hurl them halfway to the Louisiana border,” wrote Philip Singerman in his 1989 biography.

With a three-foot wrench, he manually tightened the bolts on the flange until the valve was back on and the well was capped. Adair’s boss almost fired him, but his courage caught the eye of Myron Kinley, the first to use explosives to extinguish an oil well fire.

He would stay with Kinley for almost 20 years before launching the Red Adair Co. in 1959. While known in the oil industry, the public would not be introduced properly until the “Devil’s Cigarette Lighter” fire in Algeria in 1962. Fueled by an enormous natural gas field, the blaze

consumed 550 MMcf/d and was so bright, it could be seen by John Glenn as he orbited the earth.

“I’d rather fly in space than fight one of those wild wells any day, believe me,” Glenn told Adair when he returned from his flight aboard Friendship 7.

Something about legends must attract other legends, because it took nothing less than the iconic John Wayne to portray a character based on Adair in “The Hellfighters” movie in 1968. The two became friends and Wayne accompanied Adair on a 1973 well fire in Southern California.

Adair would tackle the *Piper Alpha* fire in 1988, the most lethal offshore disaster ever, leaving 169 dead either by fire, smoke or the frigid waters of the North Sea. He would use the *Tharos*, a support ship and firefighting vessel that he designed.

His last big triumph was in Kuwait following Desert Storm. Iraqi forces had set Kuwait oil wells ablaze when they retreated from coalition forces. Adair was among the first of 16 teams to cap 732 wells in eight months.

—Joseph Markman,  
Senior Managing Editor





*Battling a gas well blaze near Casper, Wyo.*

Lowell Georgia/Hart Energy



## Celebrated Executive

# ROBERT 'BOB' ALLISON JR.

## ANADARKO PETROLEUM

**A**ll-American Wildcatter? Check. Texas Business Hall of Fame recipient? Check. Texas Alliance of Energy Producers' Legend in the Oil and Gas Industry? Yes. Chief Roughneck Award from the Independent Petroleum Association of America? Yup.

Now, Robert "Bob" Allison Jr. can add Hart Energy Hall of Famer to his lengthy list of awards and recognitions. Under Allison's leadership as CEO of Anadarko Petroleum from 1986 to 2001 and from 2003 until his retirement as CEO in 2004, the company grew its employee headcount from about 300 to about 3,400. During that same time, the company's reserves swelled to 2.2 billion barrels of oil equivalent, up from 100 million boe, to become one of the world's largest independent oil and gas E&P companies.

Anadarko, which made several multibillion-dollar acquisitions of oil and gas companies, ultimately merged in 2019 with Occidental Petroleum in a transaction valued at \$55 billion.

Before Anadarko became part of oil and gas history, the company was known on Wall Street for its success during the Allison era. Allison's leadership was noted when he returned to the CEO post after the abrupt resignation of John Seitz in 2003.

"Bob Allison is very widely known by the institutions. He really guided the company and was responsible for its biggest growth phase," Wayne Andrews of Raymond James & Associates said in a 2003 Hart Energy article. "And I think it would be viewed positively by the Street to see him back at the helm, even though we would believe also that his time is limited there."

Delivering positive results from U.S. Gulf of Mexico drilling, the Allison era included strengthening the company's



Shutterstock

**Anadarko made large discoveries of crude oil reserves in Algeria's Sahara Desert under Allison's leadership.**

portfolio with shallow-water and deepwater assets. Among the biggest wins under Allison's leadership were large discoveries of crude oil reserves in Algeria's Sahara Desert plus finds on Alaska's North Slope.

In addition to growth by the drillbit, the company also made substantial additions to its reserves through acquisitions. These included Union Pacific Resources Group, Berkeley Petroleum Corp., Western Gas Resources and Kerr-McGee.

A native of Evanston, Ill., Allison joined Anadarko Production Co. in 1973 as vice president of operations, following 14 years at Amoco Production Co. About three years later, Allison stepped into the role of president for Anadarko and went on to become the chairman and CEO of Anadarko Petroleum in 1986.

Throughout his career, Allison served as a member of several energy-related organizations. These included the Society of Petroleum Engineers, National Petroleum Council, the U.S. Oil & Gas Association and the American Petroleum Institute. He has also served as a director for Freeport-McMoran Oil & Gas.

However, life was not all about oil and gas for Allison.

The lifetime member of the Boy Scouts of America's Sam Houston Area Council also served on the board of visitors of the University of Texas MD Anderson Cancer Center, Houston Methodist DeBakey Heart & Vascular Center National Council, and the Houston Methodist President's Leadership Council.

—Velda Addison,  
Senior Editor, Energy Transition





## Geologist, Wildcatter

# BILL ARMSTRONG

## ARMSTRONG OIL & GAS

**G**rowing up the son of an oilman and meeting industry legends such as T. Boone Pickens, the late Tom Brown and members of the Hunt family, dreams of becoming a wildcatter would not be farfetched.

Growing up, Bill Armstrong could not resist the wildcatter's swashbuckler mentality and search for buried treasures, nor the technical or business sides of the oil and gas business.

"I thought to myself, even as a young boy, 'Man, I want to be a part of that,'" said Armstrong, CEO of Denver-headquartered Armstrong Oil & Gas. "And so, it was just one of those things. I fell in love with the industry early, and I'm still in love with it."

Conventional oil and gas exploration activity and spending may have fallen from highs seen around 2014-2015, but searches have not come to a halt. Explorers in places such as Guyana, Suriname, Mauritania and Namibia keep it in the spotlight—even as the energy transition pushes parts of the world to renewables and lower-carbon energy sources.

"I think people are finally realizing, 'wow, we still have to provide a lot of energy for the world. And so, wildcatting is kind of coming back in vogue,'" Armstrong told Hart Energy. "Technology is always changing. Our ability to find this stuff is always changing, and it's really fabulous stuff."

Armstrong said he is still "wildcatting like mad," mostly in Alaska but also internationally.

The geologist founded Armstrong Oil & Gas in 1985. Wildcatting, or drilling in unexplored areas in search of oil, has always been part of the company's business model. Eschewing popular shale, coalbed methane and gas plays, Armstrong focused on



Armstrong Oil & Gas

**Armstrong's discovery of the Pikka field on the North Slope of Alaska is one of the largest in U.S. history.**

making big finds in underexplored areas. And, the company has chalked up several exploration wins, including the gigantic Pikka field on Alaska's North Slope in 2013. The discovery, made in an area that was considered "past its prime" between two existing fields, ranked as the third-largest oil discovery in U.S. history.

Five years later, the company and its partner, Repsol, drilled two more wells—Horseshoe 1 and Horseshoe 1A south of the field in the Nanushuk play—solidifying its supergiant status with 1.2 billion barrels of recoverable light oil.

As a champion for exploration successes, Armstrong was named Wildcatter of the Year in 2021 by the Western Energy Alliance.

"Wildcatter is a perfect description of Bill Armstrong when you consider his discoveries in Alaska and success opening up a new frontier and renewing excitement in the state," Kathleen

Sgamma, president of the Alliance, said in a news release at the time. "But what sets Bill apart is his humble nature and big heart for helping the community."

The Armstrong Foundation mainly focuses on education and arts philanthropy.

Armstrong said if he wasn't involved in the energy business, he would have plenty of passions to pick from to stay busy. "I'm passionate about my family and my friends, the oil business, the wine business, philanthropy," he said.

Asked what he considers the most challenging issue facing the industry today, Armstrong said the "overly wrought hysteria against hydrocarbons over global warming, or climate change.... The attack on the oil and gas industry is really an issue," considering it supplies the world with affordable energy.

—Velda Addison,  
Senior Editor, Energy Transition

**A Cyclone Drilling rig operates at a Chesapeake Energy horizontal well in the Niobrara Shale in Wyoming. (Lowell Georgia/Hart Energy)**







## Prodigious Oil Finder

# WILLIAM J. (BILL) BARRETT

## BARRETT RESOURCES

**I**f there was oil and gas out there, Bill Barrett would find it.

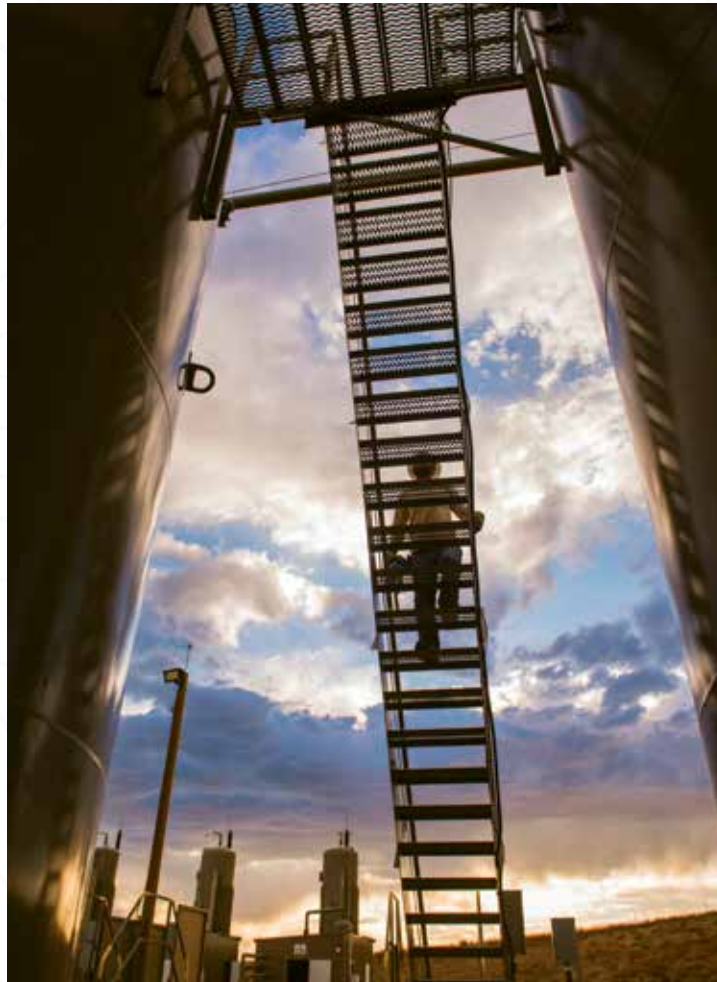
Across 50-plus years in the business, he is credited with such finds as the Wind River Basin's Madden Field, with up to 4 trillion cubic feet of gas; and Highlight Field in the Powder River Basin, with several hundred million barrels of oil.

"Exposure is the name of the game," Barret told Hart Energy in 2009. "I always believed in growth through the drillbit, and if you don't take a swing at the big reserves, you won't find 'em."

He found enough of them to warrant starting up three successful companies, two of which were sold to Williams Cos. In 1969, he and Chuck Shear started BNC Exploration (from the names Bill and Chuck), where he was vice president of exploration. The company merged with Rainbow Resources in 1971, adopting the name of the latter firm. With Barrett's oil-finding prowess, it brought a sale price of \$40 million from Williams in 1978.

When the resulting non-compete agreement expired in 1981, he started what would become Barrett Energy Co. as a part of Aeon Energy. He took his own company public in 1983, under the name Barrett Resources.

Barrett's vision and risk-



Jeremy Charles

**Bill Barrett is credited with a number of oil finds, including in the Powder River Basin.**

management skills grew the company into one of Colorado's largest producers. When oil prices crashed in 1983, majors abandoned the state in droves, creating buying opportunities for those who stayed. To make purchases without overborrowing, Barrett sold partial

interest in most wells he purchased. At first keeping just 12.5%, his company's levels rose to 25%, then 100%, as their capital resources grew.

In 2001, he sold Barrett Resources to Williams Cos. The next year, sons Fred and Terry Barrett talked their father into reentering the business, where they would rely on his solid reputation to build trust. The result was the Bill Barrett Corp., which went public in 2004.

Barrett was born in Kansas where he grew up as one of 10 children on his parents' poultry farm. He earned a master's degree in geology from Kansas State University in 1957.

He honed his craft in the Rocky Mountains, where he worked for El Paso Natural Gas, Pan American Petroleum Corp. and Wolf Exploration (where he earned the "oil finder" tag), before co-founding BNC Exploration.

Barrett collected a slew of awards during his long career, among them the Independent Petroleum Association of Mountain States' Wildcatter of the Year in 1998, a 2003 recognition by the American Association of Petroleum Geologists, and *Oil and Gas Investor's* 2005 Discovery of the Year Award for the West Tavaputs gas discovery in the southern Uinta Basin.

—Paul Wiseman, Contributing Editor



## Master of the Frac

# BUD BRIGHAM

## BRIGHAM EXPLORATION

**B**ud Brigham's small-cap Brigham Exploration, the company he founded with wife Anne, had been wildcatting on the Gulf Coast using 3D technology since 1990. In 2005, the company's success rate was 92%. But conventional-trap "bright spot" chasing was a treadmill. Unconventional resource plays captured his attention.

The stimulated horizontal Bakken play was well-proven in Montana by then. Leasehold was available on the North Dakota side of the Williston Basin. Brigham took the company there, but the early wells were disappointing. One was making 30 bbl/d..

Brigham said in "The American Shales," "We did them with single, uncontrolled fracs because that was the current technology and that's what [Bakken play founder] Bobby Lyle and Lyco [Energy] had used successfully at Elm Coulee [in Montana].

"But Elm Coulee had more porosity and more permeability."

Brigham gained an interest in EOG Resources's enormous wells east of the Nesson anticline, including access to EOG's recipe: It was using multi-stage fracturing—a "controlled" frac. Most of Brigham's

operated leasehold was west of the Nesson anticline in the basin's center, where operators were still struggling for repeatable, commercial success.

In early 2008, Brigham Exploration reentered its Mrachek 15-22 1H in McKenzie County that had an initial production of only 80 barrels from a one-mile lateral. The company completed it in seven stages; the well came back on with 565 barrels.

In January 2009, it put 20 stages on Olson 10-15H's 9,500-foot lateral—the most frac stages yet anywhere in North Dakota. It came on with 1,160 barrels.

It put 20 frac stages on another well for 1,310 barrels and 28 stages on two others for 1,810 barrels and 1,553 barrels.

The company went on to as many as 38 stages, which became known in industry as "fracking Brigham-style."

Starting with \$25,000 and its stock trading at as little as \$1 twice in its history—in 1999 and 2009—the company and its 375,000 net acres were purchased in 2011 by Statoil (now Equinor) for \$36.50 a share in a deal totaling \$4.7 billion.

In the tumult in January 1999, oil had collapsed to \$11. "Our stock got

hammered," Brigham said. "All of a sudden, the banks were wanting us to pay down our debt and our stock price went down to as low as \$1. A lot of people were questioning whether we would survive.

"It was a very difficult time. I worried a great deal."

He and Anne had more obligations than when they started the company in 1990. They already had one child and, in November 1998, they had triplets.

"So, I was going home from a very difficult day at the office to three babies. It was a challenge, but it was motivational as well. We managed to work our way through and I think, ultimately, it made us a stronger company."

After selling Brigham Exploration, he went on to found Brigham Resources, putting together an 80,000-net-acre Delaware Basin asset that he sold in 2017 to Diamondback Energy for \$2.55 billion.

He also founded Brigham Minerals, which merged into Sitio Royalties Corp.

Currently, his frac-sand company Atlas Energy Solutions is a top company in the Permian.

—Nissa Darbonne,  
Executive Editor-at-Large

*"So, I was going home from a very difficult day at the office to three babies. It was a challenge, but it was motivational as well."*

—Bud Brigham





Atlas Energy Solutions

***Bud Brigham's current venture is Atlas Energy Solutions, a frac sand company operating in the Permian Basin.***





## Digital Sales Pioneer

# BILL BRITAIN

## ENERGYNET

**B**uying things online is a daily practice taken for granted today, but it took visionary businessmen and women to build the user-friendly technology and consumer confidence that shifted huge swaths of commerce to the digital world.

For purchasing oil and gas properties online, it was Bill Britain (1948-2023), who co-founded EnergyNet in 1999 after using eBay for the first time.

"It was kind of a novel idea at the beginning, and he built it into something that's a really robust business. It's kind of an industry standard of how oil and gas or assets are now transacted where that didn't exist before," said Chris Atherton, CEO and president of EnergyNet.

When Britain died from a degenerative blood disease in January, he left behind a digital platform widely used in the oil and gas industry and a company with 50 employees.

"We're going on \$10 billion in asset sales," Atherton said "We sell today 2,000 to 2,500 individual transactions per year. We've done deals as large as \$250 million."

Britain was a 1972 West Point graduate who served as an Army officer in various posts for five years. In 1987, he co-founded and built J-Brex, a successful E&P—as well as building the knowledge base he would use when he founded EnergyNet.

Ethan House, a managing director at EnergyNet, said Britain was making deals in the late 1990s when he realized there had to be a better way to sell leftover assets too small to be of interest to large buyers.

"He felt like the market was far more liquid than a one-day sale a month and



Britain family

**Bill Britain, founder of EnergyNet, was an avid hunter and fisherman and traveled extensively.**

could be done on a 24/7 basis. That was really his epiphany," House said. "He had a bunch of small assets that were at the end of a large sale. Instead of having those assets get left behind for bigger deals effectively, [he knew] that there were more people out there that could access it than have to go to a live sale effectively. And why not open it up to more?"

House said Britain pursued this not with a deep knowledge of computers, but a belief that there was an unknown demand for this service.

"The guy has unbelievable vision and has an ability to put a puzzle together of people—and quality people—consistently," House said. "I remember going into offices back then

and telling people you were going to sell their deal online, and they just kind of laughed you out of the room, [saying,] 'No way, you can't do that.' ... Bill just had, honestly, a hunch and an idea and a vision to do it, and he made it happen."

House said Britain's entrepreneurial spirit shined through when he interviewed with him for a job at EnergyNet.

He remembers Britain saying to him, "We are still working on this. This is still new and there's no guarantee this thing actually works, but if you're willing to take a chance on it and take a chance with us, we want you on board."

—Patrick McGee,  
Senior Editor, Finance





## Growth Leader

# STEVE CHAZEN

## OCCIDENTAL PETROLEUM

**S**teve Chazen's CV was rich before he started his Hall of Fame career in the oil and gas industry. By the time he entered the space, he had already served in the U.S. Army's K9 Corps disabling mines in Vietnam, studied lunar samples while serving as a lab manager at NASA's Lyndon B. Johnson Space Center, and was employed as a managing director in corporate finance for Merrill Lynch's mergers and acquisitions arm until 1994.

That's a full career right there, but Chazen (1946-2022) was just getting started. He joined Occidental Petroleum at age 48 as executive vice president, corporate development before being promoted to CFO in 1999, president in 2007, and finally to CEO in 2011.

During his time at Occidental, the company grew to become the fourth-largest oil and gas company in the United States, based on market cap. Occidental completed almost \$40 billion worth of acquisitions during his tenure, with much of the growth derived from holdings in the Permian Basin.

After retiring from Occidental in 2015, he launched Magnolia Oil and Gas with a \$650 million IPO. This was followed by the \$2.7 billion acquisition of EnerVest's 360,000 acres in the Eagle Ford Shale and a \$191 million acquisition of 114,000 acres in the Austin Chalk Formation from Harvest Oil & Gas Corp.

Unlike some producers that focused on continued production growth through M&A activity, Magnolia sought sustainable growth under Chazen's leadership by focusing on increased production through its two initial acquisitions.

In 2018, Chazen told Hart Energy he chose the Eagle Ford and Austin Chalk because they were less risky regions. "I won't go somewhere where I have doubt about whether the oil is there," he said. "I'll put up with lots of other risks but if I can't say with 100% certainty that the oil is in place, I'm really not interested."

In 2019, Chazen was named as chairman of the board at Occidental while he continued to oversee Magnolia. He also served as chairman of the board of the American Petroleum Institute and

the Catalina Island Conservancy.

He was involved in various charities and in his community, including serving on the University of Houston System Board of Regents. Chazen also supported the university as chair of the endowment management committee among other roles.

He told Forbes in 2018 that retirement didn't suit him because he never learned to golf and had already traveled a great deal. But he had interests other than business. One of his passions was stamp collecting. In fact, he co-authored a book, "Tibet Stamps and Postal History," focused on the postal history of Tibet from ancient to modern times.

"Steve was a true visionary in the oil and gas industry. He had a deep understanding of the business and was always looking for new ways to improve it," said Vicki Hollub, who succeeded Chazen when he retired as president. "But more importantly, he was a good person who cared about his employees, his community, and the environment."

—Frank Nieto, Contributing Editor

*"I'll put up with lots of other risks but if I can't say with 100% certainty that the oil is in place, I'm really not interested."*

—Steve Chazen



*Oil exploration floor hands Mark Redman, left, and James Ott lay pipe for transport at Newfield Exploration Co.'s operations in the Uinta Basin in March 2012. (Tom Fox/Hart Energy)*







## Ethical Business Wizard

# DAN DUNCAN

## ENTERPRISE PRODUCTS PARTNERS

**S**ummertime, mid-1970s. A petrochemical company faces a sudden disruption in its supply of propane, a key raw material in one of its manufacturing processes. Suppliers, sensing opportunity, start calculating how much they will charge the company while it's vulnerable.

Dan Duncan, also sensing opportunity, offers to loan the company his propane for free. Free. To a company that is not even a customer. All Duncan asks is that the same amount of propane be returned before the winter heating season begins. There is pushback from his staff, but Duncan makes the call. Enterprise pulls the propane out of storage, transports it over, later transports propane back.

"Needless to say, it really helped the company build great goodwill," Craig Murray, a longtime friend and business associate of Duncan's, told Hart Energy. "And guess what? They became a customer."

It was a not just a savvy business move. Duncan (1933-2010) understood what it was like to be in a tough spot and need somebody to give him a break. When he was 7, his brother, Joe, and his mother both died within a span of three months. His father was away for long periods as an oil pipeline worker. Growing up in the East Texas town of Center, near the Louisiana border, he and his grandmother got by on government assistance of about \$35 a month.

After serving in the U.S. Army he headed to college and then to the oil fields to work as a roughneck and learn the industry. In 1968, Duncan and two partners founded Enterprise Products with \$10,000 and two propane delivery trucks. Next came construction of a

fractionator at Mont Belvieu and soon a small midstream company began its trek toward midstream powerhouse. Full-year revenue in 2022 totaled \$58 billion.

"When I started out in business, I continued to follow my grandmother's guiding principle of 'do the best you can every day,'" Duncan said in a speech to the United Way in 2006. "I was in hopes this would cause others to want to do business with me when they saw that I could do a good job for them, that I was honest and ethical and that I cared about the relationship with them."

Fortunately for him and his company, he added, it worked.

"Dan stressed the need to hire talented employees with a good work ethic, honesty and integrity," said Murray, an attorney who met Duncan while representing a bank that did business with Enterprise. He worked with Enterprise while at Vinson & Elkins, then joined the company as group senior vice president and general counsel in 2014. "He let them see how hard he and other executives worked and stressed to them his business principles and philosophies."

Duncan took Enterprise public in

1998 as an MLP but in 2002 eliminated the general partner's 50% incentive distribution rights (IDRs), a move that continues to benefit the company.

"Morgan Stanley called this a 'landmark action' in the industry," said Enterprise co-CEO Randy Fowler. Duncan's approach reduced the long-term cost of equity capital. This resulted in more cash flow being available to reinvest in the business, and rewarded all limited partners with durable distribution growth, he said.

"This one action was probably the most significant factor in enabling EPD to avoid the season of distribution/dividend cuts and financial restructuring that most of EPD's midstream peers with 50% IDRs had to endure from 2013 to 2020, and has enabled EPD to become one of the distribution/dividend aristocrats with 25 consecutive years of distribution growth," Fowler said. "In 2002, he prognosticated that the midstream MLPs with 50% IDRs would one day 'hit a wall.' He was right."

It was Duncan again taking a different approach, seeing value where others could not.

—Joseph Markman,  
Senior Managing Editor

*"Dan stressed the need to hire talented employees with a good work ethic, honesty and integrity."*

—Craig Murray, friend and colleague



## Spin-off Engineer

# ARCHIE DUNHAM

## CONOCOPHILLIPS

**A**s a child in Oklahoma, Archie Dunham wandered along dry stream beds, picking up fossils and wondering where they came from.

"I fell in love with geology," he told Hart Energy. "That interest inspired me to want to try and attend the University of Oklahoma (OU), even though none of our expanded Dunham family had ever even attended a college, for sure not a university. But that was my objective."

His goals would become more ambitious and result in his leading the largest oil and gas company in the world.

Dunham received a Naval scholarship to attend OU and, two days after graduation, married Linda Burns, his childhood sweetheart. Soon after, he left to serve four years in the U.S. Marine Corps before returning to the University of Oklahoma to earn his MBA.

Advanced degree in hand, Dunham joined Conoco as an associate engineer and would spend the next 33 years in various roles at Conoco and its subsidiaries. He was promoted to president of the Douglas Oil Co. subsidiary, vice president of Conoco for logistics and downstream planning, executive vice president of North American petroleum products, and executive vice president of E&P. In 1996, he was named president and CEO of Conoco and became the company's chair in 1999.

Dunham is known for two major achievements while running Conoco. The first was orchestrating the company's \$4.4 billion IPO and separation from DuPont Co. in 1998, the largest in U.S. history at the time.

"In my corporate career,



**Archie and Linda Dunham dancing.**

Archie Dunham

that certainly was my greatest achievement," he said.

DuPont's acquisition of Conoco in 1981 was welcomed, but over time, Dunham's predecessor Dino Nicandros became focused on undoing the bond. When Dunham

became CEO of Conoco, he made it his No. 1 priority to follow through with his predecessor's plan.

Dunham formed a small committee to make the argument that both Conoco and DuPont would be better off if Conoco were spun off. On





ConocoPhillips

**ConocoPhillips' Alpine Field on Alaska's western North Slope is one of the largest onshore oil fields discovered in North America in the past 20 years. The Alpine West CD5 drill site achieved first production in 2015 and has capacity for up to 43 wells.**

***“At that time, Conoco was probably the largest corporation headquartered in Houston, and ConocoPhillips certainly was. With that comes an obligation, on the part of the leadership, if you’re willing to do it—and I was—to be involved.”***

—Archie Dunham

Mother’s Day, 1998, Dunham made his pitch to the DuPont board.

“The most important presentation of my life,” he said. “Linda was in the hotel waiting for me. So, I made the presentation, the board voted unanimously to separate Conoco from DuPont. And I remember running downstairs ... Linda and I got down on our knees and we thanked God for his leadership and his guidance in making that happen.”

The second major achievement was overseeing the \$15 billion merger of equals between Conoco and Phillips Petroleum in 2002. Dunham became chairman of ConocoPhillips, as the combined company was known.

Dunham retired in 2004 to focus on philanthropic work, but returned to the corporate boardroom in 2012 when he joined Chesapeake Energy as the independent non-executive chair. He was named chairman emeritus at Chesapeake Energy in 2015 before retiring from the company in 2019.

Dunham provided significant support to the University of Oklahoma, Houston Christian University and the Houston community as a manifestation of his faith and ideals.

“At the time, Conoco was probably the largest corporation headquartered in Houston, and ConocoPhillips

certainly was,” Dunham said. “With that comes an obligation, on the part of the leadership, if you’re willing to do it—and I was—to be involved.”

Archie and Linda Dunham were married 63 years before she passed in April.

“She was a strong woman of faith,” Dunham said. “Her judgement was excellent. I relied on her wisdom and her judgement in many of the decisions I made, before advancing in the corporate world and while I was in the corporate world.”

—Jennifer Martinez,  
Associate Development Editor;  
Frank Nieto,  
Contributing Editor

## Financiers of the Shale Revolution

# MILLER, PETERSEN, PHILLIPS, ZORICH

## ENCAP INVESTMENTS

**R**epublic National Bank of Dallas, once the largest bank in Texas, is long gone, but the business relationship among four men who worked there outlasted—and greatly outsized—the bank.

In 1988, just two years after the oil industry suffered one of its worst crashes, David Miller, Gary Petersen, Martin Phillips and Robert Zorich formed EnCap Investments, a cautious, low-risk oil and gas finance business. With expertise from making loans and working with engineers at the bank, the EnCap founders situated their new business between the energy industry and institutional investors, which, at the time, were relative newcomers to energy investing.

“Instead of loaning money against oil and gas properties as we had done at the bank, we would make slightly higher-risk loans in the properties, and our first funds were mezzanine loan funds,” Petersen said. “We just went up one notch on the risk spectrum, loaned money and received a small amount of equity in the properties. Later this structure morphed into project equity investments and finally into private equity as we know it today. Now, we back management teams which

have multiple projects within their companies.”

Along with mezzanine debt, the second pillar of EnCap’s start was oil and gas producing property acquisition funds.

“We did that because that’s what the institutional world understood and would embrace,” Phillips said.

Zorich said the four worked to find investors and craft the financial products they would like and the industry could use as it limped out of the oil crash of 1986.

“We set out to find institutions who liked well-collateralized financial products, and the insurance companies were the primary buyers of that financial product. We lined up some insurance companies to be our initial investors and everything that we did back then, they could approve. They signed up to invest, but we had to get their approval on each investment,” he said. “Our activity was all very low-risk stuff, all engineering, no exploration ever.”

Miller added, “We felt confident in our ability to source opportunity, which back in those days was principally about acquisition, not drilling.”

In the mid-1990s, the company moved from debt to equity and put

together the first fund of significant size, \$480 million, in 1997. A track record of successes positioned EnCap to be one of the major financiers of the shale revolution when it started in 2008.

In another example of EnCap shifting in changing circumstances, Petersen said the firm now holds companies much longer to benefit from their hefty free cash flows.

The company has grown to 75 employees and funds more than \$40 billion.

“EnCap would never hire me today,” Phillips said, half joking as he pointed out that the company now attracts people much better educated and accomplished than he was when he helped found the company.

Miller said CEOs often ask him how four business partners did not just achieve so much but stuck together for 35 years. He said compromise was a mainstay of their four-way partnership, and no one would ever “pound the table.”

“We never had a king,” Miller said. “We were all contributing to the success of EnCap and fundamentally helping each other create wealth, and that’s pretty powerful.”

—Patrick McGee,  
Senior Editor, Finance

*“We were all contributing to the success of EnCap and fundamentally helping each other create wealth, and that’s pretty powerful.”*

—David Miller





EnCap Investments

**EnCap founders from left to right: Gary Petersen, Martin Phillips, Robert Zorich and David Miller.**



## *E&P Risk-Taker*

# JOE B. FOSTER

## NEWFIELD EXPLORATION

**J**oe B. Foster started Newfield Exploration in 1989 with \$9 million and 26 employees. Thirty years later, the company was acquired by Encana for \$7.7 billion. Those are impressive numbers for sure, but they don't tell the full story of why Foster (1934-2020) belongs in the Hall of Fame.

The startup of Newfield Exploration was a risky move for Foster and one he certainly didn't need to take. After all, he had already had a successful 31-year career at Tenneco Oil. At the time of the Tenneco Oil sale, he was in his mid-50s and had been the company's chairman. Many people expected a retirement. Instead, Foster started Newfield with other ex-Tenneco Oil employees because he believed in the potential of the Gulf Coast oilfields.

"All of these employees had worked previously in the Gulf of Mexico for Tenneco, and we had the notion that we could use the kind of major company technology which we had been using, namely 3D geophysical technology, and combine that with the cost structure and mindset of an independent to achieve a competitive advantage," Foster told

The Wall Street Transcript in 1999.

The company made its first discovery in the Gulf in 1990 and by year-end was producing more than 20 MMcf/d. Three years later, following steady growth of its natural gas and crude production, the company went public.

"The story of Newfield is a story of reinvestment. The track record of the company was increasing the net worth, volumes and margins of the business over time through good decisions," Art Smith, author of "Something from Nothing: Joe B. Foster and the People Who Built Newfield Exploration," said on The Power Hungry Podcast in August 2022.

This reinvestment by Newfield included the purchase of other offshore assets in China and Australia, as well as onshore assets in the Anadarko, Rockies and South Texas before its sale to Encana.

Foster had just as much impact outside of the oil and gas industry. He served as chair of the Greater Houston YMCA, Houston Museum of Natural Science, the Houston A+ Challenge and chair of the Texas A&M Foundation's board of trustees.

Additionally, he served on the board of directors for Memorial Hermann Healthcare System and Houston Hospice.

He and wife Harriet placed a lot of importance on education in their family with all their children attending college. To help other families fulfill their educational goals, the Fosters created and funded many college scholarships.

"[W]e just think it's a real good place to put our money. Mainly, it's just about giving back to something you benefitted from earlier in life. It's very important to give back," Foster told Texas Aggie magazine in 2009.

Charity and philanthropy meant a great deal to Foster. He discussed the importance he and his wife Harriet placed on helping others with Texas Aggie magazine in 2009.

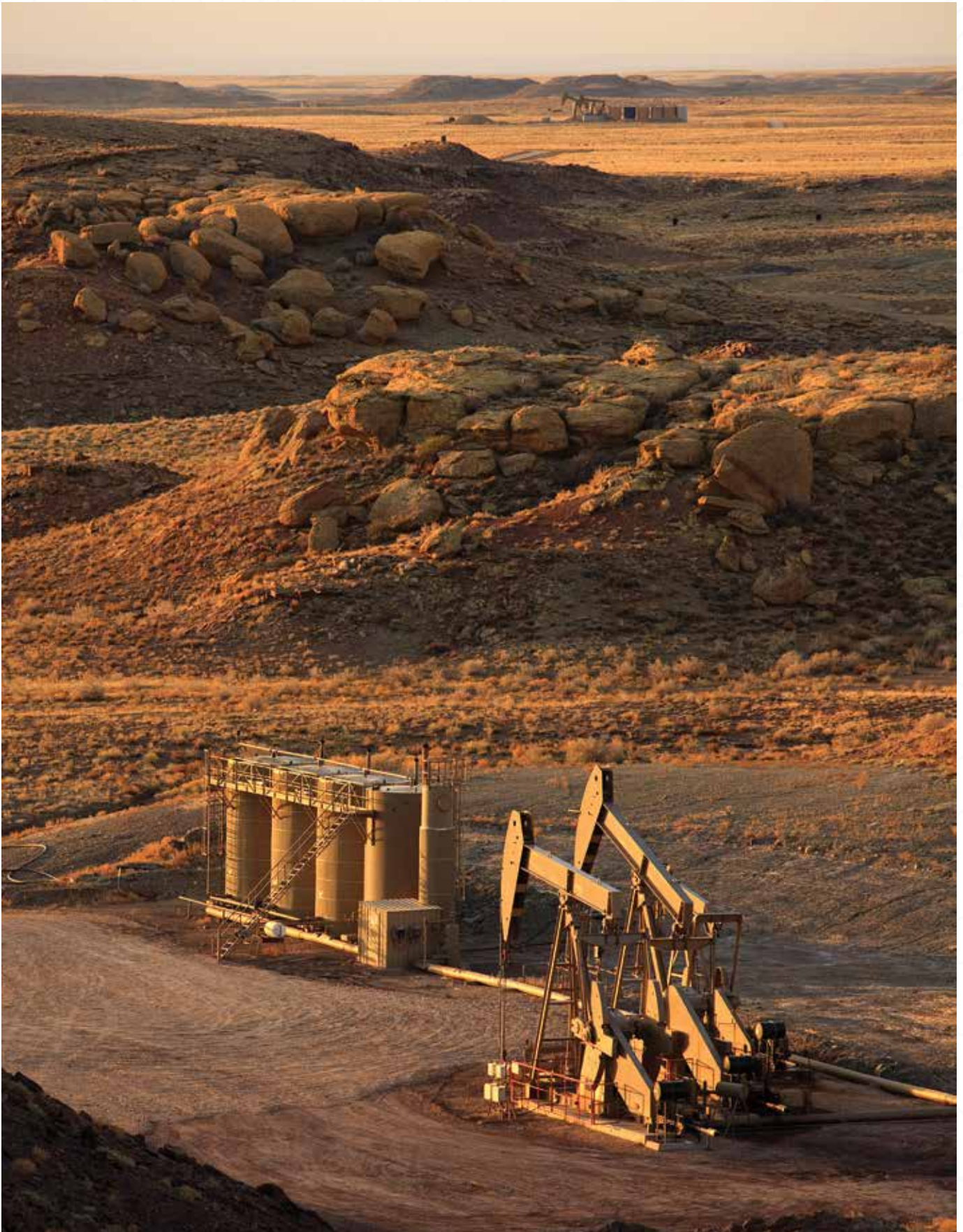
"Harriet and I both believe we have an obligation to society, to other people, to ourselves, to do something other than just earn a living and satisfy our appetites. And it's important to do it in a way that just accomplishes that. The object is not to draw attention to yourself, it's to help someone else," he said.

—Frank Nieto, Contributing Editor

***"The story of Newfield is a story of reinvestment. The track record of the company was increasing the net worth, volumes and margins of the business over time through good decisions."***

—Art Smith, author





Tom Fox/Hart Energy

***Newfield Exploration's expansion included these assets in the Uinta Basin in 2012.***



**A SandRidge Energy pumping unit in Midland County, Texas, frames a drilling rig in March 2010.  
(Lowell Georgia/Hart Energy)**





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## Chronicling Queen of the Oil Patch

# LESLIE HAINES

**HART ENERGY**

**L**eslie Haines (1952-2022), affectionately known throughout the energy reporting world as the “Queen of the Oil Patch,” former editor-in-chief of *Oil and Gas Investor*, was my colleague, coworker and friend. I knew her professionally before I joined Hart as executive editor of E&P magazine, and I had great respect for her as a writer and editor. Working alongside Haines gave me even more reasons to respect her. I had the opportunity to appreciate her kindness, generosity and integrity and to see firsthand her commitment to her craft and dedication to the industry she served.

Haines was universally respected for her professionalism, insight and leadership, and her reputation in the industry as a leader and thinker was as prominent as her reputation as a writer and editor.

Rich Eichler, whose tenure as CEO of Hart overlapped with Haines’ career for nearly 40 years, says her ability to recognize trends was a valued asset.

“One of many examples was her avid support of NAPE,” Eichler says. “From her pulpit on the editorial page, she advocated for establishing NAPE because of its potential as a forum for connecting decision makers and investors.” Now, 30 years after its inception, NAPE is the energy industry’s marketplace for buying, selling and trading prospects and producing properties. Haines also was an early adopter and promoter of shale development, he said. “She was one of the creators of the successful DUG event franchise.”

It was Haines’ rare way of looking at things that allowed her to identify trends and recognize their significance, said Douglas Brooks, industry veteran



Hart Energy

**Former Oil and Gas Investor Editor-in-Chief Leslie Haines ventured to where the news was to provide valuable insight into the industry.**

and board member at Chord Energy. “There was always a unique angle to her stories,” he told Hart Energy. “Sometimes the focus was a person, sometimes the rock, and sometimes a new technology.”

He describes Haines as a “connector of people and concepts,” who became an industry insider—despite her role as an editor—establishing lasting friendships with the people financing the future of energy.

Nissa Darbonne, executive editor-at-large at Hart Energy, worked with Haines for more than two decades and said the relationships she forged were unique. Executives valued her, she says. “I only needed to stand next to Leslie at events, and the oil and gas world would come to me.”

Although Haines was not interested in being the center of attention, more

often than not, she was.

“Leslie was everyone’s friend,” says Shelley Lamb, who filled multiple roles over her career at Hart, including publisher of *Oil and Gas Investor*. “She wanted to tell their story, and they trusted her with her words.”

To industry veterans like Bruce Vincent, CEO of Vincent Energy, Haines was never “just a writer writing stories.” She was intrigued by the industry and used him as a sounding board for the things she heard and observed. “Those conversations would often lead us to a kernel we weren’t aware of,” he says, and that often led to another new perspective and another interesting and insightful article.

“Leslie made an impact on our industry one story at a time,” Vincent said.

—Judy Murray, Contributing Editor

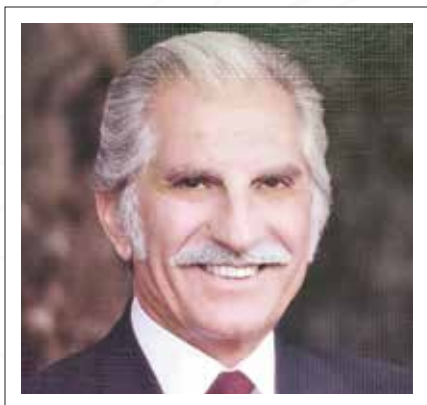




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We collaborate and engineer solutions to maximize asset value for our customers.





## Wildcatter, Geologist, Thought Leader

# MICHEL HALBOUTY

## HALBOUTY ENERGY

**M**ichel Halbouty's (1909-2004) entrance to the oil patch was as a boy lugging ice water to crews working the Spindletop field near his hometown of Beaumont, Texas. He would go on to build an illustrious career, combining the resourcefulness and nerve of a wildcatter with the education and scientific discipline of an academic and the vision of an elder statesman.

After graduation from Texas A&M University in 1931, he landed a job as a roughneck—one of the few in industry history with multiple degrees in geology and petroleum engineering. After Halbouty went out on his own and succeeded in bringing in well after well, he gained a platform to share his knowledge and concerns about threats to the industry and the country.

"I remember going to a speech that he gave one time, and I walked up to him and I said, 'Daddy, how in the world could you talk like that for that length of time extemporaneously?'" his daughter Linda Fay Halbouty told Hart Energy. "He looked at me and he said, 'When you know your subject, you can talk about anything.'"

In 1960, he spoke to the American Association of Petroleum Geologists in Los Angeles, decrying the country's increased dependence on foreign oil imports and reduced investments in domestic exploration and production. It was a subject he knew well.

"History has demonstrated through such crises as World War II and Suez that foreign governments by deliberate action can deny the United States the use of foreign oil," he said.

In a 1964 speech, he again implored his audience to take

*"History has demonstrated through such crises as World War II and Suez that foreign governments by deliberate action can deny the United States the use of foreign oil."*

—Michel Halbouty

seriously the risk of a coming cutoff. "Probably before 1975 ... the United States will have to start playing catch-up, the day someone, some group, some country, shuts down the valve on foreign oil."

It was a prescient warning of the 1973 oil embargo, but received little notice outside the industry at the time, wrote Jack Donahue in his 1979 biography of Halbouty.

His first job after college was at a Yount-Lee Oil Co. field near Houston. The site, at High Island, was atop a salt dome, just as Spindletop was, but little oil had been found over the years and most drilling resulted in dry holes. Halbouty pored over drilling logs and maps in his off hours, trying to understand why this salt dome was not yielding hydrocarbons.

And then it came to him, Donahue wrote. The dome subsurface was shaped like a mushroom, not a barber's pole like Spindletop. The oft-told story has Halbouty racing from the drilling site in his jalopy, slipping into Miles Frank Yount's mansion during a formal party and convincing the furious oilman not to stop drilling

Cade 21 because the most recent core sample showed that discovery was imminent.

Yount was convinced. Halbouty was right and the company was soon producing 75,000 bbl/d. A legend was born.

He would go on to drill in 26 states, including the first successful natural gas well in Alaska. He wrote 370 articles and four books. He also received the Legendary Geoscientist Award from the American Geological Institute, as well as an honorary doctorate from the Soviet Union's Academy of Sciences.

One of the greatest and most moving honors he received, said Linda Fay, was the Ellis Island Medal of Honor. It is "to those who have shown an outstanding commitment to serving our nation either professionally, culturally or civically," the organization says on its website. Halbouty was among the 1994 class that included Supreme Court Justice Stephen Breyer, Sen. Phil Gramm, and magazine publisher Steven Florio.

—Joseph Markman,  
Senior Managing Editor





## **Dave Lesar**

CEO, CenterPoint Energy

# *Congratulations!*

On behalf of the thousands of employees, past and present, around the world who have had the privilege of calling you colleague during your extraordinary career, congratulations on your induction into the inaugural Hart Energy Hall of Fame. Thank you for your outstanding leadership and commitment to our companies, our communities and the energy industry.



**HALLIBURTON**



*Man on a Mission*

HAROLD HAMM  
CONTINENTAL RESOURCES

**C**ontinental Resources began prospecting in the Williston Basin in the mid-1980s. The E&P had been active in a couple of oil fields in the basin when Burlington Resources (now part of ConocoPhillips) decided to put horizontals in Red River B in western North Dakota in the mid-1990s. Continental ended up co-developing Cedar Hills Field with Burlington.

The company soon joined the prolific new Elm Coulee Field play in the middle Bakken in eastern Montana in the early 2000s, and took the idea into Divide County, N.D., where it reentered an old, dry hole, deepened it and turned the bit into a lateral in the Bakken there.

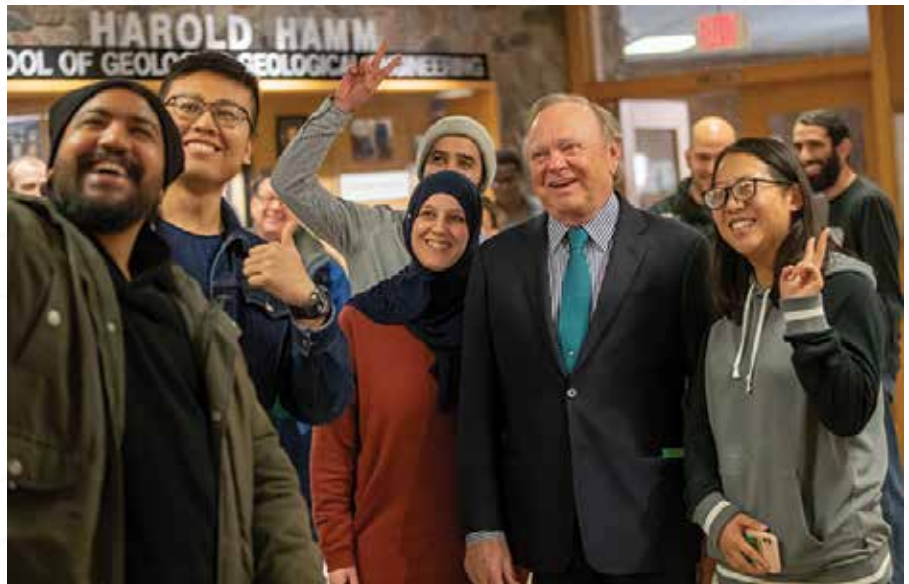
Harold Hamm, founder and executive chairman, told Hart Energy when he was inducted into the Rocky Mountain Hall of Fame in 2014, of the early days of the modern Bakken play in North Dakota. "There were times we were discouraged with this well or that well but, overall, we saw a continuous, gradual improvement with everything we were doing.

"We knew we were onto something very big—and it was going to happen."

Big, indeed: From there, the company has grown into a \$25 billion E&P, wholly focused on U.S. Lower 48 unconventional-resource plays in North Dakota, Wyoming, Oklahoma and the Permian Basin.

While controlling more than 80% of shares, Hamm took the company private in 2022 after having used public capital beginning in 2007 to fund development of Continental's new tight-rock potential in the Bakken.

"[The rock] didn't work anything like it did in Montana," he told Hart Energy. "It was different. What worked in Montana did not work [in North Dakota]. We kept trying different techniques and finally went to stage treatments. So, we had to



Continental Resources

**Harold Hamm with students at University Of North Dakota Harold Hamm School Geology & Geological Engineering.**

change everything.

"We'd bought a lot of acreage that we needed to be developing and we had very little capital. We decided we'd take the company public."

Hamm founded Oklahoma City-based Continental in 1967 as an oilfield service shop and began drilling wells in 1971.

Hamm's autobiography, "Game Changer: Our 50-Year Mission to Secure America's Energy Independence," was released in 2023. The forward is written by former Secretary of State Mike Pompeo.

Hamm told Hart Energy that he wrote the book, in part, to dispel the "jillion myths and untruths unfairly told by disparagers about this industry I love" and to inspire future generations of explorers.

"Perhaps the next little, barefoot,

country boy will get a big enough good idea to change the world," he said.

He hosted the American Energy Security Summit in September at his Hamm Institute for American Energy in Oklahoma City, where speakers included Pompeo, presidential candidates Nikki Haley and Doug Burgum, Goldman Sachs Chairman and CEO David Solomon, Chevron Chairman and CEO Mike Wirth, FedEx founder and Executive Chairman Fred Smith, Occidental Petroleum President and CEO Vicki Hollub and former Energy Secretary Dan Brouillette, who is now president of Sempra Infrastructure.

He was tight-lipped with Hart Energy about his ideas for the next big play, save for this assurance: "It's going to be better."

—Nissa Darbonne,  
Executive Editor-at-Large



# James R. “Jim Bob” Moffett

1938 – 2021

## Honoring the Legacy of Jim Bob Moffett

Hart Energy 2023 Hall  
of Fame Inductee

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Freeport-McMoRan congratulates the late Jim Bob Moffett on his induction into the inaugural class of the Hart Energy Hall of Fame.

Jim Bob was a passionate geologist and a pioneer in oil and gas exploration. He will always be remembered for his relentless drive and wildcat spirit.

Congratulations!

 **FREEPORT-McMoRAN**





## Father of the FlexRig

# HANS HELMERICH

## HELMERICH & PAYNE

**T**he oil and gas industry was in a down cycle when Helmerich & Payne launched the FlexRig in 2002. The timing of the launch wasn't great, but the new product represented a step change in rig design with flexible drilling range, faster moving time than conventional rigs and new safety features.

Industry slump or not, Hans Helmerich pushed forward and the FlexRig became a key tool in helping to kick-start the shale revolution.

He "had the courage and the grit to hang in there," H&P President and CEO John Lindsay told Hart Energy. To reassure customers, Helmerich entered into contracts of two to three years so they could count on a return.

Helmerich represents the third generation of his family to lead the company. His grandfather, Walter Hugo Helmerich II, co-founded Helmerich & Payne with Bill Payne in 1920. His father, Walter III, started working at the company in the 1950s and became president in 1960.

"I've grown up around that, hearing those stories and going around with him," Hans said.

Lindsay has worked directly with Helmerich for about 20 years. "He's a man of conviction, he has a great



Tom Fox/Hart Energy

**A Helmerich & Payne employee works on a Marathon Oil wellsite in the Eagle Ford in November 2011.**

ability to listen," he said. "He's a man of faith. He does a great job of balancing his faith in that leadership role."

Helmerich worked various jobs at H&P during summer breaks through high school and college. He began his career with the company after

graduation in 1981, and would work with his father, Walt III, for 32 years.

Helmerich said he remembered kitchen-table talks with his father that became a platform for life lessons. "He used it as a way to communicate to his five sons: 'Hey, look, you've got to have certain values, you've got to mind your reputation and make sure you're telling the truth,'" he said.

For Helmerich, the industry is about its people, who have a "frontier spirit. There's this notion of overcoming challenging circumstances."

Among Helmerich's proudest achievements is how the company retained the family feeling during its rapid expansion. After launching the FlexRig, H&P manufactured a rig about every week. Concerns about rapid growth disrupting the culture led to internal discussions about building the iron while continuing to build the culture.

More than 800 H&P employees have been with the company more than five years and many for far longer.

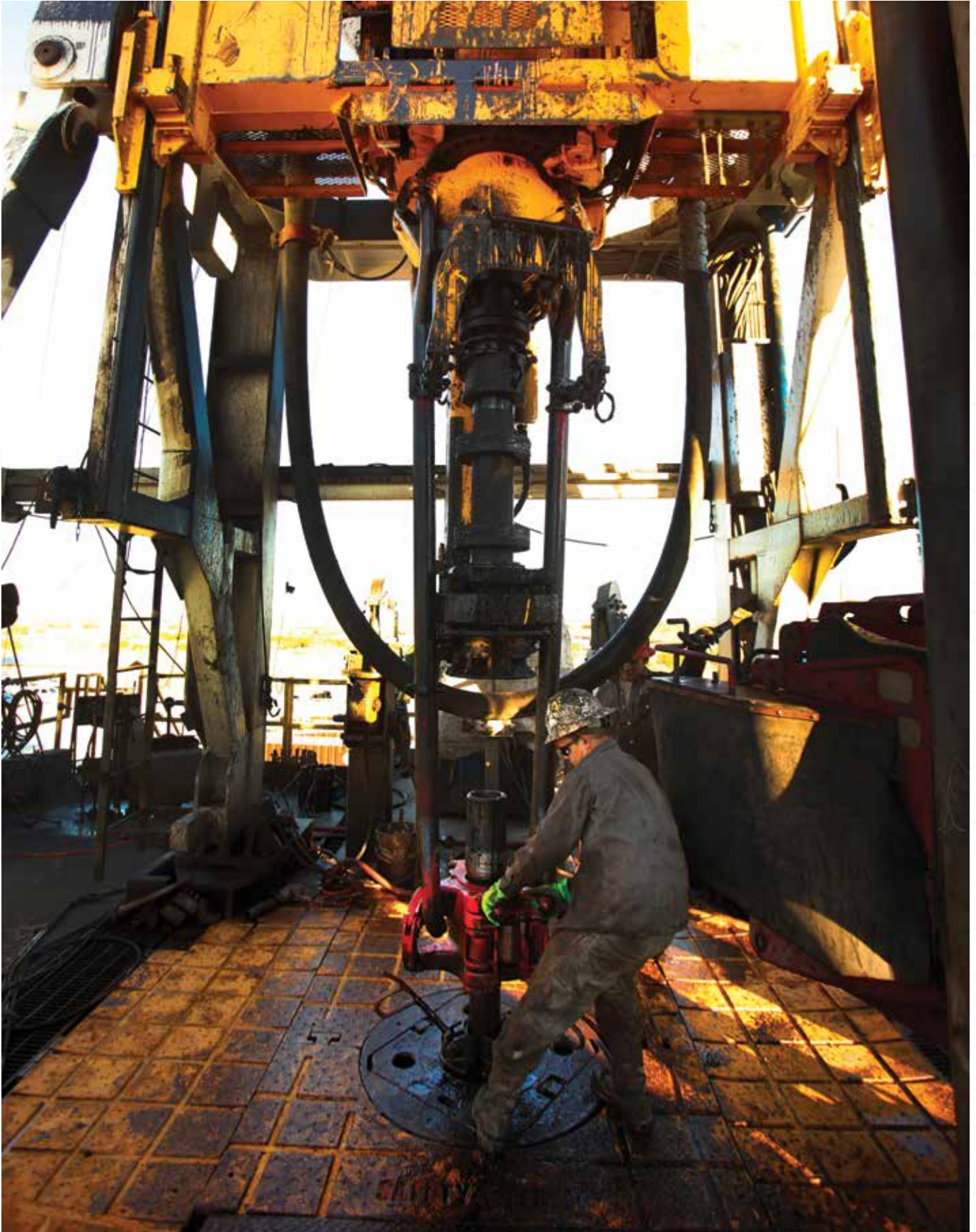
"Wow, how did we convince them to spend their entire career here?" he said. "I think there's a mutual respect and trust and it gets into your blood."

—Paul Wiseman, Contributing Editor

***"Wow, how did we convince them to spend their entire career here? I think there's a mutual respect and trust and it gets into your blood."***

—Hans Helmerich





Tom Fox/Hart Energy

*Helmerich & Payne's innovations in drilling technology transformed the industry.*



## Innovator in Natural Gas Finance

# KEN HERSH

## NGP ENERGY CAPITAL

**G**rowing up in Dallas, Ken Hersh knew little about the energy business. After high school, he attended Princeton University to study political science, took a job at Morgan Stanley after graduation, then left that position to pursue an MBA at Stanford University.

As a grad student, he landed a summer internship with McKinsey & Co. in its Dallas office and made time while in the Metroplex to visit with the legendary Fort Worth-based investor Richard Rainwater, who had worked for the Bass family and by 1986 had formed his own firm.

In early 1989, while still a student, Hersh joined Rainwater's office as part of the newly formed oil and gas private equity firm Natural Gas Partners (NGP) with David Albin, John Foster and Gamble Baldwin. Early on, NGP created an investment methodology that has become the standard for how capital is allocated to the sector.

"I was 25 years old," Hersh said. Today, NGP is older than Hersh was at the time. "We built something from scratch into a firm that's invested tens of billions of dollars."

In a planned succession, Hersh handed leadership to another generation of NGP team members in 2016 and began a new chapter: CEO of the George W. Bush Presidential Center in Dallas.

His 2023 memoir, "The Fastest Tortoise: Winning in Industries I Knew Nothing About," tells thrilling tales of investments that turned out well—and a couple that didn't—as NGP grew into one of the largest and most successful energy private equity firms.

Among deals that went well was the restructuring of the late T. Boone Pickens' Mesa Inc., resulting a year later in Mesa's merger with longtime Permian Basin wildcatter Parker & Parsley Petroleum.

The new leadership: Scott Sheffield. The new company: today's \$55-billion-market-cap Pioneer Natural Resources, now in the process of being bought by Exxon Mobil for \$59.5 billion.

NGP was also there for the early days of what is now the \$42 billion market cap Energy Transfer. Founders Ray Davis and Kelcy Warren were looking to buy a South Texas midstream gas asset. NGP invested \$37 million in 2002. In

2008, upon distributing the last of the equity to NGP's investors, the return totaled \$1.3 billion.

It was extra helpful to compensate for an investment that went bust in the midst of the late 1990s financial crisis. While doing the deal, a green light had turned yellow, but NGP moved forward, stepping outside its typical investment parameters.

The lesson: yellow lights don't turn green.

"I'm not a geologist. I'm not a geophysicist. I'm not a petroleum engineer," he told Hart Energy. "What I really loved about the energy industry is that I was able to make an impact in a business I knew nothing about by just diving in, meeting people and listening.

"You don't have to be a geologist or geophysicist to have a good conversation about energy. For a generalist, I did OK."

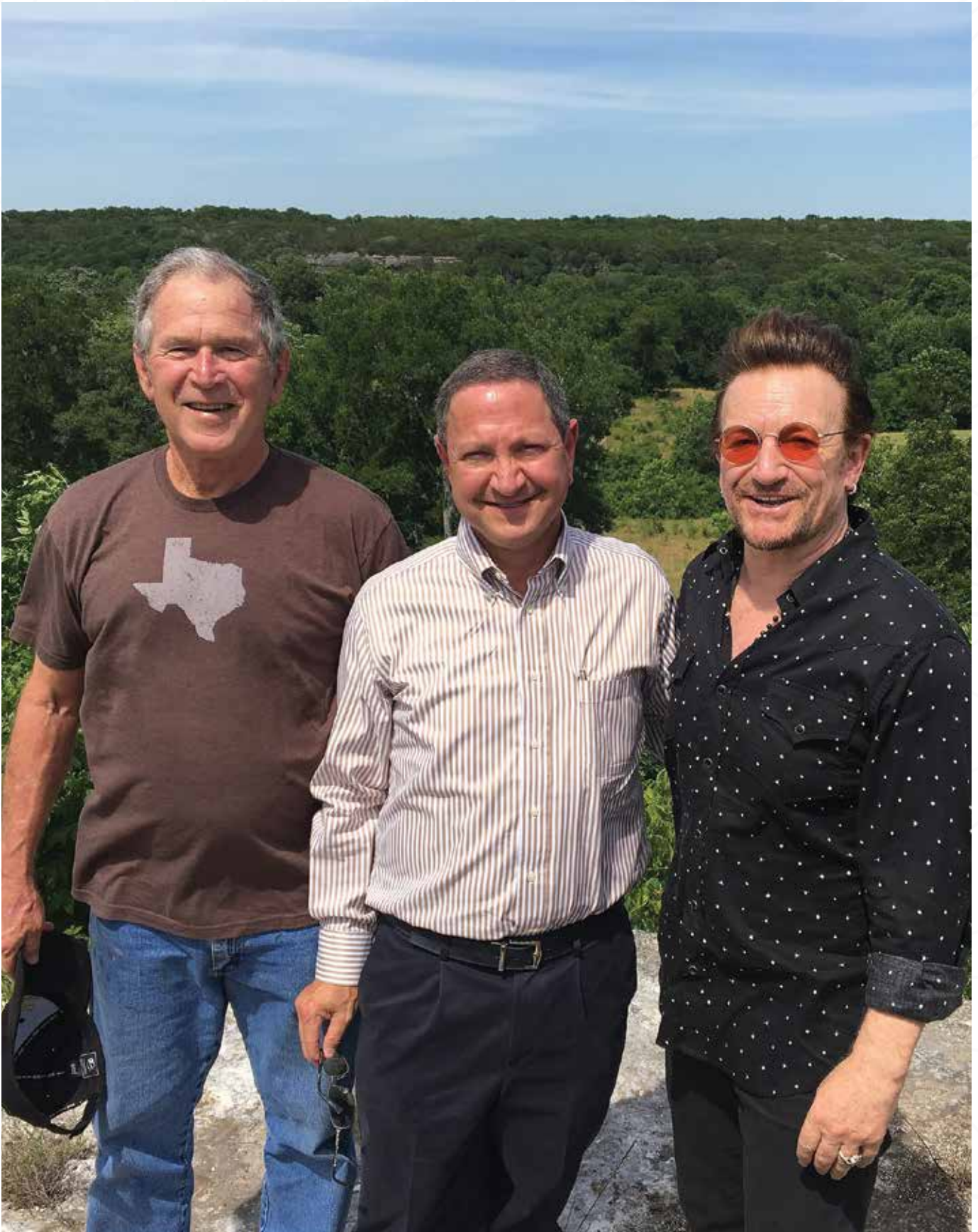
At the Bush Center today, Hersh said, "I feel 20 years younger when I go to the office at the Bush Center. There's a cadre of young, motivated, mission-driven people who want to change the world."

—Nissa Darbonne,  
Executive Editor-at-Large

***“You don't have to be a geologist or geophysicist to have a good conversation about energy. For a generalist, I did OK.”***

—Ken Hersh





Ken Hersh

**Former President George W. Bush; Ken Hersh, CEO of the George W. Bush Presidential Center; and Bono philanthropist and lead singer of the Irish rock band U2 at Bush's Crawford, Texas, ranch in 2017.**



## Turning the Majors' Trash into Hilcorp's Treasure

# JEFF HILDEBRAND

## HILCORP ENERGY

**I**n an industry like oil and gas, the global supermajors and big, public independents tend to steal the spotlight. But private producers, like Hilcorp Energy, still play a major role in the U.S. energy landscape.

Hilcorp, founded by Jeffrey Hildebrand, is one of the largest privately held E&Ps in the country, with operations in Alaska and resource basins across the Lower 48.

Hildebrand completed his undergraduate degree at The University of Texas at Austin and went to work at Exxon before returning and earning a Master of Science in petroleum engineering. He later founded Hilcorp in 1989.

Hilcorp has found success with a divergent strategy of zigging while the industry zags. Some big public E&Ps divest maturing assets and allocate their capital toward a few high-growth projects. Hilcorp's strategy has been to buy up maturing assets late in their lifecycle and extract as much production from them as possible.

"[Privates] have often filled the void of a buyer of out-of-favor assets, and I think Jeff is a great example of that," said Neal Dingmann, managing director of energy research at Truist Securities.

Hildebrand has exemplified the age-old business mantra of "buy low, sell high," Dingmann said. In 2020, Hilcorp scooped up BP's entire upstream and midstream business in Alaska for \$5.6 billion, ending a 60-year presence in the state by the U.K. supermajor.

BP had already made a series of divestments to Hilcorp as the company shifted its focus to deepwater and tight oil assets.

A few years before, Hilcorp spent \$3 billion acquiring ConocoPhillips' San Juan Basin assets covering



Hilcorp Trading Bay Platform in Alaska

Hilcorp

***"I think Jeff has been a great example at Hilcorp of building one of the most successful companies, oftentimes buying assets that other people don't want."***

—Neal Dingmann, *Truist Securities*

about 1.3 million acres in New Mexico and Colorado. Hilcorp said the San Juan Basin assets were the kind of established, conventional assets it aims to secure and enhance.

"I think Jeff has been a great example at Hilcorp of building one of the most successful companies, oftentimes buying assets that other people don't want," Dingmann said.

Hildebrand has also made sure to sell high on the other end: in 2010, Hilcorp sold a 40% interest in its Eagle Ford acreage to KKR for \$400 million.

The deal valued the 100,000-acre play at \$1 billion, with Hilcorp's stake at around \$600 million.

After growing the partnership to 140,000 net acres, Hilcorp sold its Eagle Ford assets to Marathon Oil for \$3.5 billion in cash in 2011. KKR's stake was valued at \$1.13 billion; Hilcorp received the remaining proceeds.

Outside of oil and gas, Hildebrand is widely known for his philanthropy and contributions to political causes.

—Chris Mathews,  
Senior Editor, *Shale/A&D*



SHAPING THE INDUSTRY SINCE 1979

# A LEGACY OF SUCCESS



Team Endeavor congratulates Founder Autry Stephens on Hart Energy's Hall of Fame! We commend Autry for his perseverance, wildcatter ways, and trailblazing service to the oil and gas industry over the past 40+ years.

## Oil and Gas Dynasty

# HUNT FAMILY

## PETRO-HUNT, HUNT OIL



Marshall Hunt

**Hunt family portrait, from left to right: Bunker, Herbert, Margaret, Hassie, Caroline and Lamar.**

**I**conic wildcatter H.L. Hunt, reported to be the inspiration for the J.R. Ewing character on “Dallas,” began his career in the oil business a century ago. His descendants own and operate a sprawling business still centered on oil and gas.

“Our company traces its roots back to the 1920s when the legendary H.L. Hunt entered the oil and gas business in El Dorado, Arkansas, and later played an active role in developing the East Texas Oilfield,” Marshall T. Hunt, who serves as COO of Petro-Hunt, told Hart Energy. “The management team has been instrumental in some of the largest reserve discoveries in the world.”

Petro-Hunt, a privately held producer founded by W. Herbert Hunt, one of H.L. Hunt’s 15 children, is one of many companies under the historic Hunt umbrella. Others include Pillar Energy, Pledge Resources, Kingdom Investments, Placid Refining and Little Knife Gas Plant in the Williston Basin.

The family operates four real estate companies in the Dallas-Fort Worth area and runs an investment portfolio of about \$550 million in 120 funds that include private equity, growth capital, technology, biotech, medical devices, health care, transportation and others. Another Petro-Hunt affiliate is the Game Creek Ranch near Waco, Texas. The ranch is a game preserve for white-tailed

deer management and an exotic wildlife refuge.

H.L. Hunt founded Hunt Oil in 1934 in Tyler, Texas. The company developed the first commercial well in Alabama in 1944 and entered the offshore business in the Gulf of Mexico in 1958. In the 1960s, it played a major role in developing the Fairway Field in East Texas. Ray Hunt, another of H.L.’s sons, took over the company after his father’s death in 1975. One year later, Hunt Oil discovered the Beatrice field in the British North Sea.

Hunt Oil partnered with the Peruvian government to launch Peru LNG in 2006, developing the upstream natural gas resources for the project. The project, South America’s first liquefaction plant, made its first shipment in June 2010. It also boasts the highest natural gas pipeline in the world, at 4,900 m above sea level.

H.L. Hunt also founded Hunt Petroleum in 1950. It was sold to XTO Energy in 2008 for \$4.2 billion.

Herbert’s Petro-Hunt was instrumental in discoveries across the United States and globally. Among them, the Sarir field in Libya in 1961 with his brother Bunker, which was producing 220,000 bbl/d in 2022; and the Placid Oil discovery of the L10 gas field in the Dutch North Sea. Herbert was also an early player in the Bakken shale play with his acquisition of

two fields in the 1990s. The Petro-Hunt team has been instrumental in pushing innovation for the industry through drilling and production techniques, including the first 3-D seismic in the Gulf of Mexico in 1979.

Today, the company is run by Bruce W. Hunt with his brothers Douglas Hunt and David Hunt. This generation plays a large role in the Petro-Hunt’s management. Marshall T. Hunt and Bailey Hunt are active on the E&P and refining side of the business, and Austin Hunt and Casey Hunt run the mineral and royalty interest for the family entities.

“In the current world of oil and gas, we find not only the success of the world allied to their contributions,” Carl Larry, Wood Mackenzie’s Genscape sales director, told Hart Energy. “America’s current position as a major among the world’s oil producing elites can be attributed to the vision of the Hunt family and others.”

Petro-Hunt was founded by William and is a multi-generation family business. “William was a true wildcatter ... active in the upstream and downstream sectors and involved in numerous discoveries of large and giant fields [throughout] his career,” Marshall said.

Bruce W. Hunt, now president and CEO of Petro-Hunt, is past president of the Dallas Petroleum Club. Bruce is part of the management team with



*“America’s current position as a major among the world’s oil producing elites can be attributed to the vision of the Hunt family and others.”*

—Carl Larry, *Genscape sales director, Wood Mackenzie*



**Petro-Hunt drilled and completed the world’s first medium-radius, double lateral horizontal well in South Texas.**

Petro-Hunt

his brothers Douglas Hunt and David Hunt. Doug is director of A&D, while also advising the company’s long-term strategy. David is active in the company’s mineral and royalty space, and manages a team for the company’s affiliated Alternative Investment Division.

The third generation of the W. Herbert Hunt family plays a vital role in the company’s activity.

In addition to serving as COO of Petro-Hunt, assisting in the development of the company’s E&P assets and acquisition efforts, Marshall T. Hunt is also vice president of Pillar Energy and Pledge Resources. Marshall also serves on the board of Omni Environmental Solutions and PureWest Energy, in which the company has active investments.

Bailey G. Hunt, executive vice president of strategy and corporate development of Petro-Hunt, assists in overseeing the company’s oil and gas activities along with the acquisition

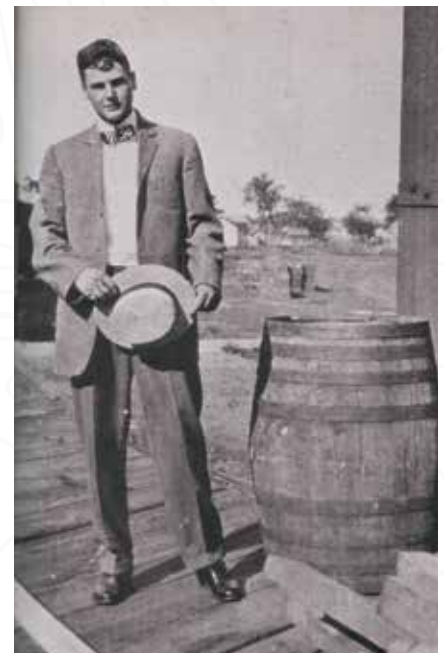


Marshall Hunt

**The oil well crew that worked on the Bradford No. 3 in 1930 stand behind Columbus Marion “Dad” Joiner (left, white shirt & hat) shaking geologist A. D. Lloyd’s hand. H.L. Hunt stands next to Lloyd, then Ed Laster next to Hunt.**

efforts. Austin Hunt and Casey Hunt serve as managing directors of the family’s mineral and royalty interests.

—Pietro D. Pitts,  
*International Managing Editor*



Marshall Hunt

**H.L. Hunt age 22 in 1911.**



## Builder of Multibillion-Dollar Businesses

# RONNIE IRANI

## RKI ENERGY RESOURCES

**T**he 10 best years of Ronnie Irani's life began with a notion that had been bouncing around his head for a while.

"It started as an idea at the kitchen table that I was playing with, and thinking back on what I knew about the industry and how to tie that with the modern technology of horizontal drilling and fracking that was just forming back in 2005," he told Hart Energy.

The result was RKI Exploration & Production, which Irani built into an Oklahoma City-based E&P operating in the Permian and Powder River basins before selling to WPX in 2015 for \$2.75 billion.

"If there is a company you can build from scratch, this one would fit the bill," Irani told Hart Energy in 2016. "It was a pure build, from absolute zero."

But building multibillion-dollar energy companies has been Irani's trademark in a career spanning more than four decades.

After starting his career with Woods Petroleum, Irani joined Louis Dreyfus Energy Services to help build up a company focused on natural gas. He was able to turn a \$40 million investment into a \$2.6 billion company.

When Louis Dreyfus Natural Gas was sold to Dominion Energy in 2001, Irani stayed at Dominion as a senior vice president and general manager until 2005, when he started RKI Exploration & Production.

But Irani, who immigrated to the U.S. from India, never would have reached the heights of the energy industry without his older brother Barry.

"Because of him, I got into oil and gas, the whole industry," he said. "When I came to the U.S., he was



RKI Energy Resources

*Ronnie Irani visits his company's operations in the field.*

already working in the industry. So, weekends he would be working at the office and I would just join him and I would see the maps and I would see the logs. And so, that really hooked me even before I got my summer internship."

His interest in his older brother's work propelled Irani through his bachelor's and master's degrees at the University of Oklahoma and enabled him to get his start in the oil and gas industry at Woods.

Now, he is the founder and CEO of RKI Energy Resources, an Oklahoma-based privately held energy company. He works behind the scenes in the industry, sharing ideas and helping companies find oil and gas. He is also a major supporter of the Ronnie K.

Irani Center for Energy Solutions at the University of Oklahoma and involved in numerous charities and nonprofits.

"One line that I've always lived by is, 'Commit, then providence moves also,'" Irani told Hart Energy.

He is now in a position to pass along his experience and lessons learned to a new generation of young people entering the oil and gas workforce, Brook Simmons, president of the Petroleum Alliance of Oklahoma, told Hart Energy.

"I am convinced the benefit to society will ripple far beyond the energy industry for many decades to come," Simmons said. "The world needs more Ronnie K. Iranis. And you know what? He is helping make them."

—Jaxon Caines, *Technology Reporter*





## Builder of a Midstream Major

# RICH KINDER

## KINDER MORGAN

**R**ichard Kinder presides over one of the greatest success stories of the midstream industry at Kinder Morgan, which he founded more than 25 years ago with former partner Bill Morgan. Today, he is executive chairman.

Raising the firm from the ashes of Enron Corp., where he was passed over for the top job before leaving the firm that eventually collapsed in an epic corporate fraud bankruptcy, Kinder went on to establish the first of a small group of “midstream majors.” Kinder Morgan is perhaps the antithesis of all things Enron—the assets are tangible, the leadership is drama-free and the balance sheet is clean.

“The dirtiest word in the lexicon of leadership is hubris—the idea that if you’ve been relatively successful at something, you won’t make mistakes and you don’t have to relearn lessons,” he told Hart Energy during an exclusive interview in June 2014. “I think leadership is all about never getting cocky, never feeling you have all the answers and asking for input from all your people. But somebody has to be the leader. Somebody has to drive the bus.”

Kinder is the largest shareholder in the mega-midstream company, but as CEO, he collected a \$1 annual salary for his work there.

“I thought way back then that management should be aligned with the shareholders,” he said.

Long before becoming one of the richest men in the world—the Bloomberg Billionaire’s Index lists him at No. 238 with personal wealth valued at \$8.72 billion—he was one of more than half a million U.S. troops deployed in Vietnam.

After earning a juris doctorate degree



Hart Energy

**Rich Kinder built one of the largest pipeline networks in the world.**

in 1968, he was drafted into the U.S. Army. The law degree qualified him to be a Judge Advocate General (JAG) officer and, in December 1969, he was deployed to a base outside of Saigon, according to the West Point Center for Oral History. Kinder was responsible for a region between Da Nang and the Mekong Delta, which he traveled via helicopter, according to West Point.

A year later, Kinder was transferred stateside to complete his four-year commitment at Fort Leavenworth, Kan. His post-military career included a stint in private practice before joining Florida Gas Transmission, which became Enron.

“There’s no limit to what can be accomplished if you don’t care who gets the credit,” Kinder told Hart Energy. “I think what you want to try to do is, while staying on top of your business, you also want to give the people who work with you as much authority as possible. And when they

succeed, give them the credit. I guess you would call it ‘management by walking around.’”

Kinder’s influence in Houston is difficult to miss. There is the Kinder Institute for Urban Research at Rice University; the Kinder High School for the Performing and Visual Arts; and The Nancy and Rich Kinder Building, which Architectural Record described as a “luminous” structure of almost 240,000 square feet at the Museum of Fine Arts Houston.

The Kinder Foundation is primarily focused on the greater Houston area, where it has contributed millions of dollars to build urban green spaces, benefit education and improve local quality of life. Among its few out-of-town contributions is the \$25 million endowment in 2015 at Kinder’s alma mater, the University of Missouri, which established the Kinder Institute on Democracy.

—Deon Daugherty, Editor-in-Chief



## Father of Offshore Drilling

# ALDEN 'DOC' LABORDE

**ODECO**

Offshore drilling rigs in 1953 were basically onshore drills plopped onto piling—essentially a new drilling platform built from scratch for each new well. In the event of a dry hole, the rig came off the piling and was hauled to the next piling location. It was time-intensive and costly.

“Dad was in the department (at Kerr-McGee) where they had to go take out all the creosote piling out of these locations and he said, ‘this is stupid,’” Jack Laborde, son of offshore drilling pioneer Alden “Doc” Laborde (1915–2014), told Hart Energy. The drilling rig, Navy veteran Doc Laborde could see, needed to be able to float. So, he designed one that could.

Kerr-McGee, however, wasn’t interested in the new technology. So, Laborde quit the company and partnered with rig builder Jack Hayward to form Ocean Drilling & Exploration Co. (ODECO). With financing of 50% from Murphy Oil and the rest from vendors, *Mr. Charlie*, named for the father of Murphy’s CEO, took to the waters of the Gulf of Mexico in 1954 and East Bay field near New Orleans in Plaquemines Parish, La.

“Daddy said the whole key to it was, the first time, the first well they drilled was in East Bay and it wound up being a big, big, big oil, I mean, big oil discovery for Shell,” said Jack Laborde. More rigs were built and Shell contracted with ODECO for years. Other operators have taken over the East Bay field since, but it continues to produce, and *Mr. Charlie* would drill in the shallow Gulf of Mexico for the next 30 years.

When it comes to innovation, Laborde was the offshore industry’s equivalent of the Wright Brothers, said Don Briggs, president of the Louisiana Oil and Gas Association.



Virgil Allen

**Alden “Doc” Laborde received the “Extraordinary Welding” award from the American Welding Society in recognition of the design and construction of “Mr. Charlie,” the first offshore drilling rig that was fully transportable, submersible and self-sufficient. The society presented the award to Laborde in a 1995 ceremony. Pictured from left to right: James Watts, Laborde and Virgil Allen.**

“He advanced the industry at times when we needed so desperately to have that energy source,” Briggs said.

But the “father of offshore drilling” wasn’t finished innovating. He went on to found Tidewater and launched the first modern offshore supply vessel, *Ebb Tide*, in 1955. In 1985, he purchased a Gulf Coast fabrication facility and co-founded Gulf Island Fabrication to build offshore oil platforms. The company went public in 1997.

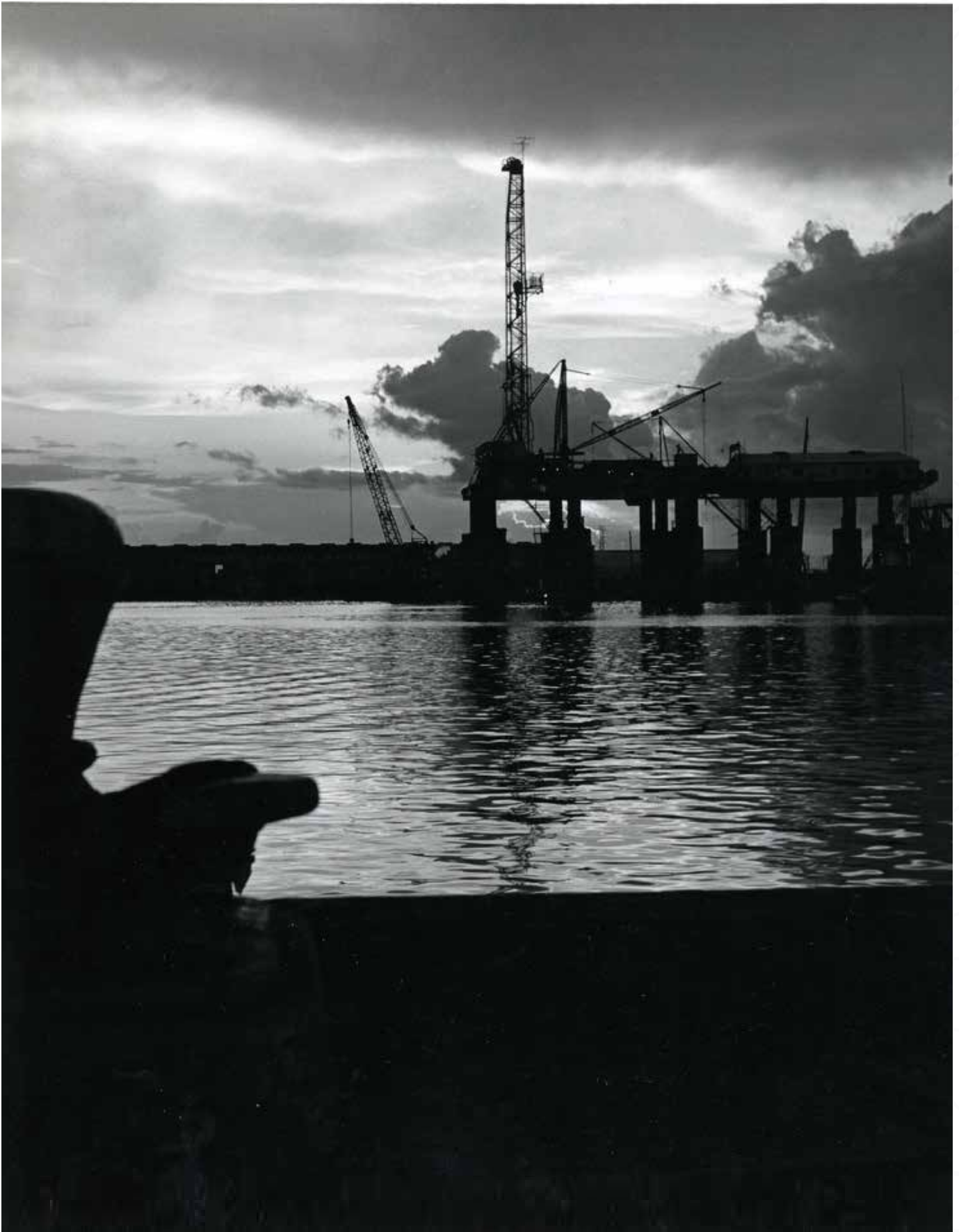
Doc was “very quiet, very religious, very honest,” said Jack Laborde. The rough-and-tumble crowd of Red Adair, Michel Halbouty, Jim Bob Moffett and other colorful industry icons of that era loved him but kidded he was “too squeaky clean to be a contractor.”

Jack Laborde took the company into international waters, including the Ekofisk field in the North Sea. His father joined him once offshore Brazil. The industry legend was stunned by the water depth (3,000 feet compared to 40–45 for *Mr. Charlie*) and how computers and thrusters had replaced anchors.

“He looked at me,” Jack said. “He said, ‘you know what, I’m going home. I’m going back to the Gulf of Mexico. I’m going to quit. I’ve gone from 35 feet of water to 3,000 feet of water and it’s time for me to go home.’ He did.”

—Paul Wiseman,  
Contributing Editor;  
Joseph Markman,  
Senior Managing Editor





*Alden "Doc" Laborde's creation, Mr. Charlie, transformed offshore drilling.*

The Rig Museum



*Russell Alexander of  
May's Welding Service  
grinds down the casing  
so crews can cap a  
Carrizo Oil and Gas  
well in the Eagle Ford  
Shale in July 2015.  
(Tom Fox/Hart Energy)*







# 50 YEARS OF INTEGRITY



Congratulations to Devon's Larry Nichols, Rick Muncrief and the other legendary founders, pioneers, and wildcatters on being named to the inaugural class of the Hart Energy Hall of Fame.







## Finder of Opportunities for Growth

# DAVE LESAR

## HALLIBURTON, CENTERPOINT ENERGY

**U**nless you're an elected official, it's unlikely you're asked to replace the Vice President of the United States. But that's what Dave Lesar did when he took over for Dick Cheney as CEO of Halliburton in 2000. Lesar served in this role before being promoted to executive chair in 2018 until his retirement at the company in 2019.

Lesar thrived as CEO by building on Cheney's legacy. Cheney's biggest contribution, Lesar told Hart Energy, was moving Halliburton from a traditional oil services company to one more focused on the technology aspect through the acquisitions of Landmark Graphics, Numar and Sperry-Sun Drilling.

While these acquisitions occurred under Cheney's leadership, Lesar played an important role in these purchases and helped Halliburton diversify its operations with an increased focus on oil and gas field services.

This change in focus was a major reason why Halliburton experienced such massive growth with Lesar at the helm. Producers at the time were outsourcing operations like drilling and reservoir integration, and Halliburton was there to take on these responsibilities for many of its E&P customers.

During his tenure as CEO, the company became the biggest provider of hydraulic fracturing services in the world and saw its share price rise 68%. He also guided the company through some difficult times, including asbestos claims related to Dresser Industries, which it acquired in 1998; and the crude oil price crash of 2014-2015.

Shortly after retiring from Halliburton, Lesar joined CenterPoint Energy in 2020 as President and CEO. CenterPoint represented a change in direction for Lesar. The company operates electric and natural gas utility businesses in



CenterPoint Energy

**Dave Lesar, center, at the CenterPoint Energy YMCA of Southwestern Indiana.**

Minnesota, Indiana, Ohio, Mississippi, Louisiana and Texas with a total of \$35 billion in assets.

Once again, Lesar saw an area for growth in the energy industry. This time it was with utilities converting from coal-fired power generation to natural gas-fired and renewable energy power generation to help reduce carbon emissions. CenterPoint is investing in both power generation sources.

Under Lesar's leadership, CenterPoint completed billions of dollars' worth of new projects, including pipeline modernization, the addition of smart metering technology, and incorporating hydrogen and other clean sources into its energy mix. CenterPoint Energy has also invested more than \$40 billion to improve the safety, reliability and resiliency of its electric and natural gas systems.

Lesar, who announced he would retire from CenterPoint Energy in January, stressed the importance of having quality people around him throughout his career.

"It is an honor to be named an inaugural Hall of Fame inductee along with our industry's groundbreaking pioneers, innovative leaders who have grown and re-invented our sector over a half-century, and those vanguards continuing the momentum on a safer and more sustainable energy future," Lesar said. "I have had the privilege of working with some extraordinary people over the course of my career who have made our organizations, our communities and me better. To all my former and current colleagues, this award is also in recognition of your efforts and execution."

—Frank Nieto, Contributing Editor





## Flying High Over the Eagle Ford

# ROD LEWIS

## LEWIS ENERGY GROUP

**I**n 2008, Rod Lewis was certain something odd was happening in South Texas. A rig had appeared in La Salle County that summer, drilling for Corpus Christi, Texas-based explorer First Rock.

That wasn't unusual in the long-drilled area. Neither was an operator using a pseudonym to tight-hole a wildcat. It was by no means concealed, either, on the flat South Texas landscape of oak and mesquite trees, scrub brush, deer stands and wild hogs.

And neither was it odd that Lewis would hover about well pads, spying on his South Texas E&P neighbors.

What fascinated Lewis was how much drillpipe was at the site and that this well had been drilled for more than seven weeks now. Then the frac crew and equipment showed up.

The spread was enormous.

Besides drilling and studying his and others' well logs, Lewis had explored South Texas by air—stalking wells, placating a detective gene.

His fascination with the air had been inherited; his father was an Air Force pilot from whom he had learned how to repair aircraft before getting a license to fly them.

In 1976, with a bachelor's degree in criminal justice from Texas A&I University (now Texas A&M-Kingsville), he wanted to work for the FBI but was rejected for being near-sighted, which was not correctable by surgery at the time.

He went to work as a gauger, going from wellhead to wellhead. In 1982, he bought a well of his own, Williams & Williamson 1A, for \$13,000.

In the early aughts, as stimulated, horizontal wells were working in other shale plays, Lewis wanted to try it on the Eagle Ford. In one, the tubing became stuck. He quit.



**Lewis Energy's Rig #4 operates in the Eagle Ford in 2011.**

Jim Olive

Still, the Eagle Ford kept taunting him. In 2005, "I decided, 'Well, hell,'" he said in "The American Shales."

Another attempt also failed. "We screened out on the third zone. It was pretty much a complete failure."

A major U.S. pressure pumper said a \$3.5-million job was needed to make it work. "I'll never forget this. I told them at the conference table, 'Guys, I just spent my last cent getting the damn [\$3-million] well drilled.'"

He dropped it. Later, he said, "If we would have, it would have broken the Eagle Ford loose right then and there, back in 2005."

That pseudonym driller he saw in 2008 was Petrohawk Energy, which was bringing in the Eagle Ford discovery well.

"I started flying by every couple of days and this frac took a long time." When flowback was initiated, Lewis hovered alongside the site.

"It got to the point where, when I was flying over, they would just shut the well down," he says.

Dick Stoneburner, geologist and Petrohawk's COO at the time, knew Lewis was watching; he knew Lewis was even dropping in and visiting the site.

"Indeed," Stoneburner said in "The American Shales." "He would set down, check flowing pressures and take back off!"

Lewis did enjoy upside from Petrohawk's discovery and from it and others further proving the play. He had some 300,000 net acres in South Texas with about 250,000 of that over Eagle Ford.

Ending 2022, LewisEnergy Group was No. 6 among privately held U.S. producers, making 157,000 boe/d, about 98% gas for about 920 MMcf/d from more than 2,200 wells, according to Enverus.

Lewis gives credit to Stoneburner and Petrohawk for cracking the Eagle Ford code and ended up partnering with Petrohawk in some of the play.

—Nissa Darbonne,  
Executive Editor-at-Large



*Champion of Hydraulic Fracturing*

AUBREY MCCLENDON

**CHESAPEAKE ENERGY, AMERICAN ENERGY PARTNERS**

**A**ubrey McClendon, together with Tom Ward, co-founded Chesapeake Energy in 1989, turning a \$50,000 investment into a multibillion-dollar company that employed 13,000 people at its peak. McClendon (1959-2016) is credited with championing hydraulic fracturing, key to the early 2000s shale revolution that changed the face of the U.S. energy industry.

“He was an enthusiastic—at times, reckless—visionary and innovator, one of the top generals leading the campaign to develop natural gas supply in this country,” wrote Leslie Haines, former Editor-In-Chief of *Oil and Gas Investor*, after McClendon’s death in March 2016.

Though a great-nephew of Robert Kerr, founder of oil giant Kerr-McGee, McClendon didn’t initially pursue a career in oil and gas. He graduated from Duke University with a major in history and minor in accounting. He was working as an accountant when he came across an article that changed his life.

“It was about two guys who had drilled a big well in the Anadarko Basin that had blown out, and it was alleged to be the biggest blowout in the history of the country,” McClendon told *Rolling Stone* in a 2012 interview. “They sold their stake to Washington Gas Light and got a \$100 million check. I thought, ‘These are two dudes who just drilled a well and it happened to hit.’ So that really piqued my interest.”

So much so that McClendon left accounting to become a landman in 1982. In 1983, he joined forces with Ward. Six years later, the two formed Chesapeake Energy.

McClendon was known as a risk-taker by many, but he wasn’t blind to the advice of others.



Tom Fox/Hart Energy

**Aubrey McClendon speaks onstage at Hart Energy’s DUG 2010 with former Oil and Gas Investor Editor-in-Chief Leslie Haynes.**



Tom Fox/Hart Energy

**A roadside memorial for Aubrey McClendon, formed Monday, March 14, 2016, at the site of his fatal accident in Oklahoma City.**





Tom Fox/Hart Energy

Aubrey McClendon onstage at Hart Energy's DUG conference in 2010.

***“He was willing to take a risk that maybe no other oil company would take.”***

***—Archie Dunham, former CEO and chairman, ConocoPhillips; former chairman, Chesapeake Energy***

“Aubrey was a brilliant leader,” Archie Dunham, former CEO and chairman of ConocoPhillips and former chairman of Chesapeake, told Hart Energy. “He wasn’t an engineer; he had to rely on his geophysicists and his landmen and his exploration and production executive vice presidents to help him make decisions.” And he listened to his geoscientists, Dunham said. “He didn’t rush in blindly, but he did rush in. He was willing to take a risk that maybe no other oil company would take.”

Dunham was chairman when the Chesapeake board of investors voted to ask for McClendon’s resignation in 2013. Dunham was assigned to break the news.

“The important thing that he did not do well was manage the balance sheet,” Dunham said. Chesapeake had put on significant debt prior to Dunham taking on the role of chairman. “Way too much debt.”

Not one to stay down for long, McClendon opened American Energy Partners within hours of his ouster from Chesapeake, going so far as to set up a billboard next to the entrance of Chesapeake’s campus advertising that the new company was hiring.

On March 1, 2016, a federal grand jury indicted McClendon for violating antitrust laws, alleging he had rigged bids for leases in Oklahoma during his time at Chesapeake. He denied all

charges and vowed to fight them, but never got the chance.

The next day, March 2, McClendon was killed in an automobile accident in Oklahoma City. The charges against him were dismissed on March 3.

During McClendon’s memorial in Oklahoma City, his son, Jack, said that every moment of his dad’s life was defined by purpose, presence and joy.

“The lasting lesson my dad would want all of us to carry out would be to make the world a better place than you found it,” he said. “Dad always found the will and way to help others.”

*—Jennifer Martinez,  
Associate Development Editor*



## Founder of the Permian's Top Private Producer

# CURTIS MEWBOURNE

## MEWBOURNE OIL CO.

**C**urtis Mewbourne founded the eponymous Mewbourne Oil Co. in 1965 and lived to see it become the top private oil and gas producer in the booming Permian Basin.

Mewbourne (1935-2022) is remembered as a consummate oilman and supporter of higher education who built a tiny Texas company into what has become the top private driller in the Delaware Basin—largely in New Mexico.

“He was just a great oilman and a great man,” said current Mewbourne CEO Ken Waits, who joined the company 40 years ago and never left, seeing his boss as a father figure. “When I think about him, I think about how proud he would be about the success of the Mewbourne Oil Co.—and I mean the responsible, long-term success.

“It’s a credit to Curtis and his vision. He was truly a pioneer.”

A nearly 60-year-old company, Mewbourne Oil first found success in the 1970s in New Mexico, but took off more when the shale boom translated to the Permian in the last decade. Mewbourne surged further in the last three years, rapidly ramping up activity levels during the pandemic when others were scaling back.

“They’ve been in the Delaware a

very long time,” said James Taylor, senior analyst for East Daley. “They were there before the boom. That carries a lot of advantages. You’re the first one to the prize if you think about it that way. It’s better to be lucky than smart, but they’re both.”

A native of Shreveport, La., Curtis Mewbourne made the fateful choice to major in petroleum engineering at the University of Oklahoma.

He graduated in 1957 and joined the U.S. Army. He entered the oil sector with the Arkansas Fuel Oil Co. and later joined the First National Bank in Dallas, but he left the bank in 1965 to start Mewbourne Oil.

According to his obituary, “The company’s initial assets were two used chairs and a desk given by his former employer ... the balance of a monthly paycheck, and one very dedicated and tenacious employee who had to use the payphone in the lobby to make calls.”

Mewbourne started out in the Midland Basin with middling success and expanded to the New Mexico side of the Permian in 1970 without finding much more. Mewbourne eventually hit it big in 1973 with a natural gas well—Peterson Com. #1—along New Mexico’s Pecos River.

“In the ‘70s, in his words, ‘The struggle for survival ended and the long journey to victory began.’”

Waits said of Curtis Mewbourne.

And, with years of estate planning and management succession training, the family company will remain in the Mewbourne name with no plans to sell, said Waits.

In a statement on behalf of the family, Mewbourne CFO Roe Buckley, who is Mewbourne’s son-in-law, said, “Curtis Mewbourne was a real champion of the oil and gas business. He loved the independent, pioneering nature of the business with all of its challenges, opportunities and rewards. As he did throughout his life, if he were alive today, he would be encouraging young people to pursue a career in this wonderful industry with both his enthusiasm and his resources.”

Curtis Mewbourne kept thinking about the next generation and gave back to his alma mater and other universities—partly for recruiting purposes—and the University of Oklahoma in 2007 renamed its College of Earth and Energy for Mewbourne.

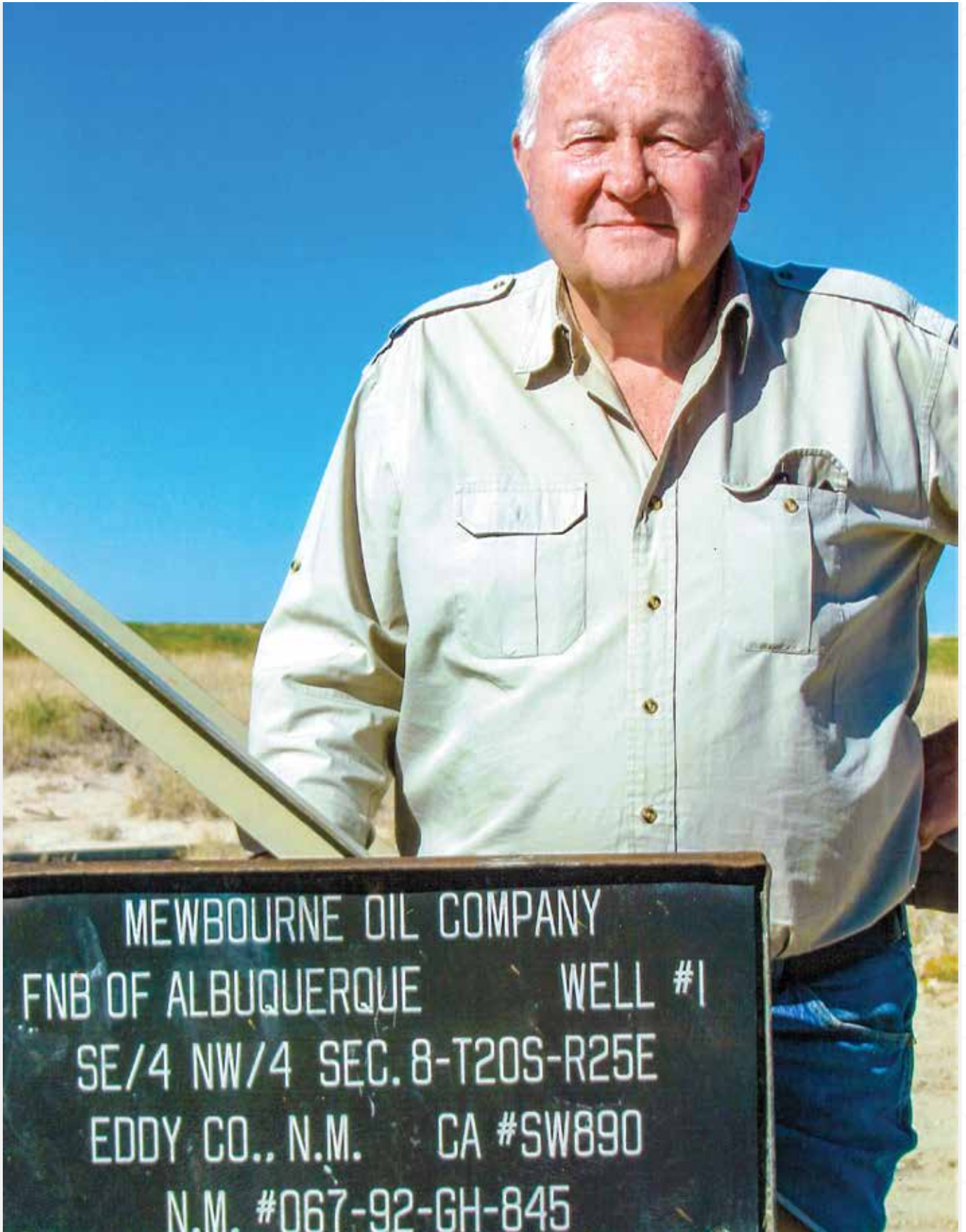
Earlier this year, in consultation with Waits and the family, the college launched the new GeoEnergy Engineering program within the college’s Mewbourne School of Petroleum and Geological Engineering.

—Jordan Blum, Editorial Director

***“In the ‘70s, in his words, ‘The struggle for survival ended and the long journey to victory began.’”***

—Ken Waits, current CEO, Mewbourne Oil





Mewbourne Oil Co.

*Curtis Mewbourne at Well #1 in the Permian Basin.*



## Father of the Shale Revolution

# GEORGE MITCHELL

**MITCHELL ENERGY & DEVELOPMENT CORP.**

**G**eorge Mitchell (1919-2013), a petroleum engineer and geologist, had been exploring the Lower 48 since 1946 with a degree from Texas A&M University and just discharged from the U.S. Army. In 1952, his Mitchell Energy & Development Corp. entered the new Bend-conglomerate gas play that Continental Oil Co. launched in 1951 in the Fort Worth Basin.

In 1981, he had the team drill a vertical, C.W. Slay 1, into the underlying Barnett shale and completed it in 1982. Permeability and porosity were so poor they were practically immeasurable. In "The American Shales," he said, "They kept telling me, 'You're wasting your time.'"

More than 250 wells later, the program was still marginal. But Union Pacific Resources Group was having success with a new frac recipe in 1996 in the tight Cotton Valley sandstone in East Texas that involved less sand, thus less gel and, overall, less spend. Mitchell Energy rolled it out in 1997.

The company also determined there was far more gas in place in the shale and that its vertical wells might be recovering up to 8% of it and not 30%. Also, it quit clay stabilizers, determining it wasn't needed.

By 2000, it was making 179 MMcf/d from the Barnett—roughly as much as from its entire E&P portfolio just five years earlier. With reduced spacing, it had 4,000 potential, additional well locations in a core area of Wise and Denton counties; altogether, it had more than 550,000 net acres in North Texas.

Devon Energy bought the company in early 2002 for \$3.5 billion. Mitchell's work in the Barnett spawned others' development of new gas plays in the Fayetteville, Woodford, Marcellus,



Hart Energy

**Hart Energy's DUG Conference in Fort Worth in 2008 honored George Mitchell: Left to right, John Richels, former CEO of Devon Energy; Mitchell; Oil and Gas Investor then editor-in-chief Leslie Haines; and J. Larry Nichols, founder and executive chairman of Devon Energy, which acquired Mitchell's company in 2002.**

Haynesville and Utica.

Dan Steward, Mitchell's vice president of geology during work on the Barnett, said in "The American Shales" that Mitchell had the team "experimenting with things in the Barnett that we didn't really understand. I mean, when we tried the first (light-sand frac), most people thought that was a stupid thing to do because, generally speaking, you don't put freshwater on shales.

"But they didn't understand that we already knew the Barnett was not sensitive to freshwater where we were working."

Mitchell said his advice to this and future generations is something globally acclaimed geoscientist Michel Halbouty "used to tell me all the time...: 'Come on! Explore! Do something.'"

In his obituary, his family wrote of "stargazing on warm summer nights in (his hometown of) Galveston" and that his childhood dream had been to be an astronomer.

After selling Mitchell Energy, "the twinkle of starlight was rekindled in his imagination." He went on to found the George P. and Cynthia Woods Mitchell Institute for Fundamental Physics and Astronomy at Texas A&M and co-funded construction of "six massive mirrors for the Giant Magellan Telescope, an unprecedented, high-risk, engineering project that proved the technology existed to open new horizons in astronomy.

"...He dreamed big."

—Nissa Darbonne,  
Executive Editor-at-Large





## Flamboyant Wildcatter and Miner

# JAMES 'JIM BOB' MOFFETT

## FREEMPORT-MCMORAN

**I**n the business world, James "Jim Bob" Moffett (1938-2021) was known as a never-say-die oilman and a fearless risk-taker. In civic life, he was a force to be reckoned with, reimagining the way things could be done.

One who needed little sleep, he contributed body, soul and finances to the New Orleans community where he was born and where he became a force for progress. He served on nonprofit boards and directed millions of company dollars to parks, libraries, children's programs, endangered species habitat restoration and a host of other causes. He also contributed millions to his alma mater, the University of Texas at Austin.

Fellow New Orleans philanthropist, Bill Goldring, said about Moffett: "He was forceful with a can-do attitude and never said something couldn't be done. He pushed the limits on everything he touched. He was in your face when he knew something was right and had to be done. He would keep pushing to make it happen."

Those who knew him called Moffett "larger than life," "respected and well known," "forceful with a can-do attitude," "a good, good person," and "a giant of a man for the city of New Orleans and the state of Louisiana."

And, to friends and associates, a gleeful Elvis impersonator. In fact, Elvis died on Moffett's birthday, Aug. 16, and Moffett died on Elvis's birthday, Jan. 8.

Moffett was born into a poor family in Houma, La. His father,

*"He was in your face when he knew something was right and had to be done. He would keep pushing to make it happen."*

—Bill Goldring, *New Orleans philanthropist*

an oilfield worker, left home when Moffett was 5, so his mother took him and his sister to Houston. Moffett attended UT on a football scholarship, graduated in 1961 with a degree in geology and started his career in the oil field as a roustabout. He became known as a wildcatter, drilling a series of wells in Louisiana.

In 1969, he joined with W.K. McWilliams Jr. and B.M. Rankin Jr. to form an exploration company with its name based on the first two letters of each man's last name: McMoRan Exploration (later changed to McMoRan Oil and Gas Co.)

Moffett engineered the 1981 merger of McMoRan with Freeport Minerals, a major New York City-based company, convincing the much larger firm to move to the New Orleans suburb of Metairie, closer to the minerals they were working. Three years later, he moved the headquarters to a 23-story tower in downtown New Orleans, near the Louisiana Superdome. The company grew to be one of the largest independent oil and gas producers, with operations in Louisiana and the

Gulf of Mexico. It also was a global mining powerhouse, operating in gold, silver, copper and uranium. In 2007, it bought mining giant Phelps Dodge Corp. for \$26 billion.

FCX purchased the company in 2013 and later shifted its focus to copper mining. Freeport-McMoRan is now one of the world's top copper producers.

Moffett enthusiastically espoused his philosophy in a 1995 interview.

"When I walk into a conference room with lawyers and accountants, they'll say to me, 'You know, no one has done this before,'" he said. "That's not a showstopper for me. It shouldn't be a showstopper.

"As long as you're convinced that you're right about things, you ought to feel comfortable enough even when you're talking about some pretty big numbers and some pretty big things ... If you believe in what you're doing and if you know that you can do things that other people can't do, and if you're confident enough to take out on a new road, that's what really creates assets that are different."

—Paul Wiseman, *Contributing*



## Builder of a Permian Powerhouse

# RICK MUNCRIEF

DEVON ENERGY

**R**ick Muncrief joined a struggling WPX Energy as CEO in 2014 when the shale producer had a gas-weighted portfolio and an uncertain basin strategy.

“We were in seven different basins at that time. The Permian was not one of those,” Muncrief said dryly in a recent interview with Hart Energy.

Muncrief grew up in the Permian and he saw the massive basin’s vast potential through the shale boom.

He methodically, but rapidly, built up WPX through West Texas and New Mexico’s liquids-rich Delaware Basin, which had yet to become the hottest play on the planet in 2015. Now, he remains focused on the Delaware as the jewel of a multi-basin portfolio after WPX combined with Oklahoma City rival Devon Energy in a \$5.75 billion so-called merger of equals.

Muncrief took over as the president and CEO of the expanded Devon when the deal closed in January 2021.

Muncrief promotes a bold and decisive acquisition approach while still holding dear to strategic and conservative fiscal values. He positioned WPX in the Delaware—while divesting in gassy, noncore areas—and is now further diversifying the merged Devon in the Williston and Eagle Ford shale plays through the recent acquisitions of RimRock Oil & Gas and Validus Energy, respectively, in 2022.

“We feel like the multi-basin, multi-commodity business is the one that’s going to be successful over the long haul,” Muncrief said, noting Devon’s other positions in the Powder River and Anadarko basins. “We all recognize the strength of our Delaware position, but we also know there’s opportunities in these other



Devon Energy

**Devon Energy produced more than 8 MMbbl of oil and 12.5 Bcf of natural gas in 2021 from its Wyoming operations, including this site in Rawlins, Wyo., in the Green River Basin.**

basins, especially if you’re in the core like we are.”

Neal Dingmann, Truist Securities energy analyst, said Muncrief was able to successfully pivot WPX to become a leader in shareholder returns at a time when investors were finally forcing producers to practice discipline. And that strategy is continuing at Devon.

“He’s a very disciplined CEO,” Dingmann said earlier this year. “The top leaders are great operators and they understand Wall Street—that’s a tough combination. Rick kind of checks all those boxes.”

Muncrief quickly made waves in 2021 at Devon by announcing a then-pioneering dividend strategy—a fixed-plus-variable dividend—that was

quickly followed by others making similar moves, such as Pioneer Natural Resources and ConocoPhillips.

### Looking back and forward

Born in Ardmore, Okla., Muncrief moved to Odessa, Texas, in 1958—before he was old enough to remember—after his father started working in the Permian for El Paso Natural Gas.

They would later live in the Delaware Basin in Hobbs and Jal, N.M.

Stationed at Devon’s headquarters in Oklahoma City today, Muncrief left the Permian to graduate from high school in Oklahoma and to attend Oklahoma State University, where he naturally majored in petroleum engineering technology.

Among other stops, Muncrief loosely





Shane Bevel/WPX Energy

*Rick Muncrief, then CEO of WPX, tours the San Juan Basin and Permian Basin drilling operations in 2017.*

***“The top leaders are great operators and they understand Wall Street—that’s a tough combination. Rick kind of checks all those boxes.”***

—Neal Dingmann, *Truist Securities*

followed his father’s legacy, working his way up at El Paso, its acquirer, Burlington, and then ConocoPhillips, which ultimately swallowed up Burlington. In 2009, he eventually took over as senior vice president of operations and resource development at Continental Resources. And then his bigger break came in 2014 through WPX.

WPX spun off from midstream operator Williams Cos. at the end of 2011 so it could concentrate on exploration and production. The company promptly struggled with a lack of crude oil exposure and challenging natural gas prices.

In mid-2015, after oil prices had plunged, WPX made its first move to buy privately held RKI Exploration & Production for \$2.35 billion because of its 92,000 acres in the Delaware in Texas’s Loving County and New Mexico’s Eddy County. The Delaware growth continued from there.

“It’s driven by the geology and the amount of raw resources in the Delaware,” Muncrief told Hart Energy. “The Permian is a place we’re very, very comfortable with and very, very proud of.”

Five years later, it turned out that the RKI deal made the Devon merger more practical. Much of RKI’s acreage

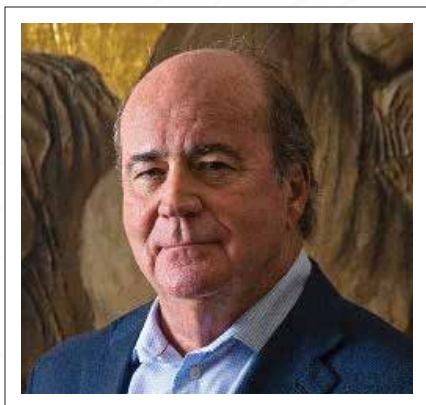
bordered Devon’s position.

That proved imperative in 2020 when Devon and WPX took action in an industry that initially halted all dealmaking during the pandemic.

“During the pandemic, we felt like everyone was on their back heels. They were afraid to make a move,” Muncrief said. “At Devon and WPX, we felt like there were things that each of us needed. For WPX, we needed a little more scale and inventory. Devon was concerned about a lot of exposure to federal lands. At WPX, we didn’t have as much.

“That’s where it was truly a win-win.”

—Jordan Blum, *Editorial Director*



## Oilman Who Found Jubilee

# JIM MUSSELMAN

**KOSMOS, CAELUS ENERGY**

**J**im Musselman has a knack for spotting opportunity. More often than not, it has paid off.

He got his first taste of the oil and gas industry as a lawyer, handling his brother Johnny's legal work and helping put together finance deals.

"I was working by the hour and I was making a lot of people a lot of money," he recalled. "I was getting paid by the hour, and I decided I needed to be in the business."

Jim and Johnny Musselman teamed up with Jon Rex Jones and brother A.V. Jones to start the oil gathering company JM Petroleum.

"We ran that for 10 years, and we ended up having 100,000 barrels a day that we were gathering," he said.

Jon Rex Jones, now president of Jones Management, said the Musselman brothers were good partners for the business that bought and sold crude.

"With Jim leading the way, it grew to 101 trucks hauling oil and selling that oil in Texas," he said. "He was smart and willing to do the work, to adapt new ideas on how to market crude oils."

Along the way, Musselman recommended innovations that today seem rudimentary but were cutting edge at the time, such as using instruments to gauge oil tank levels before and after removing oil they had purchased to scientifically prove the volume removed, and synching that information with the head office in Dallas, rather than calculating estimates and sending those numbers by mail.

"That was just one of the innovative ideas that Jim was able to foster for us," Jones said. "He's been an entrepreneur in thought and action ever since he got involved with us in JM Petroleum."

The partners ultimately sold JM Petroleum to Wesray Capital Group in

the '80s, and Musselman decided to try drilling.

"It was a terrible business. I learned that early on. You don't want to be in the drilling business unless you've got really big pockets," he said.

He pivoted and joined Triton Energy, where he was involved with the company's reorganization that replaced long-time president William Lee and Tom Finck. Musselman became CEO.

"We went into West Africa, to Equatorial Guinea, and made some good discoveries there. Not as big as Jubilee, but we made some really nice discoveries," including the Ceiba find offshore Equatorial Guinea, he said.

In 2001, Amerada Hess, which later became Hess, bought Triton and when non-competes expired, Musselman and four colleagues founded Kosmos Energy, which sought oil offshore Ghana.

But securing a rig to drill the prospect was difficult, he said. Early in the exploration phase, he overheard some of the rig hands complaining about being in Ghana.

"They just said, 'let's get this dry hole out of the way and move on.' I still chuckle about that all the time," Musselman said.

The Jubilee Field, discovered in 2007 and onstream since 2010, has about 3 Bbbl of proven reserves.

"Jubilee has got to be one of the most

*"Jubilee has got to be one of the most exciting things that we did because that really did open up that whole Ghana (play)."*

—Jim Musselman

exciting things that we did because that really did open up that whole Ghana (play). That was a pretty good step out, and that was pretty risky," he said.

After leaving Kosmos in 2010, he started Caelus Energy, which sought another Jubilee-sized field, this time on Alaska's North Slope.

"We made a billion-barrel discovery up on the north slope of Alaska, but it is probably 50 miles from any infrastructure," he said.

The company expected to be able to build the needed infrastructure to transport the oil, but faced an unfavorable regulatory environment and low oil prices, he said.

"We ended up selling that asset to Conoco, who were there, and they had longer staying power than we did. And so, that was a disappointment. We loved Alaska," Musselman said.

He said he's been blessed to have a varied career, which also involved helping lead an investor coalition to design, construct and operate the Lone Star Park horse racetrack facility that opened in Grand Prairie, Texas, in 1997. But the oil industry has always brought him the biggest thrill.

"I enjoy the thrill of the hunt and the opportunity to work with really good, smart people," Musselman said.

—Jennifer Pallanich,  
Senior Editor, Technology





## Builder of the Barnett Bonanza

# LARRY NICHOLS

## DEVON ENERGY

**L**arry Nichols recognized the potential of Mitchell Energy & Development's Barnett operations in the Fort Worth Basin in 2001. So, he bought it.

A geologist with a law degree, Nichols was a law clerk to U.S. Supreme Court Chief Justice Earl Warren and an assistant in the Department of Justice to future Supreme Court Chief Justice William Rehnquist before joining his father's oil and gas business at home in Oklahoma City in 1971.

In 1950, John Nichols had created the first publicly registered oil and gas drilling fund that eventually became Devon Energy. In 1989, the micro-cap independent E&P was in the biggest gas play in the country: the Fruitland coalbed of the San Juan Basin.

And it had worked the play itself; Devon didn't sell it to a major, which thought undercapitalized U.S. independents would have to divest to them any significant discoveries, while they were leaving the onshore U.S. for prizes abroad.

By 2001, the company forged itself into an E&P with market cap of \$16 billion.

Nichols, by then chairman and CEO, bid \$3.5 billion for Mitchell Energy.

When George Mitchell put Mitchell Energy up for sale in 1999, Devon had taken a look but passed; the potential of Mitchell's burgeoning Barnett shale-gas play seemed nascent yet and possibly lacking running room.

In 2001, Mitchell offered the company to Devon again and Nichols took the call. Mitchell's proved reserves had more than doubled to 2.5 Tcfe in that short time.

After closing in early 2002, Devon quickly proceeded to take the play horizontal and to expand its areal



Larry Nichols

**Larry Nichols poses with students at the University of Oklahoma, his alma mater, in 2008.**

potential beyond where a limestone frac barrier sits above a water-bearing zone.

By January 2005, Devon had 144 Barnett horizontals online. The Barnett field, Newark East, was now the largest gas field in Texas, producing some 1.1 Bcf/d; cumulative production was 1 Tcf. Explorers were trying horizontals in 15 counties with 90 rigs at work.

Nichols said in "The American Shales," "What we did in 2002 to combine horizontals with hydraulic fracturing in the Barnett was a huge step.... Technology evolves ... It's not a light switch that is off and then on.

"It's a light that gets a little bit brighter and brighter."

Devon went on to develop more tight-rock plays, including in Oklahoma, South Texas, the Permian Basin and the Powder River Basin. Nichols is now chairman emeritus. Devon's market cap is \$30 billion today.

The shale breakthrough is an example

of how technology changes in time—and changes the game—he said. "It's a point you can make about this industry that has happened repeatedly over time—and will in the future."

Harold Korell, who was trying to turn around Southwestern Energy with \$50 million cap in 2001 (and did, into a \$7-billion E&P today), said in "The American Shales," "That was a seismic kind of event in the industry—when Devon bought Mitchell."

And that it was Devon buying Mitchell was particularly noteworthy, he added. Nichols and the Devon team had figured out how to get the Fruitland coal to pay in the San Juan Basin in the 1980s.

Now Nichols thought Mitchell was onto something in the Barnett—something worth \$3.5 billion.

Korell took note. "That couldn't help but get your attention."

—Nissa Darbonne,  
Executive Editor-at-Large



## Innovator of the Shale Patch

# MARK G. PAPA

### EOG RESOURCES

**M**ark G. Papa is an innovator, a trendsetter and an exceptional leader who was a driving force behind shale development in the United States for decades.

Papa led the formation of EOG Resources in 1999. A year later, the company had not only been added to the S&P 500 index but was ranked as its third-best performer. By 2004, EOG had nearly 400,000 acres under lease in the Barnett Shale and in 2006, was one of the first companies to enter the Bakken Shale, where it acquired assets that were expanded over time to include more than 1 million acres producing 500,000 b/d of oil.

Along the way, EOG pioneered horizontal drilling and hydraulic fracturing techniques, developed new drilling fluids and proppants, applied data analytics to improve operations and was among the first to use artificial intelligence to enhance productivity through automation.

And while Papa was breaking new ground on multiple levels at EOG, he was delivering in spades for investors.

In 2010, he was named one of the 100 best-performing CEOs

in the world by Harvard Business Review (HBR) in a ranking in which executives were evaluated on leadership, execution, innovation and social responsibility over the course of their tenure. HBR credited Papa with a market cap change of \$17 billion at EOG over the course of his time there and an adjusted total shareholder return of 1,128%. In the 14 years Papa headed up EOG, the company's market cap grew from \$2 billion to \$54 billion, and the stock value increased 2,200%.

More recently, Papa was the recipient of a different sort of recognition—this one conferred by his alma mater, the University of Pittsburgh, where he earned a Bachelor of Science degree in Petroleum Engineering in 1968. In March 2023, Papa was named a Distinguished Alumnus in Chemical and Petroleum Engineering by the university's Swanson School of Engineering.

Steven Little, chemical engineering department chair, said many qualities set Papa apart, but in business leadership, the most noteworthy is his strong independence of mind.

"Mark has the remarkable ability and willingness to go against the grain of popular wisdom and

consensus, and make informed judgements that run counter to prevailing thought," Little said.

The ability to be clear-minded in identifying growth opportunities set Papa apart as an executive, but it is his selflessness and generosity that characterize his involvement at the university.

"Mark's passion is preparing students for future careers," Little said, noting that an ongoing initiative in curriculum development is a particular focus at present.

Papa is helping to create a program to educate leaders in the fields of natural gas, oil and renewable energy. Like Pitt's Petroleum Engineering degree—established as the first in the country in 1915—this new discipline will be first of its kind in the world, "giving students a comprehensive view of the energy industry that will cover existing energy sources that are affordable and future energy sources that are renewable," Little said. "Mark's continuing work at the University of Pittsburgh will help other aspiring engineers to forge paths of their own that will change the future of energy development."

—Judy Murray,  
Contributing Editor

***"Mark has the remarkable ability and willingness to go against the grain of popular wisdom and consensus, and make informed judgements that run counter to prevailing thought."***

—Steven Little, *chemical engineering department chair, University of Pittsburgh*



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# TOM PETRIE, JAMES PARKMAN

## PETRIE PARKMAN & CO.

**P**etrie Parkman had barely opened its doors (literally) in 1989 when Raymond Plank walked through them (figuratively) with a proposal and the energy industry's newest transaction firm was off and flying. Literally.

The co-founder of Apache Oil Corp. (now APA) "got in touch with us and said, 'I need to be bigger. Our company is not big enough,'" James Parkman told Hart Energy. So, Parkman and Tom Petrie commenced to rack up frequent flier miles over many months, meeting with CEOs in Europe, New York, Chicago, Houston and Denver to find the big deal that would satisfy Plank's desire to elevate Apache into the big leagues.

And they found it with a large parcel in Texas and New Mexico that Amoco wanted to sell. The former Standard Oil Co. unit had a reputation for making negotiations difficult and the two sides were stuck on the price. Petrie and Parkman devised a production payment plan to bridge the gap between the asking price and bid price. The \$550 million deal was completed in 1991 and suddenly Apache had doubled its size.

"This was just shortly after we started the firm," Parkman said. "So, we were able to show that we could be effective for clients seeking to do a transactional deal to move their company forward."

Petrie Parkman may have been new, but its founders were not simply energy transaction veterans but Wall Street royalty in their own right. They met at the First Boston investment bank in New York when Parkman joined in 1982. The firm had aspirations of challenging Goldman Sachs and Morgan Stanley for the top spot on the Street, and recruited Parkman to concentrate on energy transactions.

Tom Petrie was First Boston's



*Tom Petrie, left, and James Parkman.*

managing director and securities analyst star and, in fact, had been rated as the No. 1 analyst on Wall Street by Institutional Investor. The bank was aggressively pursuing takeover defense and merger clients and Petrie was a powerful asset to attract them. Among those clients was T. Boone Pickens. Petrie and Parkman worked on more than a few of his takeover adventures.

For business and finance reporters, Petrie's insight was well worth an interview.

"Tom was quoted frequently in Barron's, and if he made a stock recommendation through Barron's, it would move the needle," Parkman said.

But Petrie and Parkman were not enamored of New York City. When Wall Street experienced turbulence in the late 1980s (think Martin Siegel, Dennis Levine, Ivan Boesky and Michael Milken), the two took the opportunity to leave and open their own shop with offices in Denver for underwriting and Houston for M&A.

Plank may have been the first big client but many more would follow, and with success came opportunities to make their mark.

During the Clinton administration,

Vice President Al Gore promoted an initiative to streamline government and sell off certain assets. Among them was the Elk Hills Naval Petroleum Reserve in California, a 47,000-acre tract with 1,000 producing wells, a power plant, gas processing plant and 1 billion barrels of crude oil. The Department of Energy wanted a transaction by commercial, not government standards and hired Petrie Parkman to get it done.

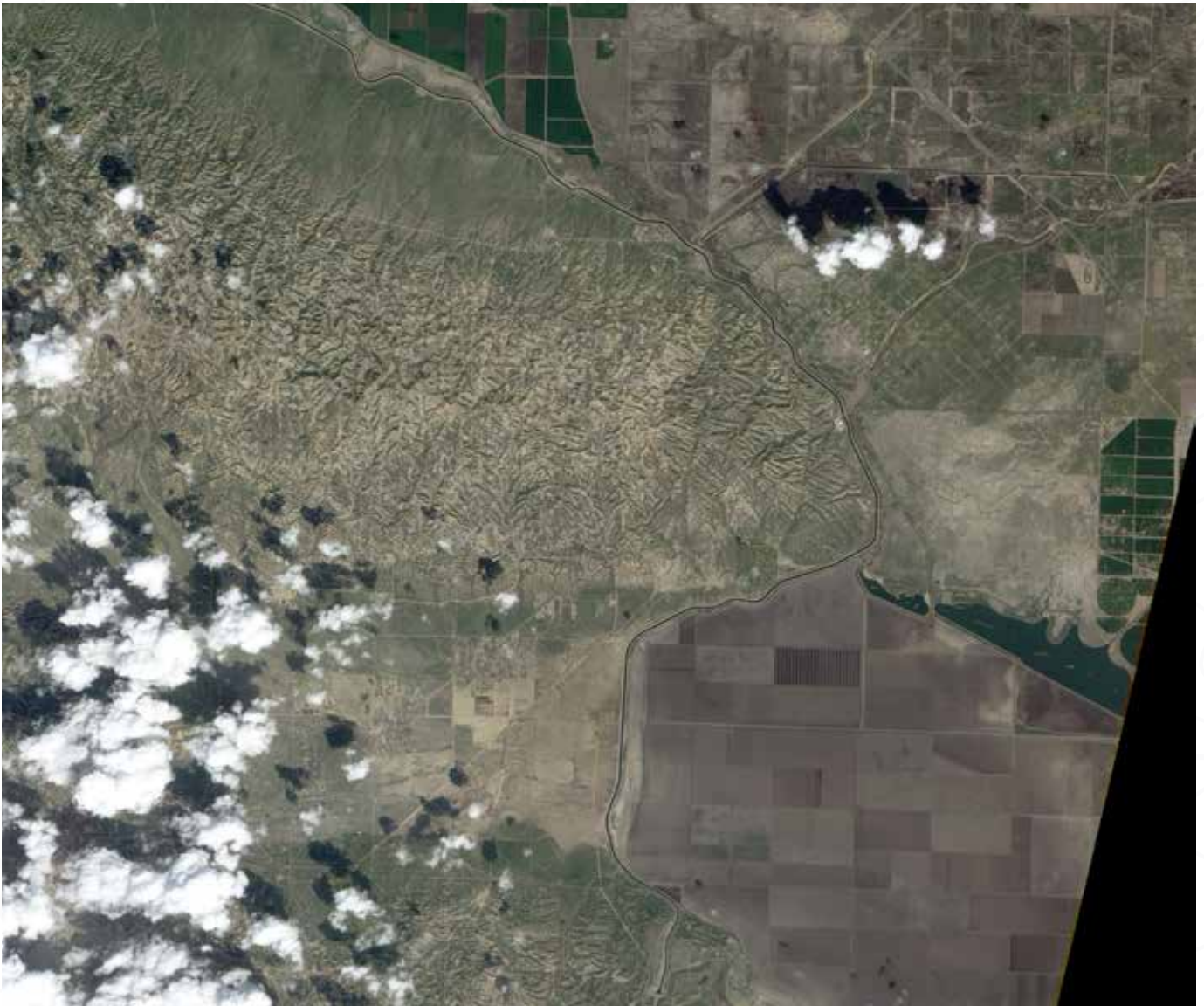
"That was a very important transaction for us, and we had to have a partnership with Credit Suisse First Boston to gain that position," Parkman said.

Occidental Petroleum made the winning bid of \$3.65 billion in October 1997, the largest sale of U.S. Government property to that time.

"I had the honor of sitting in a room with Steve Chazen when he made the final bid to me," Parkman said. "So that was a highlight of my career at Petrie Parkman."

The Elk Hills deal showed that the two had the chops to handle government deals. Around 2000, the Kingdom of Saudi Arabia hired Petrie Parkman to solicit proposals





NASA

**Petrie Parkman managed the sale of the Elk Hills Naval Petroleum Reserve in California, shown in a satellite image. The \$3.65 billion transaction was the largest sale of U.S. government property to that time.**

***“Tom was quoted frequently in Barron’s, and if he made a stock recommendation through Barron’s, it would move the needle,”***

**—James Parkman**

to operate natural gas assets for Aramco. It was a drawn-out project over two years that involved the efforts of several of Petrie Parkman’s people and intricate negotiating with a high-level government committee, but a deal with an international oil company was eventually completed.

More importantly, it changed the course of the Saudi energy industry.

“That program was the first step in the transition of Aramco and the Petroleum Ministry that brought it into modern management and practices, and laid the groundwork for all that Aramco and the Petroleum Ministry is today,” Parkman said.

In 17 years, Petrie Parkman engaged in transactions totaling \$84 billion. Petrie and Parkman sold

their investment bank to Merrill Lynch in 2006. Tom Petrie became vice chairman of Merrill Lynch in 2007 and left to join Denver-based Petrie Partners in 2012. He stepped away from the firm earlier this year. James Parkman joined Houston-based Parkman Whaling in 2007.

—Joseph Markman,  
Senior Managing Editor



## Corporate Raider, Visionary, Quintessential Oilman, Philanthropist

# T. BOONE PICKENS

## BP CAPITAL MANAGEMENT

**T.** Boone Pickens packed more than most into the 91 years of his life. A look at his career highlights reveals that much of what he was doing decades ago remains relevant—perhaps even prescient.

In his 2008 autobiography, “The First Billion is the Hardest,” Pickens (1928-2019) wrote, “Engagement. Involvement. Constant action. That’s the way to live your life.” And he followed that credo well into his 80s, working out every day and bragging about how much he could bench press.

There’s another nugget in that tome, too, which explains a lot about Pickens, his vision and some context for the industry going forward:

“When you’re hunting for elephants, don’t get distracted by rabbits.”

Pickens was born in Oklahoma and graduated with a degree in geology in 1951 from Oklahoma State University, where the football stadium bears his name.

After two years working at Phillips Petroleum Co., he left in 1956 to found Mesa Petroleum in Amarillo, Texas. He would later move its headquarters to Dallas. Mesa became a large natural gas producer that was active in the Texas Panhandle and the huge Hugoton gas field in Kansas. He also drilled in the U.K. North Sea.

Ultimately, Mesa was stung by high debt and low gas prices. In August 1997, it merged with Parker & Parsley Petroleum in Midland, Texas, to form what is today Pioneer Natural Resources, becoming the third-largest independent in the U.S. at that time.

“For three years, I had the honor to have Boone as a member of our board of directors. He was a great mentor,” Pioneer CEO Scott Sheffield told Hart



Hart Energy

**T. Boone Pickens speaks at Hart Energy’s DUG East conference in Pittsburgh in 2011.**

Energy upon learning of Pickens’ death in September 2019.

Pickens burst onto the national scene in the 1980s, making the cover of TIME in March 1985, when his actions and that of fellow investors such as Carl Icahn heralded the age of the corporate raider. Today, we live in a time of intensifying shareholder activism, but Pickens was a precursor. He was the person who, more than any other in the 1980s, made oil company executives think twice about shareholder value.

Several consolidations that swept the industry at that time were instigated by him. Pickens would buy enough stock in an oil company target to have a voice, and then he used it, pressuring executives to create value by mergers. It was called “greenmail” and many in the industry resented him for it. His attempt to take over Gulf Oil Co. of Pittsburgh in 1983 led to Gulf being acquired by Union Oil of California in 1984, becoming what is

now Chevron—the largest oil company merger of the 1980s. Pickens’ investor group made \$760 million on the merger.

Pickens was an innovator who loved to take risks and always saw opportunity. He formed one of the first MLPs in the ‘80s, Mesa LP, betting that natural gas prices would rise. He was also the father of the modern day oil and gas royalty trust. More recently, he promoted a water business and wind farms in West Texas. He said his proposed wind business would become the biggest deal of his career, bigger than the Gulf Oil deal.

He was also the founder and force behind BP Capital in Dallas, a hedge fund that won and lost billions making bets on energy commodities. Toward the end of his life, he launched the Pickens Plan, a national campaign to reduce U.S. reliance on foreign oil—an idea that still resonates.

—Deon Daugherty, Editor-in-Chief





## Leader of Independents' Movement

# RAYMOND PLANK

## APACHE CORP.

**T**he vision of Raymond Plank (1922-2018), the legendary oilman who co-founded Apache Corp., helped propel the company to the forefront of U.S. oil and gas exploration as well as globally.

"Raymond was a pioneer in the acquire-and-exploit strategy that ultimately transformed the U.S. E&P business," recalled George Solich, who for more than a decade was Apache's business-development chief and current chairman and CEO of FourPoint Energy.

"We moved from an industry that, at the time, was dominated by major oil companies to one driven by independents," Solich told Hart Energy in 2018.

Plank was born in 1922 and raised in Minneapolis. His oil and gas career spanned over 50 years before he retired in 2009. Plank left his mark on a wide range of industry and charitable groups.

Plank was at Yale University when the Japanese attacked Pearl Harbor in 1941. He enlisted and joined B-24 bomber pilots in the U.S. Army Air Corps in the Pacific during World War II, flying 40 combat missions

and earning a Bronze Star. After the war ended, Plank returned to Yale and graduated in 1946 with a bachelor of arts, majoring in international relations. He later returned to Minneapolis, where he formed a small bookkeeping, tax and accounting firm.

In 1954, he joined forces with two friends, Truman Anderson and Chuck Arnao, to form Apache. The trio flipped a coin to determine who would be president and Plank won. Apache started with six employees and \$250,000 in funding. The company's name reflected the founders' initials—A, P and A. "Che" was added to the end at the suggestion of Helen Johnson, an early employee who was awarded a \$25 U.S. savings bond for the idea.

Apache's first wells were drilled in the Cushing Field in Oklahoma. The first well only produced 7 bbl/d, while the second, the Bradley Rafferty No. 1, delivered 700 bbl/d. In Apache's first year in operation, the company generated revenue of \$190,000 with net income of \$12,535.

Under Plank's lead, Apache offered its first oil and gas investment

program in 1956 and was an industry leader in that area until it dropped annual drilling program sales in 1986. The company went public in 1969.

Apache grew through a series of acquisitions and drilling across the U.S. At one time, it was active in six countries, including in Argentina's Vaca Muerta shale play. In the 1990s, Apache obtained mega-independent status and gained superior positions in Australia, Canada and Egypt.

In 2002, Plank passed the title of CEO to Steven Farris, who retained the titles of president and COO.

In Apache's 50th anniversary publication in 2004, Plank wrote: "We remain firm in our belief that the dynamic forces which affect our business present opportunities for those with the proper strategies."

Today, Apache, now called APA Corp., is headquartered in Houston. APA's subsidiaries have operations in the U.S., Egypt's Western Desert and the U.K.'s North Sea and exploration opportunities offshore Suriname. The company's market cap is around \$12 billion.

—Pietro D. Pitts,  
International Managing Editor

*"Raymond was a pioneer in the acquire-and-exploit strategy that ultimately transformed the U.S. E&P business."*

—George Solich, *FourPoint Energy*



## Man Who Made the Mega-Merger

# LEE R. RAYMOND

## EXXON MOBIL

**L**ee Raymond spent 42 years in the oil patch in a variety of roles, but his legacy will always be tied to the transformational 1999 merger that joined Exxon and Mobil.

“Lee Raymond started an institution that became an American economic cornerstone,” Wood Mackenzie – Genscape sales director Carl Larry told Hart Energy.

The merger, which added \$1.2 billion in net earnings in the first year, resulted in what is still the largest U.S. oil and gas company. Exxon Mobil’s \$439 billion market value is only surpassed among oil companies globally by Saudi Arabia’s Saudi Aramco’s \$2.06 trillion, according to the Forbes Global 2000 List 2023: Top 200, using data through May 2023.

When compared to Exxon Mobil’s direct European peers, it takes three of them combined to surpass the Irving, Texas-based company’s market value: UK’s Shell (\$206 billion), France’s TotalEnergies (\$152 billion) and U.K.’s BP (\$108 billion).

Today, Exxon Mobil maintains a strong presence in the U.S. in addition to global operations that span from Argentina and Guyana in Latin America to Canada, Europe, Asia Pacific, Africa, Caspian and the Middle East.

“The merger was intended to allow Exxon Mobil to compete more effectively with the recently combined multinational oil companies and the

very large state oil companies who [were] rapidly expanding outside their home base both geographically and functionally,” Raymond said in 1999.

Raymond was Exxon’s chairman and CEO prior to the merger. He assumed the same roles under the newly created company.

A native of Watertown, S.D., Raymond graduated from the University of Wisconsin in 1960 with a bachelor’s degree in chemical engineering. He later received a Ph.D. in the same discipline from the University of Minnesota in 1963, the same year he joined Exxon.

Raymond started as a production research engineer but went on to hold positions with Creole Petroleum, Exxon’s operating affiliate in Venezuela, before those facilities were nationalized; the former Exxon International, which was responsible for Exxon’s international supply and transportation of petroleum products and crude oil; and Lago Oil & Transport Co., the Exxon affiliate in Aruba.



Exxon Mobil

Exxon Mobil’s refinery in Baton Rouge, La.

He rose to become president of Exxon Nuclear Co. in 1979, and was appointed executive vice president of Exxon Enterprises. In 1983, Raymond was named president and director of Esso Inter-America, with responsibilities for Exxon’s operations in the Caribbean, Central and South America. In 1984, he was appointed as a senior vice president and elected to Exxon’s board of directors. In 1987, he became president of the company.

Immediately after leaving Exxon Mobil in 2005, Raymond dedicated his time to JP MorganChase & Co. as a director before retiring in 2020.

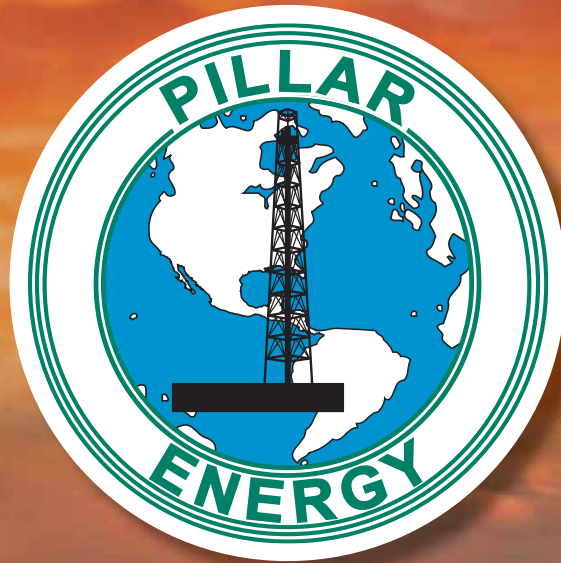
—Pietro D. Pitts,  
International Managing Editor

**“Lee Raymond started an institution that became an American economic cornerstone.”**

—Carl Larry, sales director, Wood Mackenzie - Genscape



# Buying Minerals, Royalty, Non-Operated Working Interest



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## Setting the Gold Standard for Research

# C.H. SCOTT REES

**NETHERLAND, SEWELL AND ASSOCIATES**

**T**he announcement that Scott Rees had been picked to succeed the founders at Netherland, Sewell and Associates (NSAI) was met with puzzlement.

Longtime NSAI client Rodney Kubicek, now managing director with MUFG Bank, said the succession announcement was made by Fred Sewell in the Dallas office, with a phone connection to the Houston location. In Kubicek's words, "(When) Fred announced that the new president would be Scott Rees, the Houston contingent took the phone off mute and asked, 'I'm sorry, could you repeat that?'"

To be fair, Rees had vaulted over others with more seniority to follow Clarence Netherland and Sewell when the latter retired in 2008. Soon, congratulatory and affirming calls from those who'd been passed over started to flow in.

Rees himself is quick to deflect any honors, insisting to Hart Energy that all he's done is to be "a light hand managing a group of very talented individuals." Indeed, the company as a whole has, from the beginning, maintained a reputation as the gold standard for research and evaluations.

When he was named CEO, the shale revolution was starting. He noted, "Netherland Sewell had a reputation of being able to look at all the data—and since the shale play was out of the ordinary, those shale plays, we were much more about the data and how do we chase that?"

"My role in the firm was to make sure we were open to our clients' ideas, (but) we were trying to get to the best answer—not the client's answer, not the Netherland Sewell answer, but what is the best answer for the data



NSAI

**Scott Rees speaks to the Netherland, Sewell and Associates staff.**

there?" To help clients trust answers that might surprise them, NSAI's people take care to explain the whole process.

For Rees, it's peace of mind about the data's accuracy. "I like being able to sleep at night," he said.

That approach carries weight.

"In the private equity houses that we work with, a Netherland Sewell report is pretty much the only thing these guys want to see," Kubicek said. He said he sees Rees's level-headed mentoring and leadership as keys to maintaining that reputation. Kubicek added that the dedication to finding the best answer while carefully and successfully navigating sometimes entrenched preconceptions is a company-wide attribute.

Rees's decision to join the oil industry after earning his B.A. in mechanical engineering from the University of Florida in 1981 came when he chose Exxon over other options.

In 1984, he was involved in drilling Exxon's first horizontal well with 300-foot laterals. While that project didn't work as hoped, about 20 years later Rees and company would be in the middle of the horizontal revolution.

NSAI had already hired a number of Exxon alums and reached out to Rees in late 1987. He started there shortly thereafter.

Rees anticipated broadening his experience on what he called a "five-year plan." As of 2023, he is at 36 and counting.

—Paul Wiseman, Contributing Editor





## Pioneer of the Permian

# SCOTT SHEFFIELD

## PIONEER NATURAL RESOURCES

**O**ilman. Advocate. Dealmaker. Pioneer. There is no shortage of words to describe Scott D. Sheffield or the influence he's had on the American oil and gas industry.

Sheffield has seen more ups and downs than most during his nearly five decades in the energy sector. After graduating from the University of Texas at Austin in the mid-'70s—not long after the 1973 Arab oil embargo spurred the first global energy crisis—Sheffield began his career as a reservoir engineer at Amoco in Odessa, Texas.

He later joined Midland-based Parker & Parsley Petroleum, which had acquired leases on hundreds of thousands of acres in the heart of the Permian Basin since entering the area in the early 1960s. Before the evolution of fracking technologies, these leases in a legacy West Texas resource play held essentially no value.

"You just had vertical wells in the Permian," said Neal Dingmann, managing director of energy research at Truist Securities. "At that time, you didn't know the Permian was going to be as prolific as it was."

Sheffield became Parker & Parsley's CEO in 1989. In 1997, the company merged with Mesa Petroleum, led by legendary oil tycoon T. Boone Pickens, to form Pioneer Natural Resources.

Pioneer's footprint once included



Steve Toon/Hart Energy

### A Pioneer Natural Resources rig operating in the Midland Basin.

assets in Alaska's North Slope, the Hugoton Basin, the Eagle Ford Shale in South Texas and other regions. But after the advent of fracking technology, Pioneer focused on horizontal oil and gas development in and around its West Texas roots—the core of the Permian Basin.

Fracking breathed new life into the Permian and, more broadly, into the entire U.S. energy sector. When U.S. output boomed, Sheffield and other energy executives lobbied Congress and the Obama administration to lift the nation's decades-old ban on oil and gas exports. That move has fueled billions of

dollars of domestic investment in oil and gas production.

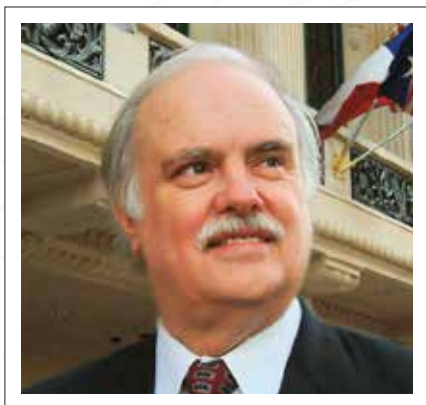
Sheffield is widely recognized as a master dealmaker, but he's cemented his reputation as a bona fide oil patch tycoon. Pioneer, the belle of the Permian ball, agreed in 2023 to sell to Exxon Mobil in a deal valued at around \$65 billion, including debt.

"Over the last several years, what have people been most jealous of Pioneer? It's that they have among the best acreage not only in the Permian, but anywhere in the U.S.," Dingmann said.

—Chris Mathews,  
Senior Editor, Shale/A&D

***“Over the last several years, what have people been most jealous of Pioneer? It’s that they have among the best acreage not only in the Permian, but anywhere in the U.S.”***

—Neal Dingmann, *Truist Securities*



## Comeback Kid of the Oil Patch

# BOB SIMPSON

**XTO ENERGY**

**I**n 1986, Steve Palko, Bob Simpson and Jon Brumley founded Cross Timbers Oil Co., later renamed XTO Energy, which was sold to Exxon Mobil for \$41 billion in stock and debt assumption in June 2010.

The triumvirate had been pushed out of their executive positions at Southland Royalty after Burlington Northern Railroad's hostile takeover in 1985.

Their plan for Cross Timbers: Acquire and exploit, particularly the somewhat neglected oil and gas properties that majors were dumping throughout the Lower 48 as they sought new prizes abroad.

Their first acquisition: A statue, Simpson confirmed to Hart Energy in 2005.

"Back in 1986, Steve Palko and I went to a fundraiser for the March of Dimes. They were auctioning this statue titled 'I'll Be Back.'

"It's a cowboy riding his horse out of town. He's lost his hat, he's lost his gun, he's shaking his fist back at the town. He's obviously been run out of town. We thought that was analogous to Southland's hostile takeover in 1985 where they ran us out of town and took our company."

With Cross Timbers, the trio was starting from scratch. "We didn't have a stitch of production; the statue was our first purchase of anything."

It became the company's mascot, but the trio soon bought an oil and gas property in Major County, Okla.

Ten years later, "we had the same artist sculpt another statue, 'I'm Back,' which is of a guy tying his horse up to a hitching post, fixing to go back into the saloon," Simpson said. "He's got his gun. He's got his hat. 'I'll Be Back' was

*XTO's strategy was "a game of inches. There will be two or three people around you [bidding for what you want] and you've got to beat them."*

—Bob Simpson

our slogan and we did it."

Ten years later, XTO held some 6 Tcfe of proved reserves, producing some 1 Bcf/d and 42,000 bbl/d.

It had also entered the new shale business. The Barnett play was quickening all around its Fort Worth headquarters in the early aughts and XTO joined in 2004. As a Cotton Valley producer in East Texas, XTO knew about tight-rock gas. It made an initial acquisition for \$120 million of 11,000 acres.

It followed that in 2005, buying out a first iteration of Antero Resources's Barnett portfolio for some \$700 million.

In 2008, XTO joined the Bakken oil play in North Dakota, buying Headington Oil for \$1.85 billion in cash and stock and gaining 352,000 net acres in the Williston Basin. A few weeks later, it bought Hunt Petroleum for about \$4.2 billion in stock and cash, gaining production and reserves throughout the U.S., including 15,000 net over Bakken.

Soon, Exxon Mobil swept in, making a roughly \$31 billion stock offer in 2009, plus assumption of some \$10 billion in debt, that closed in the summer of 2010.

At the time, XTO had 70 rigs drilling in the Barnett, Haynesville, Marcellus, Fayetteville, Woodford and Bakken shales, and conventional assets in the

San Juan, Permian and Gulf Coast basins.

After the sale, Simpson and other XTO executives founded investment firm Morningstar Partners. Today, he's chairman and CEO of newly public TXO Partners, with executive management consisting entirely of former XTO team members. Property is in the San Juan and Permian basins.

XTO co-founder Brumley had retired from the company in 1996 when the E&P was well on its feet and around the time of the "I'm Back" statement acquisition.

In 2011, he talked to Hart Energy about Simpson and team members' growth of XTO and its exit to Exxon Mobil.

"They did a great job," Brumley said. "That's a powerful management group—Bob Simpson, Palko, [Keith] Hutton, [Vaughn] Vennerberg, [Louis] Baldwin.

"[It's] a great team that came early and stayed late."

XTO's buy-and-exploit strategy was "a game of inches," Simpson told Hart Energy in 2005. "There will be two or three people around you [bidding for what you want] and you've got to beat them."

—Nissa Darbonne,  
Executive Editor-at-Large





## *If He Builds It, The Buyers Will Come*

# GEORGE SOLICH

## FOURPOINT ENERGY

**I**n a case of life imitating art, George Solich went to college on a caddy scholarship from Broodmoor Golf Club in his native Colorado Springs.

It is debatable whether the comedy classic “Caddyshack” is indeed art, but there is no debate that Solich has blazed a spectacular career building and selling a series of larger and more ambitious independent production companies. That culminated with the \$6.4-billion sale of DoublePoint Energy to Pioneer Natural Resources in 2021.

“I started as a finance major at University of Colorado,” Solich told Hart Energy. “At the time, the only companies coming to campus to recruit were oil and gas firms. So, several of my friends and I switched majors to Minerals Land Management, which at the time was offered through the business school.”

That good timing did not last. “As soon as I graduated in 1983, the bottom dropped out of the oil business,” Solich said with a wry smile. “The first job I got was actually just an internship at Belco Petroleum, which was the genesis of EOG in the early days of Enron.”

He then worked for Apache Corp. (now APA) in Denver before attending

grad school at the University of Colorado at Denver to earn a master’s degree in finance and marketing. “Frankly, I was not so enamored with the oil and gas business at the time and my first thought was going to work on Wall Street. Then Apache moved its headquarters from Minneapolis to Denver. Then we bought a significant acquisition from Amoco and doubled the size of the company.”

Apache moved its offices to Houston, and Solich was among the first to leave the mountains of the Front Range south for the Buffalo Bayou.

“Houston became the center of the acquire-and-exploit strategy,” Solich recalled. “We were working worldwide, around North America as well as Egypt, Poland, China—all over. It was a great place to learn. We were very fortunate and worked very hard.”

In 1997, Solich was courted by HS Resources to move back to Denver and lead an effort to buy Amoco out of the Denver-Julesburg (D-J) Basin. “I spent three years with HS, and at that point felt like I had enough experience under my belt that it was time to go out on my own. That was a good time, too, because there was a lot of capital flowing into the sector.”

It was 2000, and Solich got the then-impressive soft commitment of \$10 million from EnCap Investments to form Cordillera I with a focus on the Midcontinent, San Juan and D-J basins. That was sold to Patina Oil & Gas. Knowing a winner, EnCap backed Solich with \$200 million for Cordillera II, which focused on the Bakken and Permian as well as the Midcontinent.

“We focused on the acquire-and-exploit strategy,” Solich said. “We found undervalued, underappreciated and misunderstood acres, bought ‘em, and put a drill bit to ‘em.”

Not wanting to miss a beat in the shale boom, Solich and EnCap agreed to fund Cordillera III while Cordillera II was still in operation.

After Cordillera III, Solich launched FourPoint Energy, initially focusing in the Midcontinent. In 2018, FourPoint and Double Eagle announced their partnership in DoublePoint Energy in the Midland Basin, later sold to Pioneer. Over the course of his career, Solich has also formed several mineral interests businesses. He is now re-growing FourPoint, as well as forming plans for a new minerals business.

—Gregory Morris, Contributing Editor

***“We found undervalued, underappreciated and misunderstood acres, bought ‘em, and put a drill bit to ‘em.”***

—George Solich



## *A Leading Scientist of Hydraulic Fracturing*

# MOHAMED SOLIMAN

**HALLIBURTON, UNIVERSITY OF HOUSTON**

**A** holder of 50 patents, co-author of more than 250 technical papers and Society of Petroleum Engineering Legend, Dr. Mohamed Soliman is no stranger to hard work. But what makes his 60+ years in the industry even more impressive is that he is self-taught. In fact, he never even intended to enter the fracking side of the oil and gas industry.

Initially working with produced water in both Cairo and the Bay Area in California, Soliman transitioned to fracking when he was hired by Halliburton in 1979. He never looked back.

"Halliburton's main business is fracturing, so I looked and said, 'Well, if you're going to survive in this company, I need to know the main business.' I started looking at fracturing on my own and, before long, I was writing papers on the subject and I was going to the field to run fracturing tests," Soliman told Hart Energy. "I trained myself in fracturing and ended up doing a lot more fracturing than anything I've studied."

Soliman was motivated by Henry Ramey, his favorite professor at Stanford University and the father of modern well test analysis. Soliman credits Ramey with teaching him perseverance and instilling in him a true love of learning and the oilfield. This passion has been present in Soliman's life ever since his Stanford days. Friends and colleagues still see it now, some 60 years later.

"Most of the people think about what they're doing is what it does for themselves," Ramesh Main told Hart Energy. "But right now, [Soliman]'s staying at University of Houston



Mohamed Soliman

***Mohamed Soliman is the W. C. Miller Chair Professor and Department Chair of the Petroleum Engineering Department at the University of Houston.***

mainly because if he stays at the university, he'll be able to continue with the plans and that will allow him to make more contributions to the education of his students ... he's staying in there and doing what he's doing, not only because of his technical interest, but also because he believes that the industry needs that."

Despite all the major projects he's worked on, papers authored and awards received, Soliman says his greatest accomplishment and proudest achievement is guiding his students toward their master's

and doctoral degrees in his role as professor and department chair of the University of Houston's petroleum engineering program. As of 2023, he had graduated 15 Ph.Ds, with two more doctoral candidates set to graduate in 2024. And he's not done yet.

"Mostly, what I'm trying to do is to improve the ranking of the department," he said. "When I came in here seven years ago, we were not ranked at all. Now we're No. 9 and I think we deserve to go even higher.... I would like to see us going to the top five."

—Jaxon Caines, *Technology Reporter*



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## Visionary of the LNG Market

# CHARIF SOUKI

**CHENIERE ENERGY, TELLURIAN**

**T**ellurian's co-founder and executive chairman Charif Souki is arguably the godfather of U.S. LNG. His early efforts in the late 1990s and early 2000s helped the U.S. rise from an LNG importer to a top-tier exporter ranked alongside Australia and Qatar in liquefaction capacity and export volumes.

The long-term effect of those efforts was realized in 2022, when Russia's invasion of Ukraine resulted in a massive drop in Russian energy exports to Europe. Those shipments were replaced, in large part, by U.S. LNG exports.

Souki founded Cheniere Energy in 1996 and began developing its LNG business in 1999. The former investment banker with a B.A. from Colgate University and an MBA from Columbia University was born in Egypt and spent his youth in Lebanon. He traveled the world as the son of a foreign news correspondent and, later, as a private investor.

In 1999, Cheniere was among the first to secure sites and start development of new LNG terminals in the U.S. The Houston-based company focused its initial developments on Sabine Pass LNG in western Cameron Parish, La., on the Sabine Pass Channel; Corpus Christi LNG near Corpus Christi, Texas; and Creole Trail LNG at the mouth of the Calcasieu Channel in central Cameron Parish, La.

Cheniere's initial liquefaction project encompassed adding liquefaction services at the Sabine Pass LNG terminal to transform it into a bi-directional plant that could both regasify foreign-sourced LNG and liquefy U.S. sourced gas for export.



Hart Energy

**Cheniere Energy's Sabine Pass LNG plant under construction in 2014.**

Souki wouldn't see his dream come to fruition at Cheniere. In December 2015, a showdown with Carl Icahn, the investor with the largest stake in Cheniere, resulted in Souki's departure. Icahn wanted the company to return cash to shareholders and the visionary Souki had other plans.

Cheniere commenced LNG exports from Sabine Pass in 2016 and was already moving forward development and construction of a second liquefaction and export facility at the Corpus Christi LNG terminal, which commenced operations in 2018. Today, Cheniere's U.S. Gulf Coast presence consists of these plants with a combined nominal capacity of 45 mtpa.

The Sabine Pass facility has six

liquefaction trains with a capacity of 30 mtpa, while the Corpus Christi LNG facility in South Texas has three trains with capacity of 15 mtpa. Corpus Christi Stage 3 will add capacity of more than 10 mtpa, and is a brownfield expansion project currently under construction and around 38.1% complete.

Souki co-founded Tellurian with Martin Houston in 2016 and serves as its executive chairman. The company has started construction on the 27.6 mtpa Driftwood LNG export facility near Lake Charles, La. The first phase of construction is expected to cost \$14.5 billion and first LNG production is expected by late 2026 or early 2027.

—Pietro D. Pitts,  
International Managing Editor





## Company Builder in Good Times and Bad

# AUTRY C. STEPHENS

## ENDEAVOR ENERGY RESOURCES

**A**utry Stephens is both “an old-fashioned wildcatter and a modern developer,” said Lance Robertson, CEO of Endeavor Energy Resources, in describing the founder of the firm. That testimonial, and many others, came at the Permian Basin Petroleum Association’s 2021 Top Hand Award recognizing the contributions Stephens made to the industry, to the basin and to the Midland community. The event was the fastest-selling Top Hand Award ceremony in the association’s history.

Although the crowning achievements in a career spanning more than half a century took place in West Texas, Stephens started his career in East Texas. After earning a Bachelor of Science degree in petroleum engineering from the University of Texas at Austin, he took a position with Humble Oil and Refining Co. in 1962.

Just two years later he took a hiatus to join the Army Corp of Engineers. Stephens requested a pipeline engineering job and served as a lieutenant and platoon leader responsible for fuel installations. Stephens rejoined Humble for another five years before heading west to Midland.

Expanding his portfolio into the financial side of the industry, Stephens became a reservoir engineer at a local bank in Midland. The entrepreneurial spirit flowed into him by osmosis as he worked with small operators who were clients of the bank. Stephens purchased land rights and began to build a position in the Permian Basin and outlying areas. He also acquired several energy service companies to provide the lowest operating cost to his exploration and production company.

In 1979, Stephens formed a sole



Endeavor Energy Resources

**Autry Stephens is described as “an old-fashioned wildcatter and a modern developer.”**

proprietorship and drilled his first well, the McClintic B-30 #2, in the Spraberry Field of Midland County. Stephens recognized opportunities and began acquiring producing properties in both oil and gas, as well as drilling more wells.

Stephens proved to be both resilient and opportunistic during the inevitable downturns in the oil patch. When tough times drove other small operators out and pressed larger firms to rationalize their holdings, Stephens bought additional leasehold and several corporate acquisitions.

In 1996, Stephens established Big Dog Drilling. That also continued his practice of building multiple service companies that ranged across roustabout, trucking, well service, wireline, vehicle maintenance and construction.

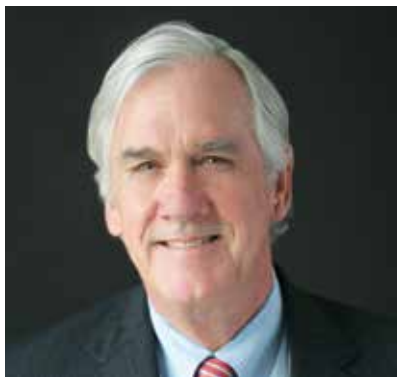
In 2000, Stephens reconfigured his

sole proprietorship into Endeavor. More than two decades later, Endeavor is one of the largest private producers in the Lower 48 with more than 1,200 employees. It is one of the largest horizontal operators in the Permian.

Underscoring the theme of both old-fashioned wildcatter and modern developer, Bryan Sheffield, founder of Parsley Energy, stressed the industrious nature that Stephens brought to the industry.

“What [Autry] means to the community is thousands and thousands of jobs; jobs during hard times,” Sheffield said at the Top Hand ceremony. “When no one was drilling, he was drilling. He found a way to drill. He found a way to acquire properties. He found a way to create jobs and keep people working.”

—Gregory Morris, Contributing Editor



## Taking the Lead on the Eagle Ford

# DICK STONEBURNER

## PETROHAWK ENERGY

**A** geologist, Dick Stoneburner had been exploring the Lower 48 since 1977 when his company, Petrohawk Energy, decided in the summer of 2007 to develop unconventional-resource plays.

The E&P was in Arkansas' Fayetteville gas play already by virtue of a merger and it was drilling the Cotton Valley, overlying Haynesville shale, in northwestern Louisiana.

Stoneburner, COO of Petrohawk, went to a conference that same week and returned to headquarters with the idea of a horizontal Haynesville play based on a core he saw there of a vertical Encana Corp. test for 4 MMcf/d.

"Imagine what it will do horizontally," he said of his thinking at the time. By year-end 2008, Petrohawk's first 10 operated Haynesville horizontals' had initial production (IP) averaging 19.3 MMcf/d.

And the company wanted another play.

In early 2008, in the midst of leasing for a larger position in the Haynesville, Stoneburner turned to Gulf Coast geologist Gregg Robertson, whose father had mapped the Austin Chalk overlying the Eagle Ford from Mexico to Mississippi in the 1970s.

In October 2008, Petrohawk reported the horizontal Eagle Ford discovery, STS 241-1H, with an IP of 9.1 MMcf/d and delineated its 150,000 net acres across 30 miles in La Salle and McMullen counties with just four additional wells.

Stoneburner said, "If ever there is a classic from-A-to-Z shale-exploration story, there's not a better one out there.... From the first thought in January 2008 to having a producing, commercial discovery in October and more than 150,000 acres put together in that short period of time, that's just



Hart Energy

**Dick Stoneburner speaks at Hart Energy's DUG Eagle Ford conference in 2011.**

how far the understanding about shale had evolved.

"Everything just fell into place."

Formed in 2003 with \$60 million, Petrohawk was purchased in 2011 by BHP Billiton for \$15.8 billion. Today, the Eagle Ford play produces 1.1 MMbbl/d and 7.5 Bcf/d of gas.

After Petrohawk's sale, Stoneburner stayed with the team as president of BHP's new North American shale production division. After this, he joined several E&P boards of directors and did a formal stint as a teacher, one of his passions, as the distinguished lecturer of the American Association of Petroleum Geologists.

He had been a managing director for Pine Brook Partners and continued on as a senior adviser.

Today, he co-leads development of shale-gas resources in northern Australia as chairman of Tamboran Resources, enlisting co-investor Bryan Sheffield, who built and sold Permian Basin E&P Parsley Energy, as well as U.S. land driller Helmerich & Payne.

"What Tamboran is uniquely situated to do is to provide what very well could be a high-volume resource with time," he told Hart Energy. "This is going to supply not only the Australian domestic market, but it's perfectly situated to provide the Asia-Pacific region with much more competitive LNG."

Looking at Tamboran's #1 Tanumbirini vertical discovery's logs reminded him of his early looks at what became enormous U.S. shale plays.

"While I was visiting them in Sydney in 2014, I looked at the log and, about a year later, saw the core analysis from Core Lab and the report from Netherland Sewell [& Associates] on the resource potential.

"The long and short of it is that, from a purely petrophysical standpoint and an original gas in place standpoint, this resource is comparable to the best resources in North America."

—Nissa Darbonne,  
Executive Editor-at-Large



# PARKMAN WHALING

CONGRATULATIONS TO ALL OF THE HALL OF FAME HONOREES

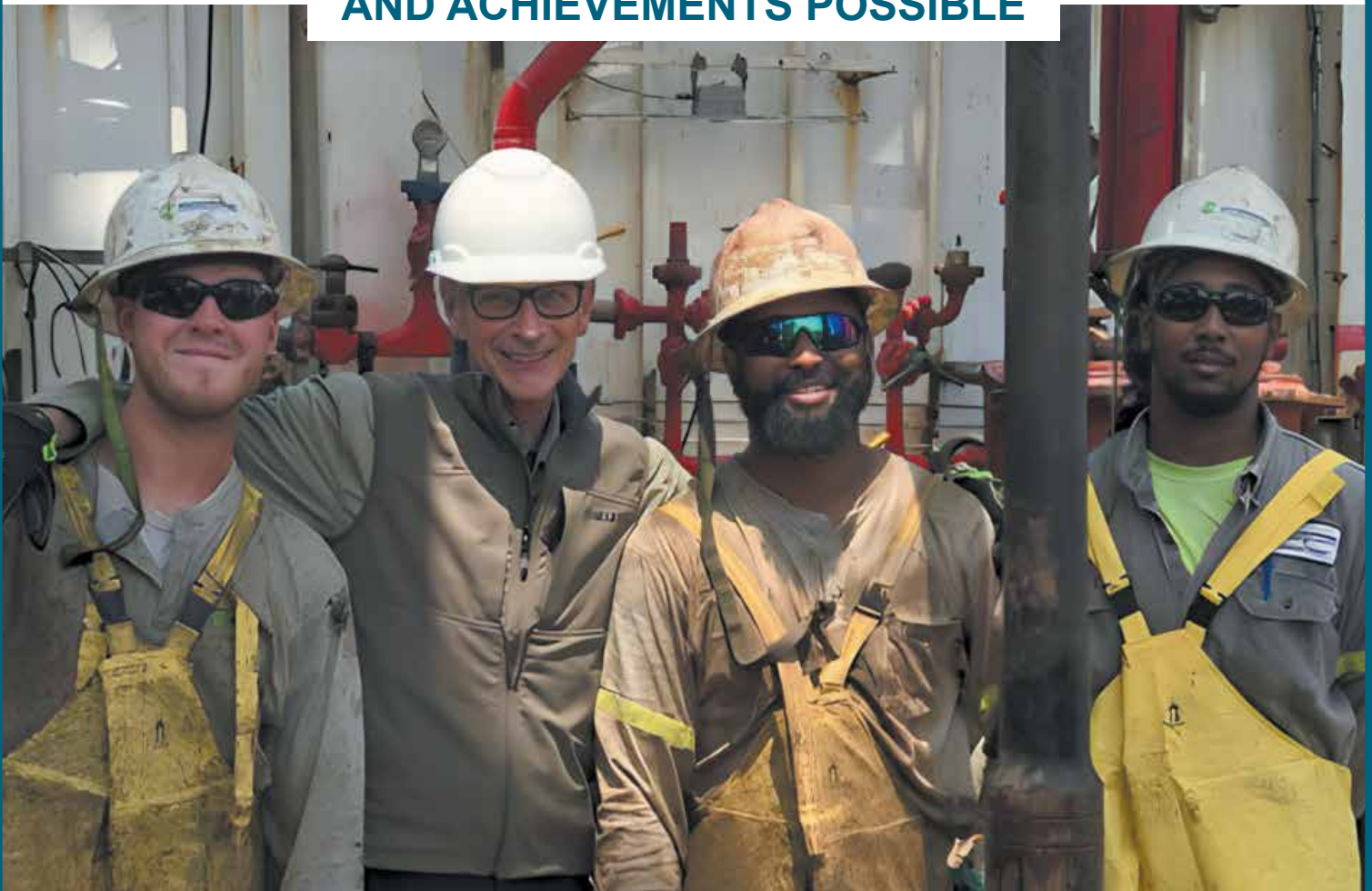
AND TO **HARTENERGY** FOR THEIR

50 YEARS CHRONICLING THE ENERGY INDUSTRY

Oil and Gas  
**Investor**



**PARKMAN WHALING WOULD LIKE TO RECOGNIZE THE  
MULTITUDE OF TALENTED AND DEVOTED INDIVIDUALS  
THAT MADE THE ACCOMPLISHMENTS, HONORS  
AND ACHIEVEMENTS POSSIBLE**



[parkmanwhaling.com](http://parkmanwhaling.com)



## Architect of a Pipeline Empire

# KELCY WARREN

## ENERGY TRANSFER

**K**elcy Warren, the Energy Transfer co-founder and executive chairman, built a pipeline empire in less than three decades that he is still growing ever larger with each new deal.

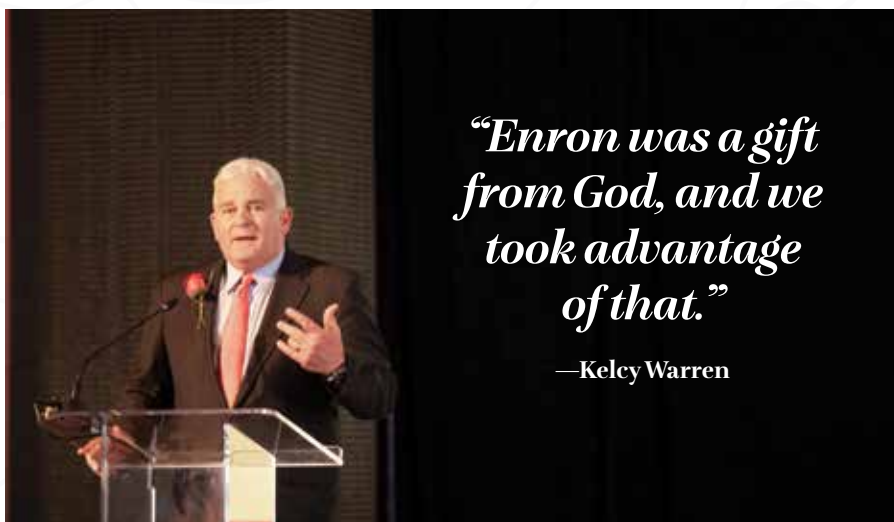
But, arguably, no moment felt more meaningful than the 2012 acquisition of Sunoco—a company where Warren’s father spent his career as a pipeline field hand and considered it “his company.” His father died in 1992.

“I wish my dad would’ve been around to see that,” Warren told Hart Energy. “It was just emotional for me. I mean, I couldn’t believe it. I remember the day that it closed. In my prayers, I talked to my dad about it.

“So, it was just unbelievably rewarding. It’s never the reason a business person should ever do an acquisition. If it has sentimental value to you, then never, ever,” he said. “But, in this case, yeah, it had that, but it was also a fabulous acquisition for our unitholders. But it was a big deal. Big deal for me.”

The point is that Energy Transfer isn’t just a business for Warren; being a leading pipeliner is a way of life instilled in him by his family.

Energy Transfer’s explosive growth has involved a lot of organic growth, such as the well-known Dakota Access Pipeline, but much of the expansion has come through acquisitions, and primarily in two big waves. First, from lots of pipeline assets put on sale in the years after the Enron collapse as other companies struggled. Then, again, in recent years, as Energy Transfer helped lead midstream consolidation amid growing pipeline capacity demand from rising crude oil and LNG exports.



Kelcy Warren

*“Enron was a gift from God, and we took advantage of that.”*

—Kelcy Warren

**Kelcy Warren credits a combination of “pure luck,” necessity and business foresight and acumen for the success.**

But it all started back in the rural East Texas area of Gladewater and White Oak, where Warren was born and raised.

### Oil and gas roots

Warren started out taking the best job offer he had after graduating the University of Texas at Arlington with the Lone Star Gas Co. He eventually moved on to the pipeline and refining company, Endevo.

Endevco fell into financial troubles and Warren was tasked with helping to find a buyer for the company. During that process, he met investors Ray C. Davis and Ben Cook. Warren ended up teaming with them to buy Endevo, rebrand it and sell it again for a bigger profit.

They used much of the proceeds to found Energy Transfer in 1996 with about 200 miles of East Texas natural gas pipelines.

Early on, Davis—now owner of the Texas Rangers baseball team—focused on the business side of things, while Warren was the visionary leader thinking longer term and imagining the continent’s largest network of pipelines and export hubs.

“Kelcy doesn’t think like other people. He sees possibilities where others don’t,” Davis said in a previous interview with the Houston Chronicle.

Warren credits a combination of “pure luck,” necessity and business foresight and acumen for the success. Early opportunities arose in the 2000s. “Enron was a gift from God, and we took advantage of that.”

“Because of the Enron collapse, many assets that would’ve never been for sale came on the market very quickly,” Warren said. “There was a dumping of assets because, people forget, it wasn’t just Enron that had





Kelcy Warren

**Kelcy Warren, Energy Transfer co-founder and executive chairman.**

this business plan. There were a lot of Enron wannabes that had copied their plan and were doing a very similar type of approach to business.”

They acquired much of Aquila Inc., the TUFSCO System, Houston Pipeline System, Transwestern Pipeline and more, building out a natural gas pipeline network.

Then, natural gas prices tanked and Warren realized Energy Transfer needed to diversify out of necessity. The company grew in the NGL space by acquiring Louis Dreyfus Highbridge Energy after another bid fell through.

Warren next had his eye on the crude oil sector. He was in New York when he got a call saying that Sunoco might be looking to sell. He flew to Philadelphia within a few hours to help set up a deal, which turned out to be valued at \$5.3 billion. “I couldn’t believe I was doing it,” he said. “I was like, ‘This is just too good to be true.’”

After several years of more organic growth and lots of fractionation construction, Energy Transfer again aimed to consolidate the midstream sector. In 2014 came Susser Holdings, followed shortly by Regency Energy Partners, PennTex Midstream Partners, USA Compression Partners and SemGroup.

In the last two years or so, Energy Transfer has scooped up Enable Midstream, Lotus Midstream and, most recently for \$7.1 billion, Crestwood Equity Partners, the latter of which bolsters its large footprints in the Permian Basin and Bakken Shale, while also expanding Energy Transfer into the emerging Powder River Basin.

“They are very compatible,” Warren said of Crestwood’s connectivity to Energy Transfer, minus some connecting of the dots with planned capital construction.

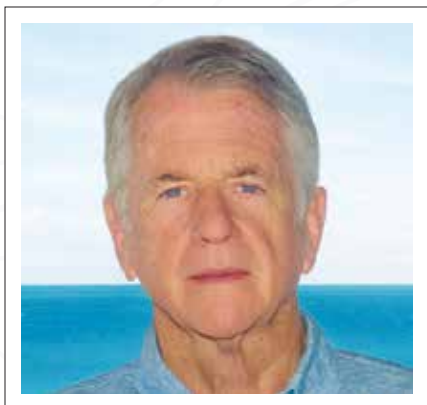
“I’d like to tell you that we saw everything in advance and we’re smarter than everybody else, but that’s just not true,” Warren said. “We’ve been very reactive here, but I think our reactions have been pretty good.”

Next, Warren sees Energy Transfer continuing to serve as an industry consolidator, but he also wants to expand more internationally throughout North and South America, while also growing more into the LNG and petrochemical industries.

“There’s fewer and fewer—one by one we’re checking ‘em off,” Warren said. “But there’s still some really good assets out there that we’ve got our eyes on that we think fit us really, really well.”

“We always try to make our machine more efficient,” he added. “If you’re a good pipeliner, you’ll never have the perfect system.”

—Jordan Blum, Editorial Director



## Master of the Made-to-Sell Model

# FLOYD WILSON

## PETROHAWK ENERGY

**F**loyd Wilson said he's still active in the business, in a quiet way.

"I'm not operating any wells, but I have some interests here and there," said Wilson, who founded Petrohawk Energy, a pioneer in shale exploration in the mid-2000s. "When you start these things, whether it's a company or a play, it's all about risk-taking ... and I still like that."

Wilson said he didn't have a hometown. He was part of a military family and grew up on different U.S. Army bases. When he graduated from the University of Houston with a degree in industrial engineering, he wasn't planning on a career in the oil and gas industry.

In the early 1970s, he began working for an energy company as a completion engineer and decided, even though he "didn't know very much," to start his own gas and oil operating company in 1976. He grew the company and eventually sold it. Then repeated the process, learning the business as he went along. Petrohawk was Wilson's sixth company, formed in 2004.

Up until then, all of Wilson's

enterprise had been traditional—acquiring reserves and drilling small wells. Then, in 2007, Petrohawk decided to sell all its assets and go big into shales.

"I don't say 'I' too much," he told Hart Energy. "It was great that I could interest some other great individuals to work with me, and we saw a whole new scale of types of wells that we had never seen before."

Working over a large area meant the risks shifted from digging a dry hole to mechanical and execution problems. Petrohawk started with the Fayetteville Shale, then moved into the Haynesville. The company's senior geologist Dick Stoneburner heard from his connections in South Texas that the largely unexplored Eagle Ford shale showed promise.

Floyd said his team quietly amassed about 200,000 acres, dug a couple of test wells 50 to 60 miles apart and found some excellent gas production. They began digging more wells to exploit the gas, then heard that other companies had found oil.

"When we drilled our first well in the oily window of the Eagle Shale,

it was shockingly good," he said. Petrohawk expanded in the area again, and in 2011 agreed to a \$15.8 billion deal with BHP.

It was, Floyd said, a pretty good payday for "someone who grew up on an Army base." The founder formed his companies on the made-to-sell model, as he preferred getting the big payoff for himself and his team.

After the sale of Petrohawk, Floyd worked with several other startups into the latter 2010s. Now he says he keeps track of his nine children and 12 grandchildren, "scattered all over the country." He also continues to keep a hand in the energy business, though not as a frontman.

"Understandably, younger people that are bright and kind of up and coming, they don't want to hear some old guy telling some old stories about how the old days were great, because they weren't always great. And it's appropriate that the old guys step aside, let some new blood in the door."

—Sandy Segrist,  
Senior Editor,  
Gas and Midstream

*"When we drilled our first well in the oily window of the Eagle Shale, it was shockingly good."*

—Floyd Wilson





## Potent Force in the Oil Patch and Politics

# IRENE S. WISCHER

## PANHANDLE PRODUCING

**I**rene Wischer's career with Panhandle Producing Co. began as an assistant corporate secretary in the late 1940s. By 1955, she became a director and secretary/treasurer of the San Antonio-based oil and gas company. "You know how secretaries sometimes run a company?" Amy Fields, Wischer's granddaughter, said to Hart Energy. "I think it was just a natural progression because she just knew it inside and out."

In 1963, Wischer was elected president and CEO and spent the rest of her working life leading the independent oil producer in a career field almost completely dominated by men. She was recognized with the Chief Roughneck Award in 1992—the first and only woman to win the award until Vicki Hollub of Occidental Petroleum won it in 2019.

Irene Stimson was born in Page, Neb., in 1915. The family moved to the San Antonio area and she graduated from Harlandale High School in 1933 before attending Draughon's Business College.

Early on, she impressed the people around her with her knowledge,

dedication and energy, and it led to an opportunity at Panhandle Producing at the right time.

"First of all, she married the boss—originally," Fields said, laughing. Irene married Earl Wischer while they were working at Panhandle. At the time, Earl was a widow with children from his previous marriage. Her husband was happy to support his wife's upward climb.

"But, I mean, (the board) still could have had any man—she just knew that business ... and I think that the board just decided that she was the one," she said.

At the same time, Irene Wischer made the business a family affair. Her granddaughters would accompany Wischer on business trips to New York, or just visit the office in San Antonio and play secretary. She was aware of her unique role in the industry and wasn't shy with her fashion.

"She had pink hard hats, and she wore high heels every day. Even out on a rig, she'd wear high heels," Fields said. "She was determined to keep her femininity while she was in that world."

Wischer spread her success

and influence beyond the energy industry. She was active in Republican politics and was considered for several high-ranking federal jobs, including Secretary of the Treasury by President Richard Nixon. Wischer turned the offers down, unwilling to leave her company, Fields said.

Wischer also set her sights on helping others, focusing on Texas, church and education.

Around 2007, she asked Linda Namestnik, with Frost Bank, to help her establish a fund to help students in need earn their four-year degrees.

During the meeting, Namestnik's eyes wandered to the office wall and she noticed a picture of Wischer standing with President Dwight Eisenhower, along with photos of her with every president since.

"I thought, 'Oh man, what the heck am I doing here,'" Namestnik said. "I started to get very intimidated.... However, her demeanor was so gracious and so approachable and so comfortable that I very soon forgot to be intimidated."

—Sandy Segrist,  
Senior Editor, Gas and Midstream

***"But, I mean, (the board) still could have had any man—she just knew that business... and I think that the board just decided that she was the one."***

—Amy Fields, Irene Wischer's granddaughter



## Wildcatter Who Thrived in New Mexico

# JOHN ASHBY YATES

## YATES PETROLEUM

**J**ohn Yates (1929-2022), in the words of Hank Williams Jr., was “just carrying on an old family tradition.”

His father, Martin Yates Jr., founded Yates Petroleum. Martin and Mary Yates were true Permian Basin pioneers, drilling their first successful oil well, named the Illinois State #3, just southeast of Artesia, N.M., in 1924. That was months after the Santa Rita #1 well in Reagan County, Texas, which is considered the discovery well for the Permian.

John, along with older brothers Harvey, Martin II (known as Bitsy) and Saint Clair Peyton (known as S.P.) also pursued their individual ventures while still taking part in the business started by their father.

Most notably, the Yates brothers developed some of New Mexico’s largest fields, including the Grayburg-Jackson, Loco Hills, Dagger Daw, Empire Abo, Eagle Creek, Penasco Draw, Pecos Slope Abo and many Morrow gas fields.

John was born in Artesia in August 1929, just a few months before the Wall Street crash and start of the Great

Depression. Venturing to the other end of the country, he studied economics at Dartmouth College in Hanover, N.H., but returned to his home state and the oil patch.

Although all the brothers pursued their own business interests in addition to Yates Petroleum, he focused on the parent company with an emphasis on operating wells. By 2005, Yates Petroleum had more than 400 employees and operated more than 5,000 wells, and was the largest lease holder in New Mexico.

“The idea was to all work together,” S.P. Yates wrote in the published family history. “Instead of dividing up the property, we decided we’d keep it and operate it. As time went on, we kept putting more and more into Yates Brothers, even some deals that we had individually. We tried to assure that we were all pulling [together], that we weren’t out competing.”

John served in various leadership roles at Yates Petroleum until he retired as chairman emeritus in 2016, when the company was acquired by EOG Resources for about \$2.5 billion.

At the time of the deal, Yates Petroleum held 1.6 million net acres across the western United States, including 186,000 net acres in the Delaware Basin, 138,000 net acres in the Northwest Shelf, 200,000 acres in the Powder River Basin, and an additional 1.1 million net acres in New Mexico, Wyoming, Colorado, Montana, North Dakota and Utah. The company’s production total was 29,600 boe/d (48% crude oil).

Not one to sit in a rocking chair on his porch, John founded the John A. & Charlotte G. Yates Legacy, where he served as chairman of the board until his passing. John served on the National Petroleum Council and was a member of the New Mexico Oil and Gas Association, Independent Petroleum Association of New Mexico, American Petroleum Institute and Roswell Geological Society, and has been inducted into the All-American Wildcatters Association. The IPAA awarded him Chief Roughneck of the Year in 1996. He also received an honorary doctorate from New Mexico State University.

—Gregory Morris, Contributing Editor

***“The idea was to all work together. Instead of dividing up the property, we decided we’d keep it and operate it.”***

—S.P. Yates, brother of John Yates





## Geologist, Executive, Legend in Exploration

# CINDY YEILDING

BP

**C**indy Yeilding tells a story about attending her first board meeting as a director at Denbury, when a new colleague said to her, “We’re so glad you’re here. You have so much to offer with your unique combination of upstream experience, operational background and carbon capture, use and storage expertise,” which was a special welcome.

“At that moment, I knew I was invited in for my experience, not my gender,” she told Hart Energy.

It was a triumph of sorts. Yeilding is not only a successful geologist and executive with a career that anyone in the oil and gas field might envy, but she’s also among the few women to reach so high on the industry’s corporate ladder.

And, she said during Hart Energy’s Carbon & ESG Strategies Conference in September, it was nice to be acknowledged for her career success without the token nature of her gender. To be sure, Yeilding has more to offer than a checked box on a diversity survey.

Kevin Meyers, Denbury’s board chairman, highlighted the array of skills that Yeilding brings to the table.

“Cindy is a widely recognized and broadly respected leader in both the

CCUS and energy industries, and her deep experience and unique skills will be highly valuable as we continue to position Denbury as an essential industry partner in the transition to a lower-carbon future,” Meyers said when he announced her appointment in 2021.

She joined BP in 1985 as a geologist. In 35 years, she progressed on the science track at the European supermajor to lead exploration teams in Venezuela and throughout the western hemisphere, the Gulf of Mexico and around the world. Since retiring from BP, Yeilding has opened her own business and joined the board of directors at The Center for Houston’s Future. In 2021, she joined the board at Denbury. She earned a bachelor’s of science degree in geology/earth science from Southern Methodist University and a master’s of science in the same field from the University of North Carolina at Chapel Hill.

The American Association of Petroleum Geologists has named her a “Legend in Exploration,” and Hart Energy named her among the 25 Influential Woman in Energy in 2020.

Yeilding credits her mother with igniting the spark for geology during childhood rock and fossil hunting trips.

She discovered she was good at math, but her “true love was art, history and architecture.”

“After a few college-level math courses, I discovered that I was not interested in making a career out of it and refocused on geology, the perfect melding of art and science,” she told Forbes in 2013.

After earning a master’s degree, she joined BP, where much of her early work was offshore on rigs.

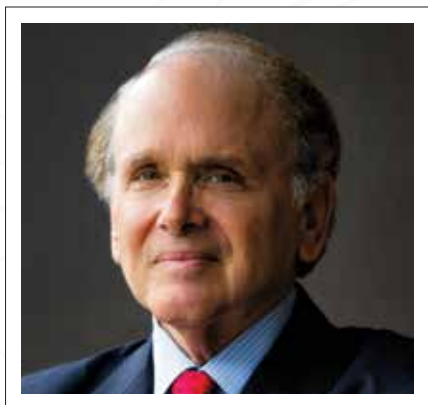
“I eventually realized that my being a geologist, not my being a woman, was what primarily bothered the all-male rig crew,” she told Forbes. “The crew of engineers assumed that I did not understand drilling and would interrupt the well constantly to stop to look at samples. In short, they believed that I would just get in the way.

“I built relationships with the team and shared my understanding of each well’s objectives and geology,” she said. “They soon began understanding the value and insights I brought to the well. When the men on the rig started throwing around terms like ‘stacked channel complex’ and ‘Miocene nannofossils,’ I knew I had become a part of the team. That I was the only woman for hundreds of miles didn’t matter.”

—Deon Daugherty, Editor-in-Chief

***“When the men on the rig started throwing around terms like ‘stacked channel complex’ and ‘Miocene nannofossils,’ I knew I had become a part of the team. That I was the only woman for hundreds of miles didn’t matter.”***

—Cindy Yeilding



*Economic Historian, Energy Analyst, Author*

## DANIEL YERGIN

**CAMBRIDGE ENERGY RESEARCH ASSOCIATES**

**D**aniel Yergin, a researcher who likes to tell stories, became fascinated with the energy industry in the 1970s as a postdoctoral fellow at Harvard.

After leaving Harvard Business School, he wanted to continue doing energy research, which he found fascinating because “everything from geopolitics to technology is encompassed when talking about the energy industry,” Yergin, now vice chairman of S&P Global, told Hart Energy.

In 1982, Yergin and Jamey Rosenfield co-founded Cambridge Energy Research Associates (CERA), purchasing a \$2 filing cabinet to formalize the venture.

“It was a bold idea to think that people wanted research on energy from a small shop in Cambridge, but it kind of acted as a magnet and drew clients,” he said.

Rosenfield, senior vice president of S&P Global, now serves as co-chairman of CERAWeek. Their goal, he told Hart Energy, is to contribute to the industry through a thought-leadership platform that brings people together to share ideas that could shape the future of energy.

Over the years, he said, Yergin has provided insights into the future of energy.

“He’s been a very sound voice of reason and has shaped the world’s understanding of energy for over 40 years,” Rosenfield said.

Two years after Yergin and Rosenfield founded CERA, they held the very first conference, which drew an audience of 200. The one-day event has grown into CERAWeek by S&P Global, which drew 8,600 attendees in March 2023.

Yergin considers himself an economic historian and energy analyst, and has chronicled the history and evolution of the industry. Perhaps best known for the Pulitzer Prize-winning book, “The Prize: The Epic Quest for Oil, Money, and Power,” released in 1991, he is also the author of the 1977 book, “Shattered Peace,” which examined the Cold War, the 2011 book, “The Quest: Energy, Security, and the Remaking of the Modern World,” and the 2021 book, “The New Map: Energy, Climate, and the Clash of Nations.”

He also co-authored “The Commanding Heights: The Battle Between Government and the Marketplace That Is Remaking the Modern World,” with Joseph A. Stanislaw. That book was released in 1998 and revised, retitled and updated as “The Commanding Heights: The Battle for the World Economy” in 2002.

“If I think about my books, it’s really one story unfolding in each book,” he said, adding his books have captured how much the energy business has changed as well as “how essential the oil and gas industry remains today.”

“The Prize,” he said, became a defining book for the industry.

“This book has a life of its own,” Yergin said. “So many people that I know say that this is the book that they read when they began in the industry, or that this was the book that led them to join the industry.”

He loves research.

“One of the problems I have as a researcher is I sometimes just go down rabbit holes.... You just keep wanting to find out more,” he said.

And writing is part of his identity.

“If I’m not doing it, I feel something’s missing,” he said.

Over the years, he has seen the energy business transform itself time and again. The energy business isn’t static, but driven by technological and strategic innovations and geopolitics, he said.

“It’s always changing, and just when everybody agrees on where things are and everybody agrees on what the consensus is, something comes along that just changes it.”

—Jennifer Pallanich,  
Senior Editor, Technology

*“He’s been a very sound voice of reason and has shaped the world’s understanding of energy for over 40 years.”*

—Jamey Rosenfield, senior vice president, S&P Global





## Geologist Who Made the Marcellus a Star

# BILL ZAGORSKI

## RANGE RESOURCES

**I**n 2003, geologist Bill Zagorski in Range Resources' Appalachia office had proposed a well, Renz 1, in Washington County, Pa., that had turned out to be a dry hole. Visiting with a fellow explorer in Houston in early 2004, Zagorski looked at the rock properties of the Barnett shale. It looked just like the Marcellus shale in Pennsylvania.

He proposed to Range that Renz 1 be re-entered and completed in the Marcellus. "I was scared, you know," Zagorski said in "The American Shales."

"I'm the guy with the dry hole and I'm asking him for more money."

And he asked that it be completed as Barnett wells were being completed—with a massive hydraulic frac—while the Marcellus was believed at the time to be water-sensitive.

Jeff Ventura, Range's COO at the time who retired as CEO in 2023, was intrigued.

Zagorski said, "I would've expected someone to say, 'We'll do it, but we'll do it next year,' or 'Well, we'll try your idea but, maybe, we'll put a small frac on it.' Instead, Jeff was pretty adamant about getting it tested and getting it tested soon."

Ventura said, "His geologic thinking was very counter ... to what the traditional thoughts in the basin had been."

In October 2004, the vertical Renz 1 re-entry was completed for an initial production of 800 Mcf of gas. At the time, it was the largest frac job done east of the Mississippi River.

Range went on to make more vertical tests. Its first three horizontal trials made as much or less than

the verticals, however. Zagorski suggested a fourth horizontal be landed in the uppermost portion of the shale.

In the meeting, he walked up with a chart. He noted that the deepest well, at about 40 feet above the bottom of the 100-foot Marcellus, made almost no gas, just 20 Mcf/d; the middle well, about 20 feet higher, came on with about 350 Mcf; the least-deep well, at about 30 feet from the top of the Marcellus, with about 600 Mcf.

Ventura said, "I remember, when he put the graph up, everybody laughed and thought, 'Hey, that's hilarious, Bill.' Someone said, 'You know, if you had two points, you could get an even straighter line.'"

But, "after brainstorming on it, we decided to try it."

Ray Walker, a Range senior vice president at the time who is now COO of privately held Ohio shale producer Encino Energy, imported an actual rig that had been drilling for Range in the Barnett and a Barnett frac crew for the job.

Walker said, "We only had about \$50 million more to make the Marcellus work."

The horizontal, Gulla 9, came on in December 2007 with 3.2 MMcf/d—as much at the time as a good Barnett

horizontal and very economic in the premium-price, northeastern U.S. gas market.

Three subsequent wells came on with 3.7 MMcf/d, 4.3 MMcf/d and 4.7 MMcf/d.

The Marcellus star was born.

Today, Appalachia produces more than 35 Bcf/d—about one-third of daily U.S. gas demand and 70% of total U.S. gas production in 2007. It is estimated to have the potential to produce 60 Bcf/d if state and federal offices permit more pipeline takeaway.

Zagorski said horizontal development means fewer wells and 10,000 times the production. "You can have a career of 10,000 wells. I used to think all that stuff was important. I still keep all my books and records of all the things we've found."

"But, at the end of the day, five or six horizontal wells in the Marcellus really makes all of that obsolete. It's incredible. Not just here; that's in the whole U.S. oil and gas industry. It's just amazing."

"We were—all this time—searching for [pockets of] nickels and dimes and we're sitting here with \$100 bills."

—Nissa Darbonne,  
Executive Editor-at-Large

***"We were—all this time—searching for [pockets of] nickels and dimes and we're sitting here with \$100 bills."***

—Bill Zagorski



*It's a dirty business but, fortunately,  
many are willing to do it.*  
(Lowell Georgia/Hart Energy)



PetroCap and Bill Britain's family join together to celebrate Bill being named to the Hart Energy Hall of Fame

Bill was an independent his entire career and loved the oil and gas business for all the right reasons – the adventure, the risk and more than anything, the people. He is looking down in amazement that his name sits alongside a group of people that he so admired.



**Bill Britain**  
(1948 - 2023)



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The background of the image is a light gray topographic map with intricate contour lines. The lines are thin and light gray, creating a complex, organic pattern of concentric and irregular shapes across the entire page. The overall tone is clean and technical.

# **AGENTS OF CHANGE IN ENERGY**



## Defining the 'Future of Midstream'

# JESSE ARENIVAS

ENLINK MIDSTREAM

**I**n the first year of his tenure as CEO of EnLink Midstream, Jesse Arenivas led a groundbreaking deal with Exxon Mobil in October 2022. EnLink is repurposing half of the company's existing natural gas pipeline network to deliver CO<sub>2</sub> from the Mississippi River corridor in southeastern Louisiana to Exxon Mobil's 125,000-acre CO<sub>2</sub> storage location under development in Vermilion Parish.

Arenivas acknowledges that there remain some difficulties and unknowns within carbon capture and sequestration (CCS), but says the opportunities it brings are worth the effort.

"The world cannot reach its climate goals without substantial investment in carbon capture," he told D Magazine for a 2023 Dallas 500 feature. "There are some challenges to CCS, but we're uniquely positioned to be successful and make an impact. That's pretty exciting."

Arenivas took the top job at EnLink in June 2022, succeeding founder, chairman and CEO Barry Davis, after almost 20 years at Kinder Morgan. There, he helped the company grow to become the largest transporter of CO<sub>2</sub> in North America. As president of both the CO<sub>2</sub> business and energy transition ventures group, he oversaw the workings of the largest transporter of CO<sub>2</sub> in North America, delivering approximately 1.3 Bcf/d for use in EOR projects.

Prior to joining Kinder Morgan, Arenivas worked at ConocoPhillips in financial and commercial roles.

Arenivas hails from Midland, Texas, so his path to a career in oil and gas wasn't too far from expected. A true Permian Basin success story, Arenivas earned a bachelor's degree in business administration from the University of Texas Permian Basin. He is also a certified public accountant.



Tom Fox/Hart Energy

### EnLink Midstream CEO Jesse Arenivas in the company's Dallas headquarters in July.

During the proverbial handing over of the baton, Davis described Arenivas as a visionary leader who would shepherd the company through its vision of the "future of midstream."

"Jesse's deep experience in our industry, including most recently at the forefront of CO<sub>2</sub> and the energy transition, combined with his background as a strategic and financially minded business development leader, will foster continued excellence in EnLink's business, as well as momentum in growing EnLink's role in the energy transition," Davis said.

During an exclusive interview with Hart Energy this summer, Arenivas quantified the unique impact ahead for the firm—a 25% growth rate on top of its billion-dollar base business.

It makes for a "very compelling story, a very interesting way to play the midstream space," he said.

Arenivas is embracing EnLink's role as

a leader in the energy transition in other ways, too. The company is more than half-way toward meeting its goal of reducing Scope 1 methane emissions intensity by 30% by 2024 from 2020 levels.

The firm has also linked 80% of its executive compensation to performance-driven incentives and targeted compensation.

Moreover, Arenivas noted his pride in being the firm's first Hispanic CEO, which adds to the diversity of EnLink's four-member board of directors.

"We consider this an energy 'transformation,' not a transition, as we believe the world's energy mix will continue to include hydrocarbons, while adding in cleaner, synthetic sources, like hydrogen, as well as renewables," Arenivas said in the CEO letter to stakeholders in August. "EnLink has what it takes to succeed through this transformation."

—Deon Daugherty, Editor-in-Chief





## Sustainability Champion

# ALLYSON ANDERSON BOOK

**BAKER HUGHES**

**A**llyson Anderson Book walks the walk when it comes to sustainability.

Named chief sustainability officer (CSO) for Baker Hughes in September 2022, she won't ask the company's 55,000 employees to do something she herself is unwilling to do.

"I don't talk about doing things. I do the things," Book said. "If I say Baker Hughes is going to get to net zero, I am working on how I personally take my emissions out and how I operate more sustainably. It is actually not convenient or easy, but if I don't do it, how's anybody else going to do it?"

In her personal life, she has worked to eliminate unnecessary purchases, and when she does vote with her dollars, she is making deliberate choices about the types of businesses she supports.

Reid Morrison, global energy consulting leader at PwC, worked with Book on Baker Hughes' "All In, Carbon Out" program to reduce the service company's carbon footprint. The program asked the company's employees to look at daily activities and propose ideas that would reduce emissions.

"Ultimately, there were over 500 ideas, all legit," he said. "This workforce turned on around decarbonization as their job."

Book understands how fragile and complex the energy system is and knows the industry can do better, Morrison said.

"She is working in the most important industry on the most important issues," he added.

Book, who earned a B.S. in geology and a B.A. in music from the University of Northern Iowa, didn't intend to enter the oil and gas industry. While pursuing



Baker Hughes

**Allyson Anderson Book (on the right) testifying before the U.S. House Science Committee Energy Subcommittee Hearing "Unearthing Innovation: The Future of Subsurface Science and Technology in the United States" in July 2023.**

a Ph.D at the University of Kansas, she was working on a project related to an oil and gas leak in Hutchinson, Kan., and had the opportunity to pursue an internship with Exxon Mobil. She said she almost didn't take the interview because she'd decided she was "going to be an environmentalist."

In the end, she said, she went for the interview, landed the internship and the position led to a job offer. Book left the doctoral program to join Exxon Mobil full time.

Shortly after that, she got into policy work. She worked on the U.S. Senate Committee on Energy and Natural Resources for Sen. Jeff Bingaman (D-N.M.) as a congressional science fellow with sponsorship from the American Geological Institute. There, she helped develop legislation and policy for geothermal, and carbon capture and sequestration activity, among other issues.

She went on to serve as associate

director for strategic engagement at the Department of the Interior's Bureau of Safety and Environmental Enforcement, where she helped institute reforms in the aftermath of the 2010 Macondo disaster in the Gulf of Mexico.

"I had to look at everything from training to rebuilding our international presence," she said. "I oversaw and helped technically contribute on six of the major rulemakings."

She later served as executive director of the American Geosciences Institute and helped modernize the organization. Then, in December 2019, she joined Baker Hughes as vice president for energy transition and was promoted to CSO in 2022.

"In every role that I've had," Book said, "there's been some sort of a mandate to figure out how to solve a problem."

—Jennifer Pallanich,  
Senior Editor, Technology



## Company Builder

# SKYE CALLANTINE

**VALIDUS ENERGY**

**“W**e’re focused on commercialization,” Skye Callantine told Hart Energy in 2015. “We go into identified resource plays and work on both sides of the margin—cost and production rates. Then, once we’ve made the play commercial, we sell it to someone who wants to fully develop the project.”

Sounds simple enough. Here’s how it has worked out:

- 2015: Callentine’s company, Felix Energy, sells assets to Devon Energy for \$2.5 billion-\$3 billion;
- 2019: Callentine sells Felix to WPX for \$2.5 billion; and
- 2022: Callentine sells Validus Energy to Devon for \$1.8 billion.

In early 2021, Devon closed on its merger with WPX, so, whatever Callentine’s been doing, Devon likes it.

Felix Energy was focused on the STACK and Cana Woodford plays in Oklahoma in the early 2010s, demonstrating an aptitude for cutting costs while increasing production. Callentine drew a parallel between the multizone, stacked pay stratigraphy of the Permian Basin to what he was encountering in the STACK.

At the time, the region had its share of skeptics, but Felix proved the economic viability of the



Hart Energy

### **Felix Energy’s operations in Oklahoma.**

play. And Callentine proved the economic viability of Felix, securing strong capital backing from EnCap Investments and a J.P. Morgan-led credit facility.

Felix Energy II worked 60,000 net acres in the sweet spot of the Delaware Basin. A year before he sold to Devon, Callentine said Felix was operating six rigs with average production of 30,000 boe/d. Most of the company’s locations in the Delaware supported 2-mile drilling laterals and the acreage was host to extensive infrastructure.

With Validus, Callentine built a pure play in the Eagle Ford. Validus purchased Ovintiv’s Eagle Ford assets for \$880 million in 2021. Production

was 35,000 boe/d on 42,000 net acres in Karnes County, Texas, adjacent to Devon’s leasehold—ingredients for a bolt-on acquisition in any M&A recipe book.

Analysts were pleasantly surprised by the deal. Devon’s Eagle Ford acreage went from 40,000 to 82,000, and its production shot up from 38,000 boe/d to 73,000 boe/d.

Validus’s 350 drilling locations were “highly economic inventory that is complementary to our existing footprint in the Eagle Ford,” Devon CEO Rick Muncrief said at the time.

Senior E&P analyst Phillips Johnston at Capital One Securities deemed it a “sensible” deal for Devon.

David Ramsden-Wood was far more enthusiastic.

“One must recognize the brilliance of Skye who, alongside John Sellers and Cody Campbell of Double Eagle, have redefined what it is to be a company builder in the last decade. It’s bloody impressive,” Ramsden-Wood wrote following the Validus sale in August 2022. “Too bad they aren’t running the country. Competence is sorely missed elsewhere.”

—Joseph Markman,  
Senior Managing Editor

***“One must recognize the brilliance of Skye who, alongside John Sellers and Cody Campbell of Double Eagle, have redefined what it is to be a company builder in the last decade.”***

—David Ramsden-Wood, analyst



*‘We’re Always Making a Deal’*

# CODY CAMPBELL AND JOHN SELLERS

## DOUBLE EAGLE ENERGY HOLDINGS

**“D**on’t confuse activity with results.”

That was the mantra of legendary football coach Mike Leach when he led the team at Texas Tech University, where Cody Campbell and John Sellers played.

“Coach Leach wanted us be mindful that merely showing up for practice every day wouldn’t make us better and simply going through the motions wouldn’t win many football games,” Campbell told Hart Energy.

The same philosophy applies to the oil and gas industry, where drilling and producing is not the same as being profitable.

Campbell and Sellers were friends in high school. That partnership continued through college and into the industry, where the two have formed a successful sequence of energy companies as co-founders and co-CEOs of Double Eagle Energy Holdings.

In May 2023, Double Eagle IV expanded its Permian Basin leasehold to about 40,000 acres. The partnership focuses on producing properties, while Tumbleweed IV, also founded by Campbell and Sellers, concentrates on royalty and mineral investment across the basin.

Campbell said Double Eagle IV is not afraid to pay for higher quality properties as long as they deliver results.

“In the long run, that’s how you do the best, [get] the lowest breakevens, great ideas and best results,” Campbell said. “That’s what we’re focused on ... the areas that are most productive in both basins.”

Since forming Double Eagle in 2008, Campbell and Sellers have completed thousands of individual transactions encompassing more than 1 million acres and more than \$6 billion in aggregate deal value. Through the various iterations, the



Double Eagle Energy Holdings

**John Sellers, left, and Cody Campbell.**

partners have been backed by some of the biggest names in energy investing.

Formation of their current companies with EnCap followed the sale in 2021 of Double Eagle III Midco 2, wholly owned by DoublePoint Energy, to Pioneer Natural Resources for about \$6.4 billion. DoublePoint was backed by equity commitments from Apollo, Magnetar, Quantum Energy Partners and GSO Capital Partners. Apollo has backed Double Eagle since April 2013, and Magnetar first invested in the company in 2016.

Campbell is no stranger to the big time, having played professional football as an offensive lineman for the Indianapolis Colts in 2005 and 2006 after earning bachelor’s degrees in finance and economics and a master’s in finance. His interest in business began in his childhood. His grandmother, a member of an investment club in Plainview, Texas,

would give him small holdings in stocks for his birthday and Christmas. She would tell him about the companies and they would discuss investing.

Sellers played defensive end at Texas Tech, and then went into real estate. His father and grandfather were in the cattle business.

“There are a lot of parallels in their business and what we do in oil and gas,” he told Hart Energy.

“We buy and sell non-stop,” said Sellers. “Basically, we’re always making a deal. I learned from my dad and granddad the importance of relationships in deal making. They had been trading cattle with the same families for two generations or more. You want to be fair when you’re buying and fair when you’re selling. We’ve been able to do multiple transactions with the same buyers and sellers during the past seven years.”

—Gregory Morris, Contributing Editor



*Engineer, Executive, Change-Maker*

LYNDAL CISSELL  
SLB

**L**yndal Cissell watched her mother go back to school to earn a law degree and start a second career. That inspired her to go after the lifestyle she always wanted.

Cissell decided to study petroleum engineering, one of only four women in the program at Northern Alberta Institute of Technology. After graduation, she joined BJ Services as a nitrogen pump operator.

In 2002, Cissell moved to SLB as an MWD hand, but aspired to achieve more. Her self-described “pure stubbornness” was driving her to become a directional driller.

In 2004, she became one of the first female directional drillers in the world and plied her craft in Canada, the U.S., Turkmenistan and Chad. It was in Chad where she found a new calling.

“Chad was very impactful in seeing real energy poverty and seeing what the world looks like when you don’t have a reliable energy infrastructure in place to support its people,” Cissell told Hart Energy.

Seeing the quality of life in Chad shifted Cissell’s perspective on what was important and lit a new fire within her.

In her recent position as managing director for North America offshore, she created jobs in Alaska and other communities she worked in. The new workforce made up of local talent could spend and invest in themselves and in their communities.

“Somewhere along the way, I moved from doing something because I wanted to prove that I could do it to making something better around me and leaving a legacy for the community,” she said.

This change in attitude was evident not only to Cissell herself, but also



Lyndal Cissell

**Lyndal Cissell, president of Americas Land at SLB, joins hands with offshore workers.**

her friends and colleagues.

“There are lots of people who want to make changes and there are few people that actually step in and do them,” Lori Fremin, president and general manager of Halermann & Carless, and fellow Energy Education Center board member with Cissell, told Hart Energy. “Lyndal is one of those that will not just say she wants to do something, but she’ll actually do it whether the charge is simple or extremely complex.”

Now as president of Americas Land at SLB, Cissell not only looks to drive innovation in technology

but also serves as representation for the younger workforce entering the energy industry.

“Though I never had intended to be the representation for young girls, I think that it’s really important to be available to both the younger and mid-career workforces coming into our industry,” Cissell said. “Diversity and representation matters. Leaders like myself need to be accessible, have honest conversations and share our career paths and experiences so others can envision their own journey.”

—Jaxon Caines, *Technology Reporter*





## Maintaining a Midstream Giant

# KIMBERLY DANG

## KINDER MORGAN

**A**s CEO of Houston-based Kinder Morgan Inc. (KMI), Kim Dang leads one of the biggest energy infrastructure companies in North America with about 82,000 miles of pipeline, 140 terminals and 700 Bcf of natural gas storage.

She was named to the position in 2023, having previously served as president, vice president of investor relations and director of investor relations for KMI after a six-year stay at Goldman Sachs, according to Kinder Morgan's website.

Dang took the helm of KMI as the company continues to strengthen its midstream position amid a growing project backlog, which increased to \$3.8 billion by the end of third-quarter 2023. Expansion projects underway include the Permian Highway Pipeline, which will grow its capacity by about 550 MMcf/d.

Others include the Markham Storage Expansion project to add more than 6 Bcf of incremental working gas storage capacity and 650 MMcf/d of incremental withdrawal capacity, and Phase 2 of the Evangeline Pass project,

expected to make way for an additional 1.1 Bcf/d of natural gas transportation capacity to Venture Global's proposed Plaquemines LNG facility.

In her first earnings call after being appointed CEO, Dang said she was excited about the opportunity.

"Now, a large part of my job is going to be about continuity. This is a great company and a great business with a great future ... Our traditional business will be around for a long time to come," Dang said in January. "Energy is a \$5 trillion global industry that is ingrained into every aspect of our lives. We'll continue to invest wisely in it as we position the company to turn slowly over time with the transition in a profitable manner."

While the company works to meet storage and transport needs for natural gas and refined products, it is also making headway on energy transition ventures, particularly in renewable natural gas following its 2021 acquisition of Kinetrex Energy.

"The Liberty landfill RNG facility began commercial in-service on October 3, 2023, while the Prairie

View facility is expected to begin commissioning in the fourth quarter of 2023," Kinder Morgan said in its third-quarter 2023 earnings release. "Together with the completed Twin Bridges landfill RNG facility, these three projects will add approximately 3.9 Bcf to KMI's total annual RNG capacity."

Dang, who is also a member of Kinder Morgan's Office of the Chairman and Board of Directors, holds an MBA from the J.L. Kellogg Graduate School of Management at Northwestern University and a bachelor's degree in accounting from Texas A&M University.

She is also Kinder Morgan's first woman to lead the company, something she told the Houston Chronicle she doesn't think about.

"I grew up with brothers, playing football in the front yard. It's more about how do you, the person that you are, be successful," Dang said in the article. "The way I phrase it: doing the best that you can with the talents that you've been given in the time allotted."

—Velda Addison,  
Senior Editor, Energy Transition

***"Now, a large part of my job is going to be about continuity."***

—Kimberly Dang



## Builder of a Private Equity Giant

# BENJAMIN DELL

## KIMMERIDGE

**F**or someone who has made such an impact on the energy sector, Benjamin Dell has an unusual perspective on his co-founding the private equity firm Kimmeridge.

"If I'd known what I'd know now, I'm not sure I would've started," Dell told Hart Energy. "If I'd known the wild ride that raising private equity capital and energy was going to be in the last 10 years and the volatility in the space, I probably wouldn't have started."

Private equity may be a wild ride, but the ride has been upward for Kimmeridge, which started with just \$40 million, according to Dell, and currently has \$4.78 billion in assets under management, according to PitchBook.

Part of Dell's leadership style is a sense of openness. The company's research is shared in white papers available on the Kimmeridge website and everyone, including Dell, works in an open-concept workspace without private offices.

"It's very flat," Dell said. "Everybody knows everything that's going on.

I mean, we built this firm together. We have very low turnover.... It's really about building a culture of collaboration, integration, and it's about performance. Nobody's above anyone else.... I'm not a believer about shutting doors or private conversations. I sit in the middle of the floor along with everyone else."

Stephen Ellis, an energy utilities strategist for Morningstar Research Services, said the Kimmeridge white papers can be significant, such as Dell's papers arguing years in advance that publicly traded E&Ps should aggressively return capital to investors.

"He's not afraid to be outspoken on industry issues that public oil and gas CEOs, might be quiet on," Ellis said.

Dell has focused heavily on the Denver-Julesburg (D-J) Basin, which expands over the borders of Colorado, Wyoming and Nebraska. Ellis noted that Dell, who has two degrees in earth sciences from St. Peter's College at the University of Oxford, has "made more of an effort to gather a much wider data set on the geology side to make

that investment."

Kimmeridge's D-J Basin focus includes backing Civitas Resources, a Colorado-based company pursuing D-J consolidation.

Dell was briefly serving as interim Civitas CEO when he met skeptical job candidate Chris Doyle in 2022. Doyle said he interviewed for the position, unsure if he was the right match for the job. That changed when he talked to Dell, who liked to engage in ideas.

"He wants somebody to really debate with him, but I'm thinking, 'This is either going to go well, and I'll be in Denver meeting with the board in person within a couple of weeks, or this is [the end of] it,'" Doyle said.

With that in mind, Doyle said he decided to bluntly lay out what he thought company leadership should do. Dell responded, "That's exactly what I think they should do."

"I've told people if it wasn't for Ben Dell—and this is 100% the case—if it wasn't for Ben Dell, I would not have taken the Civitas role," Doyle said.

—Patrick McGee,  
Senior Editor, Finance

*"I'm not a believer about shutting doors or private conversations. I sit in the middle of the floor along with everyone else."*

—Ben Dell





## Go-Getter Focused on Growth in the Gulf

# TIM DUNCAN

## TALOS ENERGY

**B**orn in New Orleans where his father worked for Amoco, Tim Duncan grew up in the offshore sector and moved around the world, but he never took his aim off of the Gulf of Mexico.

After working his way up through Zilkha Energy and other Gulf startups that were sold, Duncan co-founded Talos in 2012—before turning 40—with an offshore focus when the rest of the industry was pivoting to the emerging tight oil boom onshore.

“We’ve never given up on the idea that offshore is important and it’s relevant and it’s part of the broader energy mix,” Duncan said in an interview with Hart Energy. “We’ve stayed here where others have pivoted. We’re a throwback.”

Talos may seem old-fashioned in that way, but Duncan’s company also has proven to be a pioneer in both offshore Mexico discoveries and in U.S. carbon capture and storage in the Gulf.

For several years, Talos has grown in the U.S. Gulf, including its recent purchase of EnVen Energy for \$1.1 billion. The company went public in 2017 by entering into a reverse merger with Stone Energy.

Duncan’s strategy of wanting to stay nimble and take smart risks led Talos into the newly opened offshore Mexico market, making the potentially groundbreaking Zama discovery in 2017.

“It was about taking what we’re good at and trying to lean into something different,” Duncan said. “If we were successful, then we could differentiate ourselves.”

They proved the success, but politics intervened when the next Mexican president handed more control of the project to state-owned Pemex.

In September, Talos sold 49.9% of its Mexico stake to Grupo Carso, making



Talos Energy

**Talos Energy will apply its knowledge as a shallow-water Gulf of Mexico operator in its two CCS ventures with Storegga and Carbonvert.**

Mexican billionaire Carlos Slim one of Talos’s top investors.

Just over two years ago, Talos took another strategic leap of faith and started picking up acreage both onshore and off with the mindset of injecting—not extracting—carbon.

A slew of developing CCS projects were born from that move: the flagship Bayou Bend CCS offshore Port Arthur, Texas; River Bend CCS in Louisiana; Coastal Bend CCS near Corpus Christi, Texas; and a point-source project with Freeport LNG in Texas.

As potential pioneers in offshore CCS with Bayou Bend, Talos and partner Carbonvert found themselves in the enviable position of being approached by Chevron to join the team. Chevron came onboard last year as a 50% project owner and, in March, the expanded team added to Bayou Bend’s

40,000 offshore acres with 100,000 onshore acres between Houston and Port Arthur.

“By decarbonizing, we’re going to try to extend the life of oil and gas,” Duncan said. “We got ahead of that very, very early, and we showed some leadership.”

In the U.S. Gulf, a larger Talos is partnering more and more on discoveries with the majors that rule the deep waters, such as Chevron, BP and Shell.

Next, Talos will continue to grow in the Gulf, but Duncan said he has his eyes on global offshore expansion, whether in Latin or South America, West Africa or beyond.

“We need to be a lot bigger now that we’re public,” Duncan said. “We’re going to be a very diversified, global E&P company five to seven years from now.”

—Jordan Blum, Editorial Director

## Big Data for Big Production

# WILL HICKEY, JAMES WALTER

## PERMIAN RESOURCES

**B** lame “Dad” Joiner. Columbus Marion Joiner was 70 when his Daisy Bradford #3 became the discovery well for the giant East Texas field in 1930. That seems to have established the archetype of oil pioneer as a grizzled veteran who can smell oil.

At about half Joiner’s age, Will Hickey and James Walter are turning the idea of industry leaders, and of independent producing companies, on its head. The childhood friends from the affluent University Park area of Dallas are committed to the oil and gas industry’s relevance in the global economy for the long term, and are building Permian Resources on youth and data.

In August, Permian Resources acquired Earthstone Energy for \$4.5 billion in an all-stock transaction that boosted Permian’s holding to more than 400,000 Permian net acres, and pro forma production of approximately 300,000 boe/d.

Permian Resources was formed in September 2022 with the merger of Centennial Resource Development and Colgate Energy. The combination claimed primacy at the time as “the largest pure-play exploration and production company in the Delaware Basin [with] high-quality drilling locations on about 180,000 net acres.”

At the time of the merger, Permian Resources indicated it would reduce its rig count by one, to seven, but still spud 145 and complete approximately 150 gross wells in 2023 to be split relatively evenly between New Mexico and Texas.

The partners both attended the University of Texas at Austin. Hickey earned a bachelor of science in



**Will Hickey, left, and James Walter.**

petroleum engineering while Walter earned a degree in finance. Hickey also earned a master’s of business administration from Southern Methodist University.

Hickey joined Pioneer Natural Resources after graduation, where he rose to chief of staff for the COO. He then joined the Dallas office of private-equity firm EnCap Investments, where he evaluated and monitored investments across oil and gas with a focus on the Permian Basin. Meanwhile, Walter was doing the same thing at another PE firm, Denham Capital Management in Houston. Before that, Walter worked at Boston Consulting Group, primarily focused on evaluating upstream operations for E&P firms.

During a friendly visit, the two hatched an idea to form their own producing company. The casual discussion quickly turned to a serious plan that came to fruition as Colgate

Energy, named for the street on which they lived as children. Their initial focus was on the Delaware Basin. They had a modest initial backing of \$75 million, so they took an opportunistic approach to be efficient and keep costs low. That development mantra prevails today.

Their unusual co-CEO structure works because of their long friendship, of course, but also because Hickey takes care of the technical and engineering aspects of running the company while Walter is responsible for business development and finance.

Another prescient move was to adopt what has become known as Big Data. In an industry that tends to be individualistic—another echo of the early wildcatters?—Permian Resources evaluates every available data point from surrounding wells. All that information is aggregated to craft best practices for the company’s own wells.

—Gregory Morris, Contributing Editor

***“The childhood friends... are committed to the oil and gas industry’s relevance in the global economy for the long term, and are building Permian Resources on youth and data.”***





## Leading the Way to Net Zero Oil

# VICKI HOLLUB

## OCcidental PETROLEUM

**B**etween marching in the band at McAdory High School in McCalla, Ala., to playing in the Million Dollar Band while earning a bachelor's of science degree in mineral engineering with the petroleum option at the University of Alabama, Vicki Hollub found a way to find success.

That success continued at Occidental Petroleum, where she began as an operations manager in 1981, running EOR operations in the Permian Basin. In May 2016, she took on the mantle of CEO with the retirement of the legendary Stephen Chazen.

And while accepting the mantle from Chazen might have seemed like a daunting task at the time, Hollub has taken it on in apparent stride: growing the company through acquisitions that, while criticized at the time, now pay dividends for the firm and its shareholders, and being among the first corporate leaders in the energy space to make a major commitment to the energy transition.

Three years into her tenure as CEO, Hollub led Occidental in a bidding war with Chevron for Anadarko Petroleum. Occidental snatched the diversified E&P from Chevron's thrall with a deal that included \$38 billion in cash and the assumption of \$46 billion in debt, overwhelming the supermajor's \$48 billion offer. But the victory was initially bittersweet.

The acquisition added a portfolio of international assets, including a prime position in the Permian Basin, to Occidental's footprint. But energy shareholders' animosity toward corporate growth was reaching a fever pitch, and analysts and investors widely criticized Hollub and her team for chasing Anadarko with "a great degree of hubris and management ego." Activist



Occidental Petroleum

**Vicki Hollub has set her sights on the future of the energy transition and Oxy's role in it.**

investor Carl Ichan filed suit to stop the "misguided" deal, alleged Occidental's leadership was in over its heads, making "numerous blunders" that "might continue to trip over their feet if the board is not strengthened."

In the space of four years that included the pandemic's industry shakedown, Hollub has led Occidental to a \$58.8 billion market capitalization and the company is on track to pay off the acquisition in five years.

The industry has developed transformational technology, Hollub told Hart Energy.

"We've learned to challenge our paradigm," she said, adding that while it took George Mitchell 10 years to extract hydrocarbons from sourced rock, he eventually succeeded.

"That 10 years transformed the industry and made the shale revolution possible."

Advancements in technology, such as

the efforts Oxy is leading with regard to carbon capture, will continue to reshape the industry and how it does business.

All told, it makes the coming years an exciting time to be a leader in the energy industry.

"We see opportunities to make the energy transition work and then determine how your company or organization fits within the solution," she said. "We always want a competitive advantage and edge because it needs to be sustainable over time, create value for shareholders, and achieve what needs to be done.

"We're happy with the strategy we've laid out, and we think it's important for the world and the rest of our industry to adopt to help achieve the goal. And we may not be as far behind as people think—if everybody gets on board with what we're trying to roll out."

—Deon Daugherty, Editor-in-Chief



## Getting the Job and Deals Done

# CHRIS KALNIN

**BKV CORP.**

**B**KV Corp. Founder and CEO Chris Kalnin believes God may have given him a sixth sense: making deals.

“Not every deal I’ve made has been good, but we’ve done 21 transactions, and they have all been accretive for us,” Kalnin told Hart Energy.

Acquisitions made by the natural gas producer and electricity provider have included the purchase of power plants in Texas, assets in the Marcellus Shale and natural gas upstream with associated midstream infrastructure in the Barnett Shale area, as well as sealing deals in the carbon capture and sequestration space. One of the most memorable moments of his career came during the height on the COVID-19 pandemic.

“We were facing a major turning point for the company during negotiations with Devon over the acquisition of their assets in the Barnett Shale. We had to decide whether to proceed with the deal or not, and the future was uncertain,” Kalnin recalled. “It took extensive discussions, analysis, stakeholder alignment and everything I had learned about leadership throughout my life. I tapped into and utilized every bit of knowledge and experience, from my childhood to that moment.”

He called the deal “a remarkable achievement,” considering it came

during the COVID crisis, adding it was a pivotal point for the company. The purchase, valued at up to \$830 million, of Devon Energy’s Barnett assets in 2020 also elevated the company to top producer in the Fort Worth Basin.

In the years since, BKV has given new life to the old play, using refracs to boost output—all while working toward an ambitious mission to reach net-zero carbon emissions by 2030.

Deal-making was among Kalnin’s biggest accomplishments. Starting up BKV in 2015, despite “direct and indirect haters,” was also on the list. However, his 14-year marriage to his wife Rebecca topped the list.

“I don’t want to just be the best CEO; I want to be the best CEO, best husband and father at the same time,” he said. “The balance of those takes a lot of time but it’s intentional, and it’s part of who I am.”

Kalnin got his start in the energy industry as a consultant for McKinsey with his first project involving work for the Sultan of Brunei on long-term energy plans.

“Although I had no background in the industry, there was something about the combination of science, business, economics and geopolitics of energy that sparked a deep interest and curiosity in me,” said Kalnin, who later served as vice president of strategic business operations and planning at

Level 3 Communications (now Lumen) and a strategic adviser to the CEO at Thailand’s PTTEP.

“I fell in love with the industry and kept pursuing energy projects, which ultimately led me to pursuing the energy industry as an entrepreneur and founding the company that has grown to become BKV Corporation.”

BKV aims to “create sustainable, yet profitable energy,” something that Kalnin said sounds contradictory but can be accomplished with natural gas and carbon capture.

“We see the energy industry moving from a commodity-based to consumer-based market, because people care increasingly about where and how their energy is sourced,” he said. “BKV is setting itself up to be a company that delivers that energy safely and profitably to end-consumers in a way that negates and offsets its carbon footprint so we’re not creating more CO<sub>2</sub> for the environment.”

Climate change is the most important issue or challenge facing the energy business, he said.

Kalnin encourages other energy leaders to step up.

“Instead of denying or even pointing fingers, let’s just be the group of leaders that gets the job done. That’s what BKV is going to do.”

—Velda Addison,  
Senior Editor, Energy Transition

*“I fell in love with the industry and kept pursuing energy projects, which ultimately led me to pursuing the energy industry as an entrepreneur and founding the company that has grown to become BKV Corporation.”*

—Chris Kalnin





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## Making a Difference in CO<sub>2</sub> Emissions

# CHRIS KENDALL

## DENBURY

**C**hris Kendall did not originally intend to be part of the energy business; now, the CEO of carbon solutions company Denbury can't imagine being part of anything else.

A civil engineer by training, his first job out of college took him to South Louisiana, where offshore structures in the Gulf of Mexico reeled him into the oil and gas business. After beginning his career at Mobil Oil, he served in various international and U.S. leadership roles with Noble Energy before landing at Denbury.

"Denbury was not in a great position at that time, [but] I could see a pathway to where Denbury could lead in doing everything needed to put carbon dioxide underground and be part of the solution in a world that is continuing to grow its CO<sub>2</sub> emissions," Kendall told Hart Energy.

The company of about 800 employees has carved out a niche as a leader in the carbon capture, utilization and storage space and CO<sub>2</sub> recycler via its enhanced oil recovery operations. Its assets and capabilities captured the attention of Exxon Mobil, which agreed in July 2023 to acquire Denbury in an all-stock deal valued at about \$4.9 billion—a move that gives it access to the largest network of CO<sub>2</sub> pipelines in the U.S.

"We are moving 4 million tons a year of captured CO<sub>2</sub> underground permanently. Today, that's happening in enhanced oil recovery, which is on its own a fantastic story because of the low-carbon footprint that that barrel of oil has," Kendall said. "But in the future, it will go well beyond that. We'll be putting CO<sub>2</sub> into saline aquifers that will just go into permanent storage in vast quantities, and we'll use the same expertise and tools and assets that we have as a company to do that."

***"We have to reduce emissions, but we also have to make sure that the people can receive the energy they need. That's why I believe so strongly in CCUS as a huge part of that solution."***

—Chris Kendall

Denbury's accomplishments to date are the highlight of Kendall's career, he said, speaking about being part of a business where the future is visible.

"We can actually make a difference in carbon emissions. This is a company that is literally built to do that," he said.

Doing something with meaning and making a difference in the world is what motivates him to keep moving—that and making sure the company is doing right by its employees, giving them a place as well to do work with meaning and purpose.

The energy industry has an amazing opportunity to make a difference in the world, including by making affordable energy available in developing countries, Kendall added. He thinks about millions of people who die each year from respiratory illnesses associated with cooking indoors with coal, wood or animal dung.

"That could be solved so easily if we could find a way of getting propane gas just like you have in your grill distributed more readily and broadly across so many of these developing nations," Kendall said.

Like others, he sees providing reliable, affordable energy while addressing climate change is the biggest challenge facing the industry today.

"We have to reduce emissions, but we also have to make sure that the people can receive the energy they need," Kendall said. "That's why I believe so strongly in CCUS [carbon capture, utilization and sequestration] as a huge part of that solution."

Kendall wants others in the industry to know that the oil and gas business has developed the tools needed to grow the CCUS industry. Think of the ability to drill oil and gas wells, and similar skills honed to drill wells for CO<sub>2</sub> injection. The same holds true for pipelines, which move oil, natural gas or CO<sub>2</sub>, and scientists who model and monitor the movement of fluids deep underground.

"We use those same skills for CCUS. So, we have this. We don't have to go create something new here," Kendall said. "We have everything that we need within this industry to allow it to do much more than it's doing today."

Becoming part of Exxon Mobil, a company with identical views on CCUS plus deep expertise and a large balance sheet, would enable Denbury to do more than it would be able to do on its own, he added. "I just see it as a case where one plus one is something much greater than two."

—Velda Addison,  
Senior Editor, Energy Transition





## Communicator Takes on Carbon Challenge

# REG MANHAS

## LAPIS ENERGY

**A** lawyer with a love for oil and gas? That's exactly what Reg Manhas is, and his experience in both fields has taken him far and wide.

After receiving his chemical engineering degree from the University of British Columbia in 1989, Manhas went to work for Petro-Canada in its engineering training program. After obtaining his engineering license, Manhas returned to school to become a lawyer. He then transitioned back to the oil and gas industry, but this time as legal counsel for Talisman Energy, where he soon became vice president of corporate affairs.

"I was asked by our CEO to leave the legal department and create an external affairs sustainable function for the company," Manhas told Hart Energy. "I then spent the next 20 years basically working in that space of corporate sustainability, stakeholder relations, government relations."

During his time with Talisman, Manhas helped lead the company's entry into the U.S. shale business, as well as entry into Western Canada, Peru, Colombia and northern Iraq. In 2012, Manhas accepted a position as senior vice president of Kosmos Energy, where he helped build team communications functions, government relations functions, political risk functions, sustainability functions, and help the company manage its activities in West Africa.

Manhas succeeded because of his exceptional relatability and people skills.

"He's got great empathy, a great understanding of people, great understanding of business, and he knows how to establish relationships that both identify opportunities and then allow us to access them, too," said Brian Maxted, who hired Manhas at Kosmos. "He's a very good kind of interpolator in negotiations as well. He can operate at multiple levels, as well, is as good at the technical level

of the working level as he is in the C-suite and the boardroom."

Manhas' relational expertise has allowed him to work as an engineer, an attorney and a person who deals with local communities, whether in the Amazon jungle or in Western Canada with First Nations or in West Africa.

As CEO of Lapis Energy, his goal is to fund the best places to store carbon. He also looks to demonstrate that these projects can be developed in a safe and commercial manner.

"I think acknowledgement and awareness, not just within the energy industry, but more broadly within policy makers around the world, that if the planet is going to hit its carbon reduction targets by 2030, 2040, whatever the targets are that each country is setting, it's going to be virtually impossible to hit those targets without carbon sequestration playing a major role."

—Jaxon Caines,  
Technology Reporter

***"He can operate at multiple levels, as well, is as good at the technical level of the working level as he is in the C-suite and the boardroom."***

—Brian Maxted, formerly at Kosmos Energy



## Go-To Buyer of Non-Operated Positions

# NICK O'GRADY

## NORTHERN OIL AND GAS

**N**icholas (Nick) O'Grady serves as the CEO of Northern Oil and Gas (NOG), a position he's held since January 2020. O'Grady, 45, has nearly two decades in energy-related finance experience, both as an investment banker and as a principal investor. Throughout his years with NOG, he has been part of teams that have executed on acquisitions and related financings worth billions.

Under O'Grady's direction, NOG has gained a reputation as the go-to acquirer of non-operated positions. Since 2018, NOG has completed over \$3.2 billion of accretive acquisitions. This, despite the company not participating in large package M&A in 2020 during the COVID-19 pandemic.

Minnesota-based NOG continues to build scale as the largest dedicated public non-operated working interest company. The company's more recent step-outs into the Permian Basin and the Marcellus have expanded its non-operated business model and set up a strategic balancing act as the company continues to expand.

With M&A, "there has to be a

reason," O'Grady told Hart Energy. "So, it's really just taking swings at bat ... At the end of the day, you need a counterparty that's realistic, that buys and sells with the same methodology."

NOG's efficient operations have allowed the company to enhance its return profile. NOG boasts peer-leading cost structure and corporate return on capital employed, and with just around 40 employees, which is a scalable model.

NOG's growth comes amid an ongoing evolution in the oil and gas sector with an eye on a lower-carbon future. The industry still confronts headwinds to attract younger workers who might prefer the tech sector or other industries that offer a better work-life balance. Still, O'Grady is optimistic about the future.

"I think energy in general is broadening out," O'Grady said. "You have transition businesses in all kinds of facets; you have everything from solar, wind, battery technology and electric vehicles. I think, by nature, that stodginess is going away [and] certainly from a talent perspective."

O'Grady said his biggest fear

relates to the sector's reputation.

"The biggest thing that scares me is that everyone thinks that this industry is the devil," O'Grady said. "So, you have to convince young people, saying, 'We are truly necessary, we're not bad, we're actually making your life better.' There is a cost to that. We need to work better to do that."

O'Grady joined NOG in June 2018 as CFO. He was promoted to president in September 2019 and CEO in January 2020. He began his career with Bank of America in the natural resources investment banking group. Later he moved into the asset management business, working at companies such as Highbridge Capital Management.

Immediately prior to joining NOG, O'Grady worked at Hudson Bay Capital Management, where he focused on energy-related equities, public credit, and private and direct investments. O'Grady earned his Bachelor of Arts in both history and economics from Bowdoin College in Brunswick, Maine.

—Pietro D. Pitts,  
International Managing Editor

***"The biggest thing that scares me is that everyone thinks that this industry is the devil. So, you have to convince young people, saying, 'We are truly necessary, we're not bad, we're actually making your life better.'"***

—Nick O'Grady





## Money Manager of the Shale Boom and Energy Transition

# DAN PICKERING

**PICKERING ENERGY PARTNERS**

*“This is about the rocks and geology and pipelines and lots of capital, but it’s really also a lot about people.”*

—Dan Pickering

**G**rowing up in Missouri, where some 69,000 barrels of oil were produced in the last year, according to the state’s Department of Natural Resources.

Dan Pickering’s entrance into the energy business was not a given. However, he enjoyed science, and an engineering career beckoned.

“It seemed kind of exotic and exciting to an 18-year-old college freshman, and one thing led to the next, and then I was in the energy business for all my life,” he told Hart Energy.

During his first year at the Missouri University of Science & Technology in 1985, he crafted somewhere on the order of 50 letters on his typewriter and mailed them to oil and gas companies looking for an entrance. The effort paid off. The summer between his freshman and sophomore years, Pickering worked at Phillips Petroleum as a roustabout, a gig normally reserved for older students.

“That sort of got me the experience that led to the next job and then the next job,” he said. “And so, I would say a highlight was having the good fortune to get involved in the space early as a young college kid.”

After business school at the University of Chicago, Pickering went into money management at Fidelity Investments, where he was assigned to cover the energy sector on the heels of a long industry downturn in 1994.

“I got to see the sector go from down and out to being in really great shape,” he said. “I got to see the consolidation of the ‘90s.”

Fast-forward to 1996 and Pickering joined Simmons & Company International as a research analyst covering the energy sector under the tutelage of founder Matt Simmons, which paved the way for Pickering to

step out and start his own business—Tudor, Pickering, Holt & Co. (TPH), a move that, in his mid-30s, was “scary and exciting at the same time.”

“And I was lucky enough to have really great partners with Bobby Tudor and Maynard Holt. We bought the shale boom. Experiencing a boom like shale was amazing. To sort of build a business within an upcycle was so exciting,” he said.

He founded Pickering Energy Partners in 2019, deploying billions of dollars in capital to target oil and gas, as well as leading the industry with consulting and advisory insight.

“And then, starting again with Pickering Energy Partners ... You can’t teach an old dog new tricks, so we just wrote the same playbook and have been out enjoying the current recovery in the energy patch,” he said.

Leading the Houston-based firm, Pickering has found the disruptive impact of the energy transition too important to ignore—and capital has a big role in the megatrend that now defines much of the market. Last year, the firm created an energy transition advisory practice focused exclusively on clean energy, decarbonization solutions and other critical energy transition matters.

“The smarter we get about energy transition topics, the better we’re going to be at our specific jobs within the verticals. I believe that the word

‘transition’ is going to get dropped over the next 10 years, and it’s just going to be ‘energy,’” Pickering told Hart Energy when the team’s advisory board was created in September 2022.

The lessons during Pickering’s career, as well as those of the last 50 years for the industry, are many, but some stand out.

“You’ve got to have respect for the cyclicity. We’re in a commodity business. There are boom-and-bust cycles. I think the application of that to the future, that’s going to apply to the energy transition, too,” he said. “We’re going to see cycles in that business, too.”

The cyclicity applies to more than just supply and demand, and commodity prices. It also exists in the availability of capital.

“Sometimes folks want to throw money at you, and then they want to put you in bankruptcy,” he said. “I think that having a healthy respect for capital availability is going to be really important.”

And, he said, energy is a global business; its international component will remain key.

“This is about the rocks and geology and pipelines and lots of capital, but it’s really also a lot about people—whether that’s the partners you pick, either as individuals or core companies—having good partners, I don’t think that’s going to go out of style.”

—Deon Daugherty, Editor-in-Chief



## Champions of US Natural Gas

# RICE BROTHERS

## EQT/RICE INVESTMENT GROUP

**G**rowing up in Massachusetts, far from energy companies and oil and gas basins, the brothers Danny, Derek and Toby Rice were heavily focused on sports. They seemed highly unlikely to become involved in energy, let alone take leadership roles in the field. But their father, a successful investor, told them about emerging opportunities in the Marcellus Shale, and they decided to pursue it together.

Their combined efforts led them to found Rice Energy and build its Appalachian Basin holdings into a natural gas giant that EQT bought for \$6.7 billion in 2017. The story could have ended there with an early retirement.

But Danny Rice said he and his brothers did not like the direction EQT took the company they built.

"We needed to restore it to what we always envisioned," he told Hart Energy. "It [was] just cost spiraling out of control, not having good visibility with what business was doing from the top of the organization down to the lowest levels of the organization."

Danny Rice led a proxy campaign that ended with Danny on the board and his brother, Toby Rice, as CEO.

"They're young, but smart guys," said Michael Scialla, an analyst at Stephens. "You'd be worried maybe about concerns about nepotism ... but I think they're pretty highly regarded as good managers."

He said Toby Rice has led EQT to be more aggressive on acquisitions, including the recent Tug Hill acquisition that brings EQT quality infrastructure with lines that go to more favorable locations at cheaper costs.

Scialla also said the brothers are tireless champions of U.S. natural gas as a transition fuel. Toby Rice has pushed a campaign to "unleash" LNG with more pipelines getting the cleaner, cheaper fossil fuel to more customers.

Derek Rice, who has two degrees in geology and is a partner of Rice Investment Group, told Hart Energy that "the idea of going through the motions of investing in normal companies and making good returns just like every other private equity

group [does not] really motivate us."

He said he and his brothers are looking for business opportunities that will change the trajectory of energy.

The youngest brother, Ryan Rice, is a partner of Rice Investment Group and CEO and founder of ResNet AI, an oil and gas production surveillance and intelligence platform.

Toby Rice said he and his brothers talk about once a week on these shared goals.

"I would say we are very aligned in what's driving us right now. Because of the success we had with Rice Energy, money has not really been a driving factor for the brothers," he told Hart Energy. "I think what's driving us is making an impact on this world. And for me, particularly, when I saw the correlation between energy consumption and human progress, the more energy people use, the better quality of life and the longer they live. That to me was like a light bulb that went off."

—Patrick McGee,  
Senior Editor, Finance

*"We needed to restore [EQT] to what we always envisioned."*

—Danny Rice





## A Problem-Solver Takes on Methane

# VANESSA RYAN

## CHEVRON

**V**anessa Ryan, Chevron's manager of methane reduction, believes in collaborating on the hard stuff to make a difference in the world.

She has served as chair of the Environmental Partnership since its inception in 2017, and her focus is on helping companies of all sizes find ways to reduce methane emissions.

"None of us have all the answers, but together we have the best answers," Ryan said. "Our industry, unlike many others, has a track record of collaborating on the hard stuff. Safety has been an area where we've collaborated for decades now."

As a result, the industry's safety record improved significantly. She hopes the industry's focus on methane reduction will deliver similar results.

"What is really exciting and interesting about the oil and gas industry is that we can and do very regularly collaborate to solve society's hard problems. And I think it's very clear that we're well on that pathway in methane, as well," she said.

The Environmental Partnership, which has grown from about two dozen members in 2017 to more than 100 under her leadership, is one way the energy industry can collaborate on the common goal of reducing methane emissions from operations.

"We facilitate learning from each other in a way that truly is learning from each other. Chevron has taken best practices from very, very small companies, and I think that they have had the opportunity to learn from us as well," Ryan said.

Matthew Todd, former director of the Environmental Partnership and co-founder of Aerscape, said it takes special skills to lead a group with more



**Vanessa Ryan, manager of methane reduction at Chevron.**

Chevron

than 100 company members.

"She is incredibly knowledgeable about the industry and where there are opportunities to drive further progress. It's not just having a technical understanding of industry and its operations, but being able to navigate all of the different stakeholder groups as well," he said. "She's been able to build really meaningful relationships" with industry, state and federal government representatives as well as the environmental community.

Ryan, who considers herself a problem-solver at heart, grew up in a family of engineers. Talking through problems was promoted as the best way to figure out how to solve them, she said.

She earned a bachelor of arts degree in political economy from University of California at Berkeley, and her master's degree in public policy from University of Southern California. She joined Chevron in 2007 as a public policy adviser and has since had a

number of different opportunities within the company. Along the way, she has risen through the ranks, serving as policy, government and public affairs coordinator in Vietnam, senior adviser for Asia Pacific Exploration & Production, senior adviser for shale issues, senior adviser for energy transitions, carbon reduction manager, and climate and carbon policy manager before being named methane reduction manager in 2022.

She has two sons who love technology.

"One of the cool parts about my current job is that I have immense street cred with my kids because they know that I get to fly drones and satellites for work and that we contract LIDAR companies," she said. "They love to sit around the dinner table and listen to some of the cool technology stuff that we get to deploy at work."

—Jennifer Pallanich,  
Senior Editor, Technology



## Moving the Needle With Data Science

# RYAN SITTON

## PINNACLE

**W**hile a commissioner with Texas' poorly named Railroad Commission that regulates oil and gas—not locomotives—Ryan Sitton suddenly found himself in the throes of the pandemic and a global oil price war between the Saudis and Russians in early 2020.

Sitton, tilting at metaphorical windmills, helped push a plan endorsed by some—but not most—oil producers to force the temporary limitation of Texas production volumes to help stabilize prices. The unpopular effort failed mightily, but, less than a month later, the benchmark oil price fell into negative pricing territory for the first time ever.

Sitton, after all, was just following the data.

And that's what he continues to do as the CEO of Pinnacle, which he founded in 2006, for industrial data solutions and analyses. And the company is continuing to grow in today's age of artificial intelligence (AI).

"We have always been a company that went out and pulled together all of this data and did complex system analysis," Sitton told Hart Energy. "But, in 2006, data science was not a thing. People who used statistics and data aggregation were not sexy. In fact, it was really boring.

"Fast forward, and this thing we've been doing for 17 years all of a sudden is incredibly sexy. And, fortunately for us, we got into it very early."

Pinnacle now focuses on preventative systems modeling and analyses for the biggest oil and gas facilities, refineries, petrochemical plants and other massive manufacturing facilities. Specifically, Pinnacle focuses on the machine learning realm of AI.

Sitton compares Pinnacle's software-driven business model to the savings drivers now get from vehicle computers

*"In 2006, data science was not a thing... Fast forward, and this thing we've been doing for 17 years all of a sudden is incredibly sexy."*

—Ryan Sitton

analyzing when an oil change is needed. Drivers are saving money because they no longer have to get their vehicles serviced every 3,000 miles or three months, whichever came first, because now they can wait longer for when their vehicles more accurately alert them of the need.

"Well, scale that up across the most complicated facilities on Earth," Sitton said. "It's not that hard to figure out the optimal time to change my oil, but there's only 600 refineries in the world, and they're all unique animals. So, there's no easy way to figure out the optimal time to change that oil or do that inspection or change those tires. So, you're talking about facilities that are 1,000 times more complicated than your truck, and where the dollar impacts are 10,000 times the size."

### Moving the needle

On the Railroad Commission, Sitton often bucked the established power structure, but he still helped to move the needle on necessary well plugging and abandonment issues, as well as wastewater challenges. And he also drove more attention to the ever-quirky effort to get the Railroad Commission out of the shadows and renamed to something that actually fits its responsibilities.

So, despite his frustrations, Sitton still feels like he accomplished a lot during his six years as a politician.

But it's his work as an entrepreneur

where he believes he's making the biggest difference.

Sitton started his career in the OxyChem side of Occidental Petroleum before moving onto Marathon Petroleum. He later left for a leadership assignment in Australia, ultimately starting a new division for the smaller firm Berwanger Inc.

"So it turned out to be a real blessing because I went there to do small-project engineering and ended up turning into somewhat of a small business entrepreneur."

That experience proved invaluable when Siemens acquired Berwanger and laid him off. His Berwanger work gave him the confidence he needed to branch out and found Pinnacle.

The initial Pinnacle Asset Integrity Services company focused on fixed, stationary equipment in the energy sector. But acquisitions and experience brought Pinnacle to service some of the world's biggest and most complicated industrial facilities.

Pinnacle became PinnacleART in 2015 after acquiring Advanced Reliability Technologies. Then rebranded to just Pinnacle in 2020, focused on "data-driven reliability." Since then, the company has acquired Trinity Bridge, a specialty risk-based inspection firm and, more recently, AllAssets from Lloyd's Register.

If Pinnacle can help with the reliability of refineries, he said, "We can really help the reliability of the human race."

—Jordan Blum, Editorial Director





## Developer of Frac Tech to Unlock the Barnett

# CHRIS WRIGHT

## LIBERTY ENERGY

**C**hris Wright was 15 when he decided he wanted to jump headfirst into the energy industry.

He saw energy as a means to address the issue of poverty and realized that access to energy is crucial for improving the quality of life for individuals and societies.

"I was 12 years old and saw a homeless person on the street in downtown Denver and I didn't know anything about substance abuse or mental illness, but I just couldn't believe there was someone without a roof over his head, food to eat," Wright told Hart Energy. "So, that has been a lifelong obsession or focus with me and in my youthful studies of what changes people's lives. Energy's just central in that role. You've got poor societies or poor people—they just have less access to energy and therefore lower qualities of life."

Wright decided he wanted to do something about it and settled on a career in the energy industry at age 15 after hearing that the world was "running out of oil, gas and coal."

After high school, Wright studied fusion energy at MIT, then focused on solar energy as a graduate student at the University of California at Berkeley. After grad school, he landed a job in geothermal energy. Despite choosing to work in these groundbreaking fields, he got the itch to work with traditional energy sources when he joined Hunter Geophysics in the late '80s.

"I got a job there, but they had a technology that the main application was the oil and gas business," Wright said. "So, I already knew I was going to be in energy, but that was kind of my entree to oil and gas. And then I kind



Liberty Energy

**Chris Wright: "Everyone in the company feels this mission, that our job is to better human lives, not just for ourselves and our families, but for our communities and for the world."**

of dug into numbers. I'm a data nerd. Before I looked at numbers, I'm like, maybe this thing about running out of oil and gas isn't true," he said. "So, then I realized, 'hey, if I want to really be in the energy business, I should be in oil and gas.'"

Wright started a company that developed technologies for mapping fractures. In what he calls a stroke of luck, he met someone from Mitchell Energy who convinced him to go to Texas and try out his frac solutions in the Barnett Shale. The technologies Wright developed helped launch commercial Shale gas production in the late 1990s.

In 2011, Wright founded Liberty Energy, an oilfield services firm

that offers completion services and technologies to onshore E&Ps. He has served as chairman and CEO since its inception in what he calls his "most rewarding experience."

"I'm humbled and thrilled to be part of the American oil and gas industry that has changed the world energy situation for the better. We've lowered the price of oil, we've lowered the price of natural gas and helped about 100 million people every year get clean cooking fuel for the first time."

"Everyone in the company feels this mission," he said, "that our job is to better human lives, not just for ourselves and our families, but for our communities and for the world."

—Jaxon Caines, Technology Reporter



TANK 1000  
CONDENSATE  
STORAGE



*Another day starts at Newfield Exploration Co.'s operations in the Greater Monument Butte area in Utah in March 2012. (Tom Fox/Hart Energy)*



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*Wind and snow pelt rig hands at a Niobrara Shale well in Wyoming. (Lowell Georgia/Hart Energy)*

# Price Volatility? You Ain't Seen Nothin' Yet

The past is prologue: From Rockefeller to the RRC to OPEC, there have been endless efforts to control the price of oil. They haven't worked. And they won't.

**JOSEPH MARKMAN, SENIOR MANAGING EDITOR**

John D. Rockefeller figured it out back in 1869. All that was needed to stabilize the price of oil was a mechanism for crude refiners and drillers to agree on a price, then enforce production limits to maintain it.

The 1872 "Treaty of Titusville" between Rockefeller's National Refiners' Association and the Petroleum Producers Union in Pennsylvania did just that. It set a price of \$5/bbl (\$125.28/bbl in 2023) and a production ceiling of 15,000 bbl/d. This landmark agreement

proved that entities normally at odds with each other could make a mutually beneficial deal for long-term gain.

It lasted for several hours. "Just as the Treaty of Titusville was inked, discipline among producers once again collapsed and wild drilling resumed," Robert McNally wrote in his 2017 book, "Crude Volatility: The History and the Future of Boom-Bust Oil Prices." By January 1873, the market price had fallen to \$3.29/bbl (\$82.44/bbl in 2023) and spot prices had sunk as low as

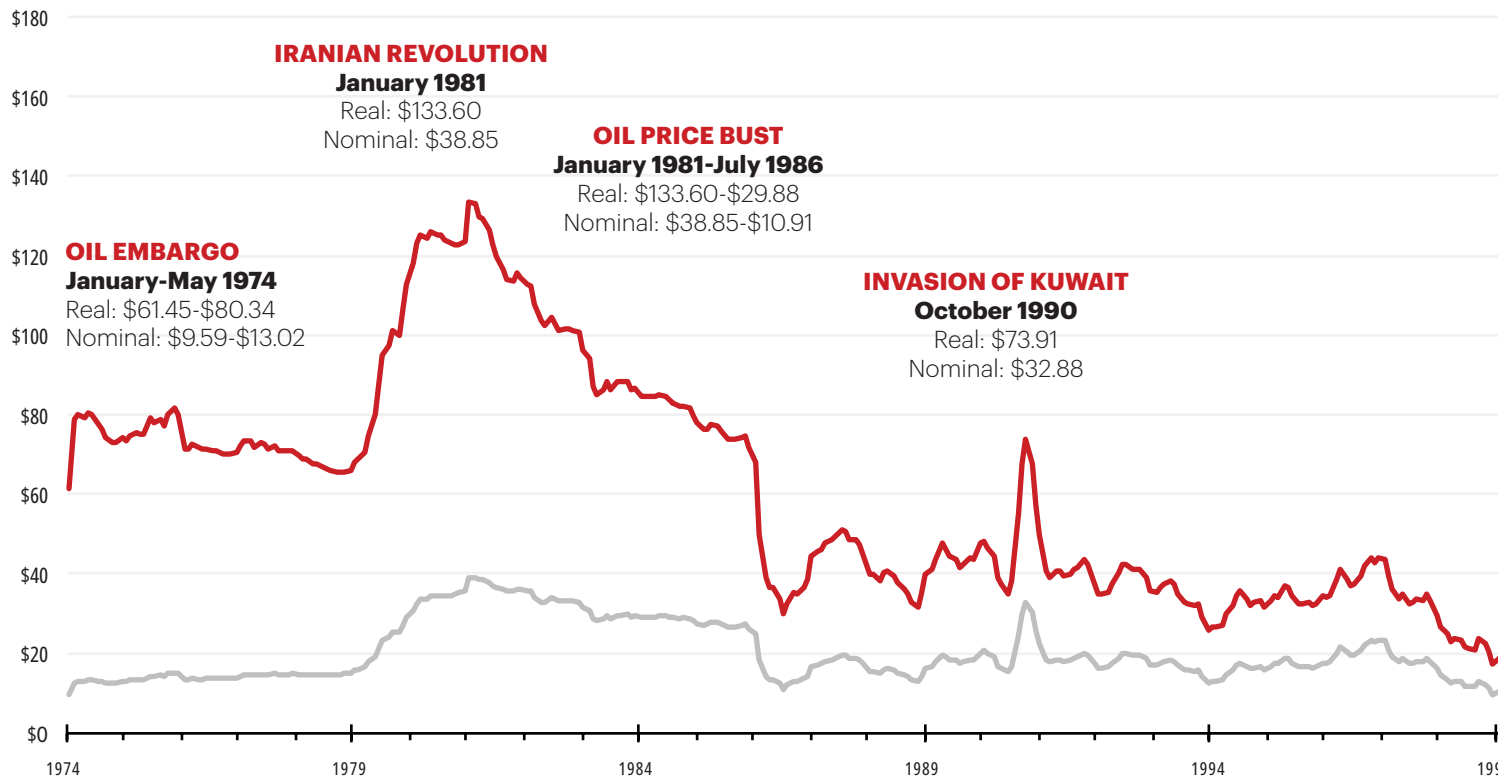
\$2.60/bbl (\$65.15/bbl), McNally wrote.

The volatile nature of oil prices has gripped the energy industry—in day-to-day operations and strategic planning—almost since Edwin L. Drake struck oil in Titusville, Pa., in 1859 and made drilling for crude a viable business.

"It's always been a cyclical commodity," Mark Finley, fellow in energy and global oil at Rice University's Baker Institute for Public Policy, told Hart Energy. "It's also been a commodity that has been prone to someone trying to manage it, whether

## The cost of crude, with inflation factored in

Monthly imported crude oil price, \$/bbl, nominal (price at the time) and real (price in January 2023 dollars)



Source: EIA Short-Term Energy Outlook, January 2023



it was the Standard Oil monopoly or the 'Seven Sisters' or the Texas Railroad Commission or OPEC."

Demand for oil is driven in large part by demand for refined oil products in transportation. That component of the equation is inelastic, in that motorists who drive to work are likely to fill their tanks with gasoline whether the price rises or falls. By contrast, a shopper in a grocery store engages in elastic demand. If apples are cheap, apples are bought. If apples become more expensive and oranges drop in price, then oranges end up in the shopping cart.

"The challenge with the oil market as it relates to boom and bust is really the imbalances that we see between supply and demand," Angie Gildea, national sector lead for energy, natural resources and chemicals at KPMG, told Hart Energy. "As demand changes as the economy expands and contracts, you have changes in consumption and demand, which drives one side of the equation. But then, supply also changes with things like geopolitical events or weather or things like that."

But unlike demand for oil, supply is elastic. When the price rises, producers have traditionally pumped more of it out



*“As demand changes as the economy expands and contracts, you have changes in consumption and demand, which drives one side of the equation. But then, supply also changes with things like geopolitical events or weather or things like that.”*

—Angie Gildea, national sector lead for energy, natural resources and chemicals, KPMG

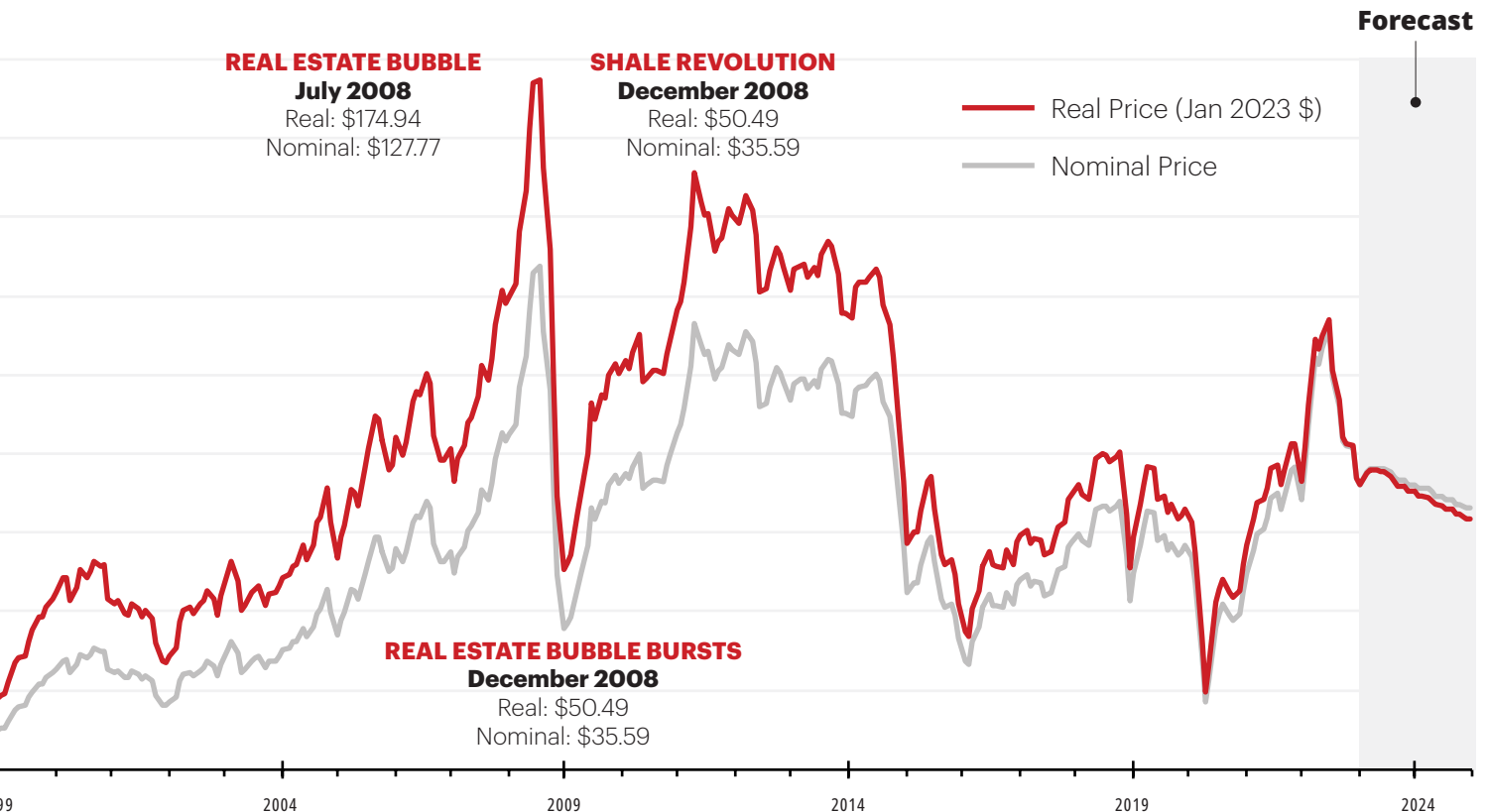
of the ground. That greater supply on the market pulls the price down, which eventually motivates lower production. The lower supply creates scarcity on the market, which pushes the price up again. A lot of people make their livings tracking these trends.

**Stability at last**

Stung by the failure of unruly producers to stick to the Titusville deal, Rockefeller

(who went by the code name “Chowder” among business associates) went back to work. In 1875, he organized the Central Association, a group of refiners who agreed to lease their assets to the association in exchange for stock in Rockefeller’s Standard Oil Co.

“In the rate war among the railroads, the Central Association occupied the enormously strategic position of controlling nine-tenths of the refining



business of the country,” Gilbert Holland Montague declared in a 1905 article for *The North American Review*. “The dominance thus gained over the transportation situation firmly established the Standard Oil Company in its present supreme position.”

Rockefeller controlled not just the bulk of the refining sector but the bulk of the oil pipelines in the U.S., as well as a chunk of the country’s storage capacity. A wildcatter seeking to bypass the original oil baron would first need to find a non-Rockefeller refinery to buy his oil, then figure out a way to get it there without access to pipelines or the railroads, whose own robber barons were in cahoots with Rockefeller. Good luck with all that.

In essence, the price of oil was

dictated by how much Rockefeller wanted to refine, and how much he was willing to pay to refine it. Excess production was no longer a problem because there was nowhere for the excess oil to go.

The result was the long-sought stability Rockefeller craved. In the 21 years prior to Standard Oil’s overwhelming control of the market, crude oil prices fluctuated an average of 53% per year, according to McNally’s calculations. During the Standard Oil era, with boom-and-bust a thing of the past, that fluctuation was reduced to a mere 24%.

But that control was limited to the U.S. market, and wasn’t destined to last. The oil business had taken off globally and Royal Dutch Shell was developing

into a powerhouse. Antitrust fervor in Washington—leading to passage of the Sherman Anti-Trust Act of 1890 and President Theodore Roosevelt’s effective use of it to go after conglomerates—resulted in the dissolution of Standard Oil by Supreme Court decision in 1911.

### Texas takes a turn

Rockefeller understood how the oil price roller coaster cut into margins and drove some companies out of business. He cared about the former, not so much about the latter, and did everything he could to try to get it under his control.

When the federal government took control out of his hands, state governments took a crack at breaking the bucking bronco of an industry.

Oklahoma’s first major oil play was

## NOTHING BEATS LIGHT AND SWEET

While the industry expression, “not all barrels are created equal” is true, it’s also true that if enough barrels are created in a way that is more or less the same, they can establish a benchmark price.

Two general criteria are typically used to set a benchmark. One is API gravity, which relates to viscosity, or how heavy

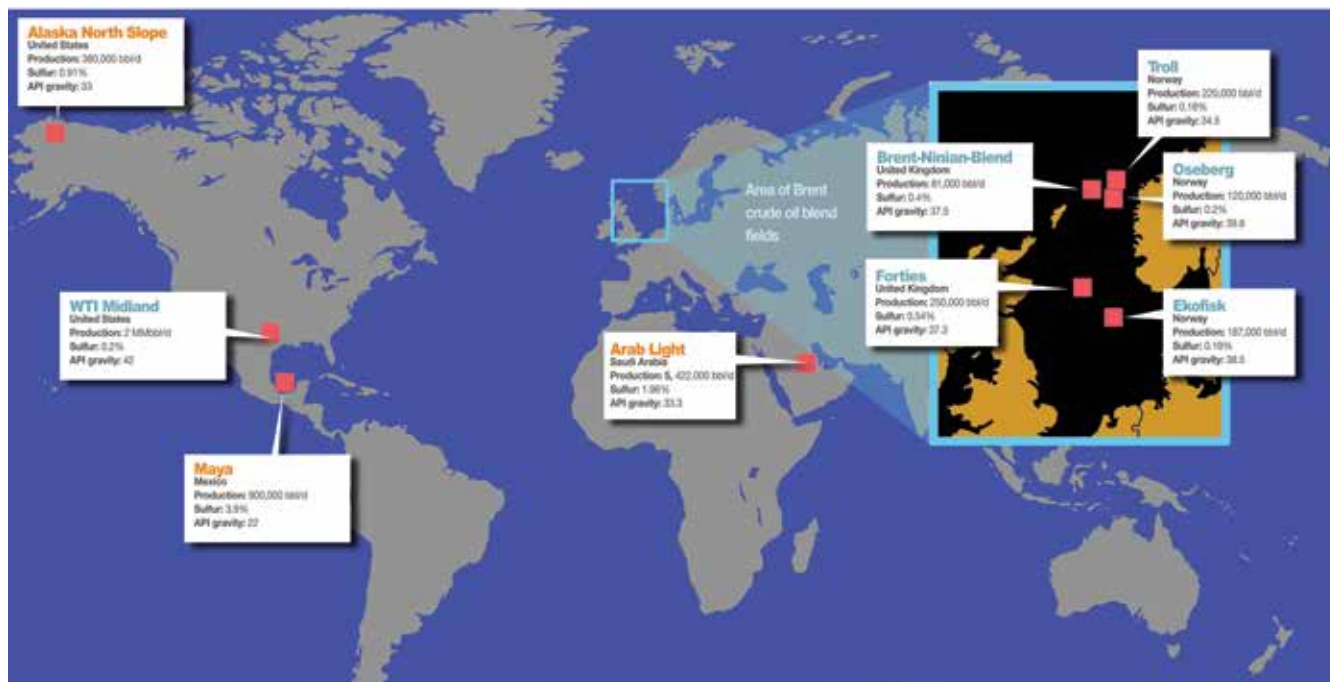
or light a particular oil is compared to water. If an oil’s API gravity is greater than 10, it is lighter than water and will float. If less than 10, it is heavier and will sink. (Only one oil on Platts periodic table of oil, Sqepuri in Albania, is listed as less than 10.)

The other standard is sulfur content. Air quality regulations across the globe

mandate that sulfur be removed in the refining process. The greater the presence of sulfur, the more expensive it will be to eliminate.

“When you bring a benchmark, you need to hit those specs in the blend,” Birol Dindoruk, professor of petroleum engineering, and chemical and biomolecular engineering at the

### Selected crude oil grades



Source: S&P Global Commodity Insights



Glenn Pool, discovered about 12 miles south of Tulsa in 1905. Overproduction dragged the price down to only 30 cents/bbl. In 1914, the Oklahoma Corporation Commission (OCC), an agency of state government, responded by ordering oil from the Glenn Pool field to be priced at no less than 65 cents/bbl. There was no enforcement mechanism so the order was ignored.

The next year, the state legislature authorized the OCC to restrict production in particular fields in which supply exceeded demand. Those restrictions were ignored, as well. The oil business was so lucrative that operators were incentivized to produce more and risk repercussions. Even the declaration of martial law and dispatch of troops into the fields to shut down wells didn't have

much effect.

Texas had more success. The Railroad Commission of Texas (RRC) utilized a series of measures, including quotas on low-cost, highly productive wells that did not require artificial lift, to protect small producers from price busts and maintain stability for the state's economy.

"Designed to help small, high-cost producers, (the) quota system added to overall oil production costs and kept oil prices higher than they would have been under purely competitive conditions," McNally wrote.

Business historian William R. Childs estimates that the RRC controlled 35% to 45% of all oil and gas produced in the U.S. between 1930 and the 1970s. That's a lot of power concentrated in one state government agency, but as far as boom/

bust was concerned, it was a success. During that time, the price of oil varied by an average of 3.6%.

"Favoring small producers was economically wasteful, as it led the commission to approve the drilling of thousands of wells that were marginal producers," the Texas State Library and Archives Commission says on its website. "The extra investment spurred exploration, but it also contributed to higher costs.... In the long run, these costs would hurt the ability of Texas oil to compete with foreign imports."

That foreign oil was coming from the Middle East. And there was a lot of it.

### Feelings of energy insecurity

The sheer volumes needed to satiate the world's thirst for fossil fuels in the



University of Houston, told Hart Energy.

The international benchmark is a blend commonly referred to as Brent, but actually

refers to production from five fields in the North Sea: Brent and Forties (UK) and Oseberg, Ekofisk and Troll (Norway). Output from the original Brent field is a small fraction of what it was and, in May, WTI Midland was added to the group to add muscle to a weakening brand.

But gravity and sulfur content are not the only metrics used to determine price.

"Your oil may have some metals in it that people don't want," Dindoruk said. "When you look at these benchmarks, they don't cite it, but of course, the buyers know that from analysis. You may think that you are selling it as WTI but if you have some nasty stuff in it, the buyer is going to discount the price as well."

So, not only are all barrels not created equal, they are not equal even within the U.S. benchmark WTI traded in Cushing, Okla. The WTI grade that was added to the international Brent benchmark collective is restricted to a particular light, sweet crude extracted in fields near Midland, Texas in the Permian Basin.

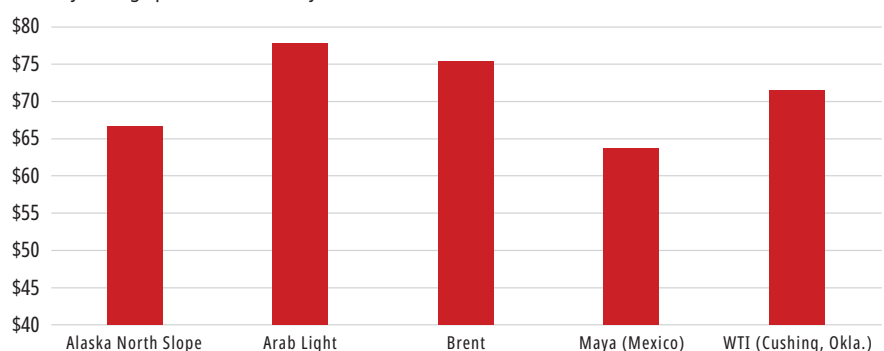


Shell International

**Diminished production from the Brent field in the North Sea has resulted in decommissioning of assets there. The Brent Delta topside, on a barge, turns into the mouth of the River Tees in Hartlepool, England, in 2017.**

### Selected crude prices

Monthly average price, US\$/bbl, May 2023



Source: EIA



U.S. Environmental Protection Agency

***His expression says it all: The price of gasoline may have soared during the oil embargo, but at this station in May 1974, there wasn't any to be bought.***

booming 1950s and 1960s shifted much of the global oil market power to producers in the Middle East.

In the years following World War II, seven large international oil companies (Exxon, Gulf, Texaco, Mobil, Standard Oil of California, BP and Shell), dubbed the "Seven Sisters," pretty much controlled global production and price. In the mid-1950s, for example, the Seven Sisters in the Middle East held 12% of the world's oil supply off the market to keep prices steady, McNally wrote. Some 23% of global output was held off in the U.S., mostly in Texas by the

RRC, during that time.

Middle East oil was owned by the Arab countries but they had to strike deals with the Seven Sisters to produce and sell it. By the 1970s, they made clear they were done negotiating and would set supply limits unilaterally.

In October 1973, Egypt and Syria attacked Israel. In response to a major U.S. aid program to support Israel, the Organization of Arab Petroleum Exporting Countries banned crude exports to the U.S.

From a market perspective, the embargo had only a short-term

effect and did not change U.S. policy. But from a psychological perspective, the long lines for gasoline and spiking fuel prices had a huge impact. Suddenly, the most powerful nation on earth found itself extremely vulnerable. Energy security joined the lexicon and U.S. energy independence became the goal.

### **Geopolitical shift**

The full OPEC cartel, however, is not a modern Standard Oil or RRC or Seven Sisters. It has never held the stranglehold on supply and price like previous crude power brokers because too many forces—geopolitical and economic—have been beyond its control.

One of them was the Shale Revolution, which not only slashed U.S. imports but thrust the country back into the realm of oil exporters. Another is the energy transition, in which net-zero carbon emission goals have led many oil customers in the industrialized world to favor renewable and other cleaner fuel sources over fossil fuels.

Major economic disruptions also factor in. The real estate bubble that burst in late 2008 tested the inelastic nature of gasoline demand. In fact, motorists showed that they would not buy as much fuel when their incomes decreased. The COVID-19 pandemic had the same effect. When the world shut down, the low price of gasoline was meaningless because there was nowhere to go.

If not an actual geopolitical sea change, there has, at least, been a perception of one. In 1980, President Jimmy Carter laid out what is known as the Carter Doctrine, in which he pledged U.S. military force to defend its interests in the Middle East, namely the flow of oil to the U.S. and western Europe.

Those interests were challenged in late 1990, when Iraq invaded Kuwait and took over the OPEC member's oilfields. President George H.W. Bush responded by building a 38-nation coalition to oust the Iraqis.

Ostensibly, Operation Desert Storm was about defending an ally from aggression, but "we wouldn't have defended Kuwait if Kuwait hadn't been a big oil producer," Finley said.

In 2019, however, the biggest oil producer of them all, Saudi Arabia,





U.S. National Archives

**Two Marine Corps M-1A1 Abrams main battle tanks move across the desert during the ground phase of Operation Desert Storm on Feb. 24, 1991. While the given reason for the war was to liberate Kuwait, “we wouldn’t have defended Kuwait if Kuwait hadn’t been a big oil producer,” said Mark Finley of Rice University’s Baker Institute for Public Policy.**

came under attack. Iran-backed Houthi rebels hit the Khurais and Abqaiq oil processing facilities, forcing the Saudis to suspend production of 5.7 MMbbl/d. While President Donald Trump offered U.S. support for Saudi self-defense, he didn’t offer U.S. forces.

“It was every energy security analyst’s worst nightmare,” Finley said. “And President Trump’s response was, ‘it’s not an attack on America. We don’t import that much oil from Saudi Arabia. Not our problem.’”

Finley disagrees. It still is a U.S. problem, he said, and noted that about 20% of the world’s oil traverses the Strait of Hormuz. The Navy’s Fifth Fleet remains based in Bahrain, where it patrols the Persian Gulf, Red Sea, Arabian Sea and parts of the Indian Ocean.

“It’s a global marketplace and oil is still the biggest fuel for the U.S. economy,” he said. “So, the United States is still vulnerable, even if we don’t import oil from Saudi Arabia. But I think the political reality was very clear and it was very clear to the Saudis, too.”

### The more things change...

The world has changed in countless ways since John D. Rockefeller bought large tracts of oak timber in 1870 to produce his own 42-gallon barrels. The desire to control the price of oil, however, and the market’s refusal to cooperate, has not.

“I think we are going to see volatility in prices continue for the foreseeable future,” said Emma Richards, London-based associate director for oil and gas at BMI. “I don’t think that we are going to move away from the kind of cyclical nature that has always characterized that industry.”

But the energy transition does introduce a twist: “I think, increasingly, those price swings will be policy led,” she said during an August webinar. “So, the nature of the cycles will change somewhat.”

What determines price in the energy transition really comes down to which progresses faster—policies that hold back supply or policies that curtail demand.

“We’re never going to find a perfect balance between those two things,” Richards said. “So, in periods where the supply is more heavily curtailed,



Mike Blankenship

we’ll see prices rise and vice versa when demand-side policies come more into effect.”

“Volatility is the name of the game,” Mike Blankenship, managing partner of Winston & Strawn’s Houston office and co-head of its energy and infrastructure industry group, told Hart Energy. “I do think that is changing, though, with the energy transition.”

Gildea believes the development

of renewables and other non-fossil fuel sources could ultimately help to tame price volatility.

“There’s the potential that we could have some stability, more stability, in oil prices longer term as we have more options around different types of fuels,” she said. “Also, as we have more technology advances from energy storage and things like how we’re managing the grid system. That could potentially provide more stability from a price perspective.”

It won’t happen overnight, she said, but will evolve over the next 50 years. But will the energy transition impact prices in the short term?

“My reaction would be yes,” said Urszula Szalkowska, Poland-based managing director for Europe at EcoEngineers, a global consulting firm that works with companies to navigate the energy transition.

“Especially in Europe, where in road and aviation, there is a steep decarbonization through biofuels.

“My thinking is that this is going to impact demand for fossil fuels,” she told Hart Energy. “[Producers] will have to look for different markets, like chemicals, where decarbonization is expected through more efficient processes, which also adds to the price.”

The difficulty in predicting prices between now and 2050, when the world aspires to be net zero, stems from the difficulty in predicting anything over the next 27 years. The past teaches us that we often have no clue as to what the future holds.

In 1996, for example, the Shale Revolution was but a twinkle in George Mitchell’s eye.

“People didn’t know that cell phones were going to be the way we live,” Blankenship said. “And that people are going to become billionaires because of apps on cell phones.”

In his opinion, the technology that will drive oil and gas and the energy transition has not been invented or, at least, perfected yet.

Rockefeller may have figured out how to manage the price swings inherent in energy, but he couldn’t manage them forever. Neither could anyone else.

And if past is prologue, the markets of the future offer this certainty: they will be volatile. ■

# Been There, Done That, Moving Forward

While a supply crisis drove shifts in energy and policy during the 1970s, innovation and economics have driven other transitions, such as the moves from firewood to coal to oil and natural gas. Renewable energy and low-carbon energy resources have taken center stage.

**VELDA ADDISON, SENIOR EDITOR, ENERGY TRANSITION**

**T**urn the clock back about 50 years. Joe Powell recalls pumping gasoline for customers at a Texaco station in a Maryland suburb during a time of panic.



**Joe Powell**

It was his first job in high school, an introduction of sorts to the energy industry for the former chief scientist for Shell, who now

serves as director of the University of Houston Energy Transition Institute. At the time, it wasn't the threat of global warming that nudged the industry to shift to different energy sources to meet demand. Instead, fears of peak oil ran rampant in the U.S.

"We thought we'd run out of oil resources and there was gasoline rationing because of the oil embargo," Powell said. "So, you could only buy gas on an odd or even day, depending upon your license plate number. We had really no idea."

Little global oil exploration had occurred, and "we certainly didn't know what we had in the U.S. very well," he said, hinting at massive natural gas reserves and shale oil. The president "was telling people we were out of energy, put on a sweater or get used to being cold. Then, we had a national speed limit of 55 miles per hour because cars were more efficient at a lower speed."

The energy crisis led to a push for energy security as President Richard



API Photograph and Film Collection, Archives Center, National Museum of American History, Smithsonian Institution

***The energy crisis of the early 1970s fast-tracked congressional approval of the Trans-Alaska Pipeline System to move crude oil from drilling sites such as Alaska North Slope Prudhoe Bay No. 1, shown in 1969.***

Nixon's Project Independence aimed to eliminate oil imports by 1980. The focus was on domestic oil and gas production, nuclear energy, technology and fast-tracking projects, including approval of the Trans-Alaska Pipeline System.

President Gerald Ford followed with more emphasis on oil production, nuclear and coal.

Powell remembers the coal gasification movement as being one of the major shifts in energy, one that

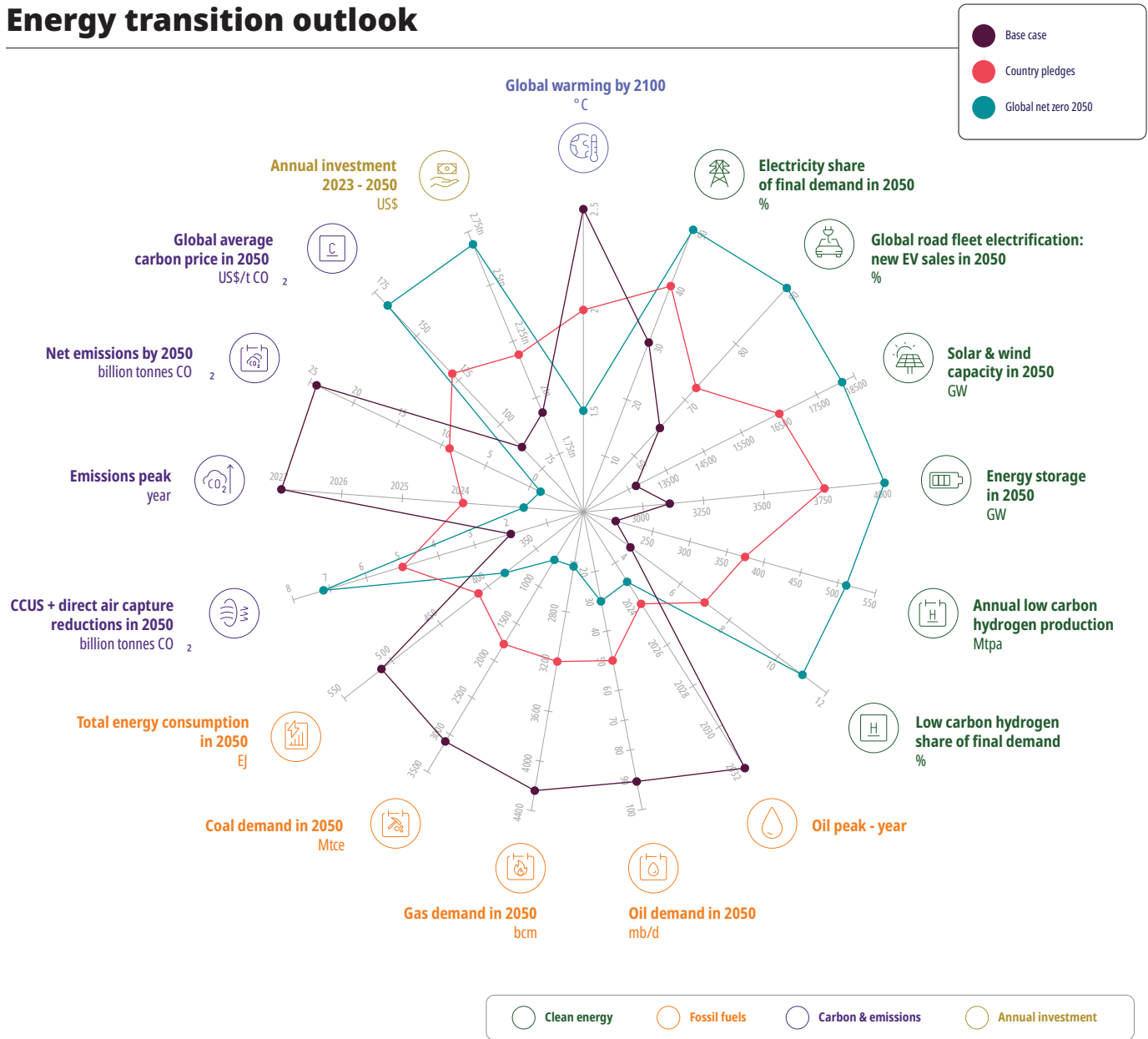
drew him into the energy field.

"We knew we had coal and you could gasify that to make gasoline and diesel by technology that had been 30 years old by then," Powell said, later characterizing the shift in energy during the 1970s as "scary, about having to do without and concerns on what it meant for quality of life going forward for U.S. citizens."

While a supply crisis drove shifts in energy and policy during that decade, innovation and economics



# Energy transition outlook



Source: Wood Mackenzie

**A consolidated view of Wood Mackenzie's three different pathways for the energy and natural resources sector as outlined in its Energy Transition Outlook**

have driven other transitions, such as the move from firewood to coal to oil and natural gas. Renewable energy and low-carbon energy resources have taken center stage in the latest energy transition to combat climate change. Just as with previous energy transitions, demand continues to grow.

## A changing world

Declining capital costs combined with government subsidies, including

from the Inflation Reduction Act (IRA), are expected to continue fueling growth and investment in renewables in the U.S. to meet electricity demand. The U.S. Energy Information Administration (EIA) forecasts the electricity mix will shift from fossil fuels to renewables by 2050 with power generation from renewables jumping to 44%.

Across cases examined in the EIA's "Annual Energy Outlook 2023," solar and wind generating capacity could

see triple-digit increases between 2022 and 2050. Under different scenarios, solar generating capacity rises by about 325% to 1,019% by 2050, while wind generating capacity increases by about 138% to 235%.

Policy momentum, including the IRA, REPowerEU in the EU and China's 14th Five-year Plan for Renewable Energy, and global energy crises are driving renewable power growth in 2023, according to the International Energy Agency (IEA). In a Renewable

Energy Market update, the IEA said global renewable electricity capacity could jump to 4,500 GW in 2024, equivalent to the combined power output of China and the U.S.

Despite the growth, only three of the 50 components tracked by the IEA are fully on track with the Net Zero Emissions (NZE) by 2050 Scenario. These are solar photovoltaic, electric vehicles and lighting.

“Wind, hydro, geothermal, solar thermal and ocean energy use needs to expand significantly faster in order to get on track. Non-bioenergy renewables need to increase their share of total energy supply from close to 5% today to approximately 17% by 2030 in the NZE Scenario,” the IEA said. “To achieve this, annual renewable energy use must increase at an average rate of about 13% during 2023-2030, twice as much as the average over the past five years.”

The IEA pointed out there has been rapid growth in clean energy technology deployment, despite not being fully on track globally. For example, installed capacity for electrolyzers—key in the production of electrolytic hydrogen—grew by more than 20% in 2022, while manufacturing capacity increased by more than 25%.

Progress is faster in areas with available technology and falling costs, the IEA said. It also noted that the transition is taking place at “different speeds across regions and sectors.”

Others seem to agree.



API Photograph and Film Collection, Archives Center, National Museum of American History, Smithsonian Institution

**In the early stages of building the Trans-Alaska Pipeline System, a surveyor works on the North Slope of Alaska.**

**Energy trilemma lingers**

Experts from the Washington, D.C.-based Energy Policy Research Foundation (EPRINC), a nonprofit that studies energy economics and policy issues, discussed how the world could look in 2030 and 2050 during a Hart Energy conference.

“The global energy transition will not be linear, but it will be multi-speed and multi-track,” said Batt Odgerel, director of energy transition research at EPRINC.

The starting points are different

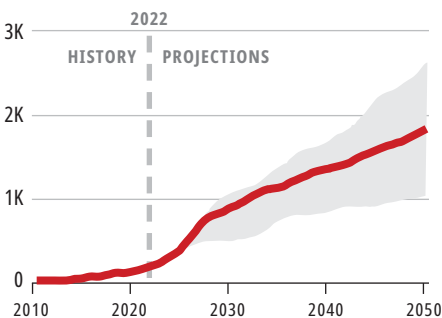
for countries and each face different economic development and social challenges, he said.

“The U.S. and European Union have made some significant strides in the past decades toward achieving greater adoption in clean energy technologies,” Odgerel said. “But if you look at other regions like Africa, energy access and equity are still major challenges. In India and China, coal is still the king and it’s hard to imagine coal going away any time soon.”

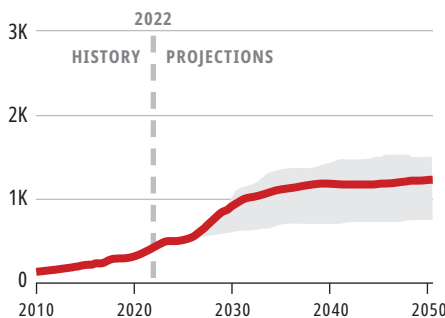
**U.S. electricity generation by select technologies for all cases**

(billion kilowatt hours)

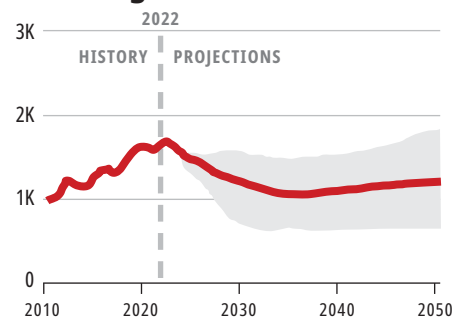
**Solar**



**Wind**



**Natural gas**



Data source: U.S. Energy Information Administration, Annual Energy Outlook 2023 (AE02023)

Note: Shaded regions represent maximum and minimum values for each projection year across the AE02023 Reference case and side cases.

— Reference case





Shutterstock

**Coal miners in Huaibei, in northern Anhui Province, China. "In India and China, coal is still the king and it's hard to imagine coal going away any time soon," said Batt Odgerel, director of energy transition research at EPRINC.**

Oil and gas investment in new fields, something the IEA said must cease in order to meet net-zero goals, could be detrimental for energy-poor countries if the energy trilemma—the interdependency among energy security, energy affordability and carbon reduction—isn't solved.

"The social cost of carbon is very high, and it's important to take it seriously," Odgerel said. "But at the same time, any abrupt change in oil and gas production and cessation of

oil and gas investment will likely lead to unintended consequences in the long- and medium run. So, business leaders and policymakers have to balance and navigate between the two or, even better, find solutions to address both of these challenges."

Similar sentiments were shared by others.

"We need to double the amount of energy production so that the developing world can have equity with the standard of living that we have today, and that's our obligation,"

Powell told Hart Energy. "We have the dual challenge of providing global access to energy and then also reducing the impact of greenhouse gases, which is quite a challenge to be solved globally."

**Trillions of dollars**

It will take a lot of effort and a lot of money, perhaps trillions of dollars.

By Wood Mackenzie's estimates, at least US\$1.4 trillion must be invested annually in renewables, infrastructure and energy transition technologies to hold global warming to no more than 2.5 C and \$2.4 trillion to achieve the net-zero goal of 1.5 C by 2050.

In a report released in September, the data-driven energy consultancy said no major country was on track to meet 2030 emissions goals. The firm's base case of 2.5 degrees show energy-related emissions peaking in 2027 and dropping about 25% by 2050 from 2019 levels. Low-carbon energy's share of the global energy mix rises to 14% by 2030 and 28% by 2050. In its net-zero case, low-carbon supply rises to 78% by 2050, up from 42% of power generation today. Wind and solar's share rises to more than 53%, up from today's 13%.

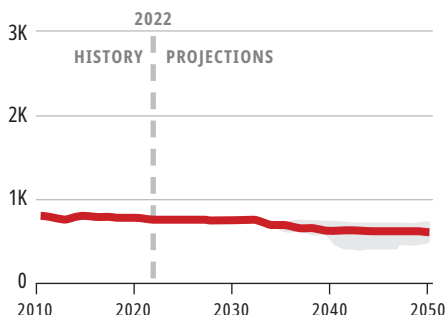
"The supply of low-carbon energy has grown by a third since 2015, but the world's energy demand has grown much faster with rising incomes and populations," Simon Flowers, chairman and chief analyst at Wood Mackenzie, said in a news release.

"The good news is that sustainability is alive and kicking, spurred on by policy including the introduction of the U.S. Inflation Reduction Act and Europe's REPowerEU. Achieving 1.5 C is going to be extremely challenging, but it is possible and greatly depends on actions taken this decade."

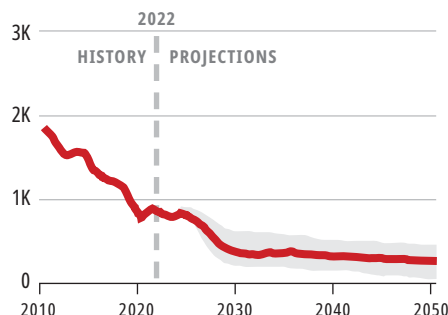
Such actions include adoption of energy storage, small-module nuclear and geothermal, along with expanded power transmission infrastructure, hydrogen and carbon capture, utilization and storage, according to Wood Mackenzie. Carbon pricing is needed to help drive uptake of cleaner energy in the cement, chemicals and steel sectors.

"Oil and gas still have a role to play as part of a managed transition. There will be a natural depletion as low and zero-carbon options develop but supply still needs to be replenished

**Nuclear**



**Coal**





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**The EIA estimates solar generating capacity will rise between 325% to 1,019% by 2050.**



Shutterstock

**Engineers inspect a wind turbine. Wind power for electricity generation could increase by up to 235% between 2022 and 2050, the EIA says.**

as we move towards net zero," said Prakash Sharma, vice president of scenarios and technologies research at Wood Mackenzie and lead author of the report.

Improved end-use efficiency and electrification are expected to push fossil fuels' share of end-use energy demand from 69% in 2023 to 53% by 2050, according to Wood Mackenzie's report.

### Shifts in energy

A look at past energy transitions and the magnitude of the one underway indicate that only time will tell which technologies will stick around and which ones won't.

Powell recalled shifts in energy during the past 50 years or so. Following the oil crisis in the 1970s, he recalled focus moving to stranded natural gas opportunities going

into the 1980s and how it could be converted to chemicals or liquid fuels. That was followed by growth of the LNG business, which helped make natural gas tradeable globally.

"Despite all of that going into the '90s, natural gas prices were high in the United States. So, there was a concern about whether we could be competitive in terms of manufacturing and, specifically, in manufacturing of chemicals," Powell said. "Major companies were looking to relocate to Southeast Asia, where you may have better pricing opportunities. We worked really hard to find some promising technologies. Then, there was a fracking revolution and all of a sudden, the U.S. then had the most abundant natural gas and the lowest prices," plus light, tight oil.

In the midst of the fracking craze was a biofuels phase. Companies looked to use woodchips as feedstock and produce ethanol from corn stover, he said. But biomass and its low-energy density proved to be too big of a challenge back then.

Now, focus is on low-carbon fuels, Powell said, noting he is working on a report on the topic. "One of the things we're looking at is, can you take CO<sub>2</sub> out of the atmosphere and use the renewable energy to upgrade it back to a fuel and then use that in aviation fuel? Can you get the cost of that to come down if the renewable energy is cheap enough, so that it could be a future source of aviation fuel?"

Looking ahead to the next 50 years, he sees more electrification, renewables and storage. He sees lives becoming more integrated with computations, big data and AI algorithms.

"Some say save the last drop of petroleum for chemicals because a lot of those can go into sequestered products," Powell said, adding there will be opportunity to make products from biomass or CO<sub>2</sub> captured from the air. "And hopefully, a lot more of that will be recycled.... So, [there's a] tremendous number of problems to solve. There's been nothing but transition throughout my career and it's going to be quite a wild ride over the next 50 years to get all that sorted out." ■





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A photograph of a worker wearing a white hard hat and yellow safety gloves, working on a blue industrial pipe. The worker is in the background, slightly out of focus, while the pipe and a grey valve are in the foreground. The image is partially obscured by a blue diagonal graphic element.

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# Blockbuster Bonanza

A half-century of massive deals, eye-popping purchase prices and larger-than-life characters have reshaped the global energy landscape.

**CHRIS MATHEWS, SENIOR EDITOR, SHALE/A&D**

Few industries have had such far-reaching, global impacts as the energy industry during the last 50 years.

Since the Arab oil embargo of 1973, questions have persisted about the security and affordability of energy. And as global consumption grew, concerns have been raised about the environmental sustainability of energy processes.

The build-out of these energy systems has taken the industry across the world, from the sands of the Middle East to the icy depths of the North Sea to the shrub-dotted fields of West Texas.

These systems have played key roles in fueling the growth of modern civilization. They've also fueled a robust market for massive deals—mergers

and acquisitions that have defined the era's energy landscape and most important players.

A look back at the largest 50 energy deals from the past 50 years offers a glimpse of how the industry's biggest companies were formed. But more recent deals give us a glimpse into the industry's future: Exxon Mobil's blockbuster \$65 billion acquisition of Pioneer Natural Resources in 2023 positions the Permian Basin as one of the supermajor's main pillars of future production. It was also the fourth-largest energy deal the market has seen in the past 50 years, according to data from S&P Global.

Here's a look at the largest 50 energy deals in the past half-century—with perspective on some of the biggest-of-the-big transactions:

## 1 Exxon Corp. merges with Mobil Corp. (\$84.39 billion)

Exxon Corp. and Mobil Corp. merged in 1999 to form the world's largest oil company. The mega-merger, inked as the industry weathered a period of low oil prices, was aimed at improving earnings and saving costs as the U.S. companies navigated a more competitive—and global—energy landscape. The influence of Exxon Mobil, the nation's largest energy company with a market cap of around \$446 billion, is known the world over more than two decades later.

## 2 Royal Dutch Shell acquires BG Group (\$81.11 billion)

The combination of Royal Dutch Shell and BG Group united the U.K.'s first- and third-largest natural gas producers when the deal closed in 2016. The deal gave Shell an industry-leading position in the global LNG market, as well as a large deepwater position offshore Brazil.

## 3 Energy Transfer Equity merges with Energy Transfer Partners (\$68.88 billion)

Energy Transfer Equity and Energy Transfer Partners completed their merger in October 2018, rolling up two of the nation's largest infrastructure players into a single partnership. The deal helped streamline a complex organizational structure and created a company with an investment grade bond rating. And it was yet another nail in the coffin of the MLP structure, which had waned in influence.

## 4 Exxon Mobil acquires Pioneer Natural Resources (\$65.75 billion)

Exxon Mobil's acquisition of Permian Basin juggernaut Pioneer Natural Resources will reshape the future of the American oil patch. The merger adds Pioneer's more than 850,000 net acres in the Midland Basin with Exxon's 570,000 net acres in the Delaware and Midland. Combined, the companies have an estimated 16 billion boe resource in the Permian—volumes Exxon plans to extract from the rock for years to come.

## 9 Occidental Petroleum acquires Anadarko Petroleum (\$57.81 billion)

Occidental's massive acquisition of Anadarko Petroleum in 2019 was met with skepticism by many. Some analysts and investors knocked Occidental CEO Vicki Hollub and her team for chasing Anadarko with "a great degree of hubris and management ego." Other cheered Chevron, which had also bid to acquire Anadarko, for not overpaying. Four years later, Hollub has quieted her doubters, shepherding Occidental to a \$58.8 billion market capitalization and closing in on paying off the acquisition in half a decade.

## Largest 50 deals in the energy sector in last 50 years (1-25)

Rank	Buyer	Target	Date	Tranction value (\$B)	Closed date	Deal feature
1	Exxon Corp.	Mobil Corp.	12/01/98	84.39	11/30/99	New shareholder gaining majority control, stock deal
2	Royal Dutch Shell	BG Group	04/08/15	81.11	02/15/16	Cross-border, new shareholder gaining majority control
3	Energy Transfer Equity	Energy Transfer Partners	08/01/18	68.88	10/19/18	Minority shareholder purchasing remaining shares, stock deal
4	Exxon Mobil	Pioneer Natural Resources	10/11/23	65.75	Pending	New shareholder gaining majority control, stock deal
5	Kinder Morgan Inc.	Kinder Morgan Energy Partners	08/10/14	62.32	11/26/14	Add-on/bolt-on/consolidation/tuck-in, leveraged buyout (lbo), minority shareholder purchasing remaining shares
6	Total Fina	TotalEnergies Holdings	07/05/99	62.09	10/27/99	New shareholder gaining majority control, stock deal, tender offer, tender offer (full bid)
7	Chevron	Hess Corp.	10/23/23	60.13	Pending	New shareholder gaining majority control, stock Deal
8	Sunoco Logistics Partners	Energy Transfer Partners	11/21/16	59.53	04/28/17	New shareholder gaining majority control, stock deal
9	Occidental Petroleum Corp.	Anadarko Petroleum Corp.	04/24/19	57.81	08/08/19	New shareholder gaining majority control
10	British Petroleum Co.	BP Amoco Corp.	08/11/98	53.89	12/31/98	Cross-border, new shareholder gaining majority control, stock deal
11	Enbridge Inc.	Spectra Energy	09/06/16	46.87	02/27/17	Cross-border, new shareholder gaining majority control, stock deal
12	Standard Oil Co. of California (Socal)	Texaco	10/15/00	44.10	10/09/01	New shareholder gaining majority control, stock deal
13	Exxon Mobil	XTO Energy	12/14/09	40.74	06/25/10	New shareholder gaining majority control, stock deal
14	AmRuz Trading AG and SeaGroup International	CJSC Ukrtatnafta	06/15/99	35.80	06/15/99	Cross-border, minority equity acquisition
15	ConocoPhillips	Burlington Resources	12/13/05	35.12	03/31/06	New shareholder gaining majority control
16	Marathon Petroleum Corp.	Andeavor	04/30/18	34.86	10/01/18	New shareholder gaining majority control
17	Kinder Morgan Inc.	El Paso Corp.	10/16/11	34.69	05/24/12	Add-on/bolt-on/consolidation/tuck-in, leveraged buyout (lbo), new shareholder gaining majority control
18	BP Amoco	Atlantic Richfield	04/01/99	33.60	04/14/00	Cross-border, new shareholder gaining majority control, stock deal
19	Statoil ASA	Norsk Hydro ASA, oil and gas Division	12/18/06	28.94	10/01/07	Corporate divestiture, franchise acquisition, new owner gaining majority control, stock deal
20	PJSC Rosneft Oil Co.	TNK-BP Ltd. (50%)	10/17/12	28.00	03/21/13	Acquisition of joint venture interests, new shareholder gaining majority control
21	Enbridge Income Fund	Enbridge Pipelines and Enbridge Pipelines (Athabasca)	12/03/14	26.69	09/01/15	Corporate divestiture, new owner gaining majority control, stock deal
22	Phillips Petroleum Co.	Conoco Inc.	11/19/01	26.43	08/30/02	New shareholder gaining majority control, stock deal
23	PJSC Rosneft Oil Co.	TNK-BP Ltd. (50%)	10/17/12	26.39	03/21/13	Acquisition of joint venture interests, new shareholder gaining majority control
24	El Paso Corp.	Coastal Corp.	01/17/00	22.00	01/29/01	Leveraged buyout (lbo), new shareholder gaining majority control, stock deal
25	Richard Kinder, Bill Morgan, Faye Sarofim, Mike Morgan, Goldman Sachs Capital Partners, American International Group and ALG affiliates, Carlyle Group and Riverstone Holdings	Kinder Morgan Inc.	08/28/06	21.03	05/30/07	Cash deal, creation of joint venture, going private tranction, leveraged buyout (lbo), new shareholder gaining majority control



## Largest 50 deals in the energy sector in last 50 years (26-50)

Rank	Buyer	Target	Date	Tranction value (\$B)	Closed date	Deal feature
26	Enterprise Products Partners	Enterprise GP Holdings	09/07/10	20.19	11/22/10	New shareholder gaining majority control, stock deal
27	Anadarko Petroleum Corp.	Kerr-McGee Corp.	06/23/06	18.90	08/10/06	Cash deal, new shareholder gaining majority control
28	ONEOK Inc.	Magellan Midstream Partners	05/14/23	18.83	09/25/23	New shareholder gaining majority control
29	Energy Transfer Partners	Regency Energy Partners	01/26/15	18.83	04/30/15	New shareholder gaining majority control, stock deal
30	Suncor Energy	Petro-Canada	03/22/09	18.30	08/01/09	Merger of equals, new shareholder gaining majority control, stock deal
31	ChevronTexaco Corp.	Unocal Corp.	04/04/05	18.09	08/10/05	New shareholder gaining majority control
32	CNOOC	Nexen Inc.	07/23/12	17.99	02/25/13	Cash deal, cross-border, new shareholder gaining majority control
33	ONEOK Inc.	ONEOK Partners	02/01/17	17.50	06/30/17	Minority shareholder purchasing remaining shares, stock deal
34	MarkWest Energy Partners	MPLX	07/13/15	17.46	12/04/15	Add-on/bolt-on/consolidation/tuck-in, leveraged buyout (lbo), new shareholder gaining majority control
35	Transocean Inc.	GlobalSantaFe Corp.	07/23/07	17.32	11/27/07	Cross-border, merger of equals, new shareholder gaining majority control
36	Trafigura Group, United Capital Partners and Petrol Complex Pte. Ltd.	Essar Oil Ltd.	07/08/15	17.14	08/21/17	Cross-border
37	Repsol SA	YPF SA	04/30/99	17.10	06/23/99	Cross-border, government decreasing ownership stake, minority shareholder gaining majority control, minority shareholder increasing ownership stake, tender offer, tender offer (partial bid)
38	BHP Group	Petrohawk Energy	07/14/11	15.75	08/19/11	Cash deal, cross-border, new shareholder gaining majority control, tender offer, tender offer (full bid), tender offer (squeeze out)
39	Schlumberger	Cameron International Corp.	08/26/15	14.83	04/01/16	Cross-border, new shareholder gaining majority control
40	Enbridge Inc.	Enbridge Energy Partners	05/17/18	14.50	12/20/18	Cross-border, minority shareholder purchasing remaining shares, stock deal
41	Adani Ports and Special Economic Zone	Indian Oiltanking Ltd.	11/09/22	14.33	01/31/23	Acquisition of joint venture interests, minority equity acquisition
42	Woodside Petroleum	BHP Petroleum International	08/17/21	14.21	06/01/22	Corporate divestiture, new shareholder gaining majority control, stock deal
43	Chevron	Noble Energy	07/20/20	13.76	10/05/20	New shareholder gaining majority control, stock deal
44	Schlumberger	Smith International	02/21/10	13.66	08/27/10	Cross-border, new shareholder gaining majority control, stock deal
45	Repsol SA	Talisman Energy	12/15/14	13.43	05/08/15	Cash deal, cross-border, new shareholder gaining majority control
46	Cenovus Energy	Remaining 50% Interest in FCCL Oil Sands Partner and majority of Western Canada	03/29/17	13.23	05/17/17	New owner gaining majority control
47	ConocoPhillips	Concho Resources	10/19/20	13.13	01/15/21	New shareholder gaining majority control, stock deal
48	OJSC Gazprom	OJSC Siberian Oil Co.	09/28/05	13.10	10/21/05	Minority shareholder increasing ownership stake
49	TransCanada PipeLines	Columbia Pipeline Group	03/17/16	13.08	07/01/16	Cash deal, cross-border, new shareholder gaining majority control
50	Nippon Oil Corp.	Nippon Mining Holdings	12/04/08	13.06	04/01/10	New shareholder gaining majority control, stock deal

Data compiled Oct. 23, 2023. Limited to M&A deals where the target sector is energy as classified by S&P Global Market Intelligence or Global Industry Classification Standard. Tranction value is value paid for equity and in cash plus net debt assumed at the time of announcement. Values are not adjusted for inflation. Excludes terminated deals.

Source: S&P Global Market Intelligence. © 2023 S&P Global.

# OF PRICE AND OILMEN

Financing the energy industry continues to evolve with market growth and transformation, resource development and innovation.

**PATRICK MCGEE, SENIOR EDITOR, FINANCE**

Convert financial statements from the energy industry's last 50 years into text and you'll uncover a tale worthy of Steinbeck. Epic failure offset by staggering success, multiple generations of dynamic characters gaining maturity and wisdom—or not—and a story arc covering everything from the oilfields in Oklahoma to the oilfields east of Eden.

The 1973 Arab oil embargo was a severe crisis for the U.S., but not a financial one for oil and gas companies. They were flush with cash as demand was at a record high. Unlike the way they run their companies today—but still, not so long ago—E&Ps were spending,



**Hinds Howard**

some said, like a “drunken sailor.” “They were making a lot of money, production was on the decline, and they were diversifying into other things,” Hinds Howard, a portfolio manager at CBRE Investment Management, told Hart Energy. “It felt like a pretty flush time. That’s the time when they started to go out and acquire and become conglomerates.... There wasn’t a lot of stress in terms of getting cash.”

But crashes were on the way, along with massive reorderings of finances and innovative work on financial devices.

## Protagonists emerge

Some stories have compelling characters introduced mid-story who loom large, but eventually recede into the background. In the last 50 years of oil and gas finance, two of these characters would be Reserve Base Lending and Master Limited Partnerships. Known by their acronyms,



—**Kassia Yanosek, McKinsey & Co.**

RBL and MLPs, these innovations were created for the industry.

Haynes Boone partner Buddy Clark spent years researching RBL’s origin for his book, “Oil Capital; The History of American Oil, Wildcatters, Independents and Their Bankers,” and found that Continental Illinois Bank and Trust came to Houston in the late 1970s and created RBL, an entirely new financial device and unique to the industry’s unknowable assets.

“They introduced this revolver [loan] that just transformed the businesses for the local bankers,” Clark said. “The revolver was, ‘Here’s your line of credit, we’ll look at what you have as far as production every six months, and it will go up and down.’”

In recent years, RBL reliance has waned as interest rates climbed and many banks left the upstream sector. In a sign of how capital constantly moves and morphs to fit changing circumstances, private credit is emerging as one way to fill the void.

Nimesh Bhakta, head of investments for the Americas for the Swiss energy trader Vitol, said his company recently moved into the private credit space to meet some of the capital need.

“We are stepping into that space, especially in this higher-rate environment,” he said. “The risk-

*“There was uncertainty around supply in 1973 and where [supply] was going to come from. I think, in today’s market, the uncertainty is, ‘Where is the demand?’”*

adjusted return profile is simply too attractive to ignore.”

MLPs got their start in 1981, when Houston-based Apache Corp. (now APA) formed Apache Petroleum Co., a publicly traded limited partnership. “It was called Master Limited Partnership because it was a bunch of drilling partnerships that Apache owned that they aggregated

into one master limited partnership to trade on the exchange,” said David Oelman, a partner at Vinson & Elkins.

It was a hit, at least for a time. Other oil companies copied the idea, as did other businesses, especially real estate. Burger King and the Boston Celtics basketball team were MLPs for a while. MLPs birthed a new batch of billionaires, but they proved to be a shooting star of finance.

“It was too good for too long,” Oelman said. “Trying to grow and increase the dividends at the same time was a pretty tough trick to pull off. When commodity prices cooled, their growth prospects cooled, and they had too much debt.”

MLPs still maintain a presence in midstream oil and gas, among them



**David Oelman**





APA Corp.

**Apache Corp. (now APA Corp), the first MLP, has operated the Forties Alpha platform in the Forties field in the North Sea.**

Plains All American Pipeline, MPLX, Enterprise Products Partners, Energy Transfer and EnLink Midstream. Howard remembers his grandfather, Jackson C. Hinds, the former EnTex CEO, singing MLPs' praises. Howard now writes a weekly newsletter about the remaining MLPs. They have nowhere near the heft they once did, he said, but they served a purpose and left a legacy.

"The structure was used by very intelligent people to the ultimate benefit of the infrastructure of this country and also to themselves—and that's capitalism. And at some point, there were excesses and those excesses led to some pain," Howard said.

### Plot twists

Oil and gas is a well-known story of dramatic boom-bust cycles. Capital dried up quick during the busts, with caution and some innovation comprising efforts to piece new financing together.

EnCap Investments was an example of that caution and incrementalism—and it was an example of how energy financing evolved. Four employees of a Dallas bank decided to form their own company in 1988, just a few years after

the price of oil had crashed. They offered mezzanine loans and gas producing-property acquisition funds because that is what institutional investors, new to fossil fuel investing, would accept.

EnCap kept reforming its financial devices at the intersection of E&P needs and lender ability. The firm morphed into a private equity giant while other ambitious newcomers such as Quantum



**Stephen Trauber**

Capital Group also emerged as multibillion-dollar powerhouses. Some private equity firms turned to the shale boom when opportunities dried up in the dot-com

bust, and left when shale enthusiasm declined as ESG concerns emerged.

With the height of the shale boom past, private equity's presence is sharply diminished. Stephen Trauber, a retired investment banker, said it will never be such a dominant player in oil and gas again.

"There's too many forces against fossil fuels," he said. "Many of these

large private equity firms that had energy arms [are] facing a lot of backlash across their other funds by being invested in the energy sector. Most of these large private equity firms decide ... 'We have plenty of other places to put our capital. We don't need to be in the energy sector.'"

### Characters return

Some important parts of energy finance have come full circle. The first wildcatters once turned to wealthy individuals and families for capital. Now, family offices are showing up in increasingly greater numbers. Private equity is back in the energy space, but this time it's investing in the energy transition. The Mideast is in crisis again, as it was in 1973, and U.S. oil and gas companies have plentiful free cash flows, as they did in 1973 when demand was high.

The drilling partnerships of MLPs are gone, but the innovative packaging of E&P assets continues. John Donovan, founder and managing partner of Donovan Ventures, said his private equity firm sponsors Energia, a company that packages wells as a private investment.

"We're packaging 100 wells and

then saying, 'Here's the stream of production ... and, in exchange for no AFEs [Authorization for Expenses] and no capital calls, you've got to have this pure access to the commodity without the leverage, without the G&A, without everything else,'" Donovan said.

### The story arc

The culmination where trials and tribulations forge defining character development comes with free cash flow and how it is handled. The oil and gas industry's main characters, the E&Ps, experienced this, having come to learn the error of their ways in reckless spending to pump everything out of the ground. Boom-bust trauma and investor flight have turned E&Ps into pillars of capital discipline.

"For a long time towards the end of the 20th century and the first maybe 15 years of this century, oil and gas



**Pavel Molchanov**

companies in the United States were spending money like a proverbial drunken sailor," said Pavel Molchanov, a managing director at Raymond James & Associates.

"Every penny of cash flow that comes in the door, they were reinvesting that in the drill bit, in new wells, in new production.... What put an end to that finally is it was such a disastrous experience for the industry that it massively changed the psychology of management teams."

Painful busts and scores of bankruptcies forced companies into a new era of maturity and careful spending. E&Ps are paying off debts and returning capital to investors in the form of dividends and stock buybacks.

"It absolutely works," Molchanov said. "Look at the stock. ... A lot of these stocks are at all-time highs."

Kassia Yanosek, partner at McKinsey & Co. who writes about energy in Foreign Affairs, said a significant the-more-things-change-the-more-they-stay-the-same element of the story concerns the price of oil.

"There was uncertainty around supply in 1973 and where [supply] was going to come from. I think in today's market, the uncertainty is, 'Where is the demand?'" she said, explaining that the energy transition threatens future demand for



APA

**Apache Corp. (now APA), operator of this rig in the Delaware Basin, was the first MLP.**

fossil fuels.

### The next chapter

Global investment in clean energy technologies is outpacing spending on fossil fuels, according to the International Energy Agency; more than 60% of the world's \$2.8 trillion in energy investments in 2023 will be in clean energy. Energy financiers have rearranged their efforts around this new reality, with much of the analysis and caution that the boom-bust cycles have so harshly taught.

Brian Blakeman, CFO of Tailwater Capital, said the Dallas-based private equity firm skips over investing in solar and wind to instead invest in clean energy's infrastructure.

"We've been involved in the shale stage and we understand the relevance and constraints that were presented during that time. There was a tremendous need for infrastructure during that time, and our team is focused on identifying those areas of opportunities that will present themselves during the energy transition," he said.

This fits with Yanosek's characterization of equity investing in clean energy.

"They look at energy transition and say, 'Ah, that's the asset class I want because those assets are going to be here for the long term,'" she said.

Carefully calibrated steps toward the energy transition also show in how the supermajors devise their investment strategies. Rachel Schelble, head of corporate carbon management and infrastructure at Wood Mackenzie, said

supermajors invest in energy transition incubators and startups more to keep tabs on emerging technologies than for a return on investment.

These cautious approaches contrast U.S. companies with the Europeans' recent rush—and then retreat—from heavy investment in the energy transition.

"We saw a real divergence where the Europeans said, 'I'm going to invest in the transition, and that's where I'm going to head.' Whereas the U.S. producer said, 'I'm going to stick with our core traditional business,'" Yanosek said, adding that she was speaking in broad brushstrokes. "That was a divergence that hadn't happened really in the past 50 years. And that divergence is now showing up clearly in valuations; we're seeing the BPs and Shells trade at a 45% to 50% discount to the [U.S.] oil and gas majors."

She said today's global trend in energy funding is a shift from public to private financing. In a reversal of the storyline from 50 years ago, Yanosek said the Mideast oil giants are not trying to change the world with an embargo, but are sprinting to stay on board with the world's transition to cleaner energy.

"Many of these sovereigns are saying, 'We want to make sure that we're going to be part of the future.' So much of the dollars for the private markets are also coming from the Middle East," she said. "You could say that, not unlike 1973, we are shifting again to a world where the Middle East is increasing in their role in the current dislocation in the market, shifting its dollars to the transition." ■



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# Safer Than Ever

Advanced technology and social changes have made the oil patch less dangerous for U.S. workers, but industry insiders say there is always room for improvement.

## DEON DAUGHERTY, EDITOR-IN-CHIEF

Working in the U.S. oil and gas industry is undoubtedly a safer proposition today than it would have been 50 years ago. Technological advances have accelerated, workforce training has evolved and the intensity of public scrutiny has grown to a level likely unimaginable when “Dallas” debuted on CBS in 1978.

Anecdotal evidence and government statistics prove up the assumptions.

Micah Backlund, director of Health, Safety and Environment (HSE) at Helmerich & Payne, is a third-generation oilman.

“Both of my grandfathers worked on rigs, and both of them had the scars to prove it,” he told Hart Energy. “But I’m optimistic that we’ve got folks that will retire today with all of their appendages attached, their backs are not hurting. And even some of the chronic issues that were associated with working in the oil field, we’re working to address those and ultimately eliminate them from the workspace.”

Comprehensive data prior to the 1990s is sparse. But in more recent decades, particularly with the early 2000s shale boom, the federal government has dedicated resources to examining safety in the field of U.S. oil and gas extraction (OGE).

Between 2003 and 2013, the OGE



API Photograph and Film Collection, Archives Center, National Museum of American History, Smithsonian Institution

### Apprentice ironworker Melva Miller works at Pump Station 1 of the Trans-Alaska Pipeline System in August 1975.

workforce doubled and the rig count increased 70%, but the fatality rate for those workers declined more than 36%, according to the U.S. Centers for Disease Control and Prevention (CDC).

“The implementation of safety measures focused on land transportation safety, the increased use of automated drilling technologies, and increased collaboration between industry, government and academic institutions may have contributed to the reduced worker fatality rates,” Ryan

Hill, director of the National Institute for Occupational Safety and Health’s (NIOSH) Western States Division, told Hart Energy. “Nonetheless, the fatality rate for oil and gas extraction was nearly seven times higher than among all U.S. workers.”

The work at NIOSH has created a close collaboration between government researchers and on-site workers, Hill said.

“What we have found is that oil and gas extraction workers take great



*“What we have found is that oil and gas extraction workers take great pride in their work; they work very hard (often in difficult conditions) and they work as safely as possible.”*

—Ryan Hill, director, National Institute for Occupational Safety and Health’s Western States Division



pride in their work; they work very hard (often in difficult conditions) and they work as safely as possible," he said. "Our goal is to make sure that all workers go home safely at the end of every day."

To be sure, government regulations have played a role in improved safety culture.

General occupational injuries and fatalities in the U.S. increased 20% during the 1960s, prompting passage of the Occupational Safety and Health Act (OSH Act) in 1970. The act established the Occupational Safety and Health Administration (OSHA).

The 53-year-old law "really solidified requirements for employers to provide a safe workplace and provided some strong guidelines on what those expectations were," Backlund said.

"Now, we would view those as the minimum expectations for a safe workplace. They are regulatory required and driven, but most employers in the oil and gas industry are focused on how they can better perform in an HSE effort and go beyond what is compliance driven and really focus on the prevention of injuries to the workers themselves for the more humanitarian benefits than the regulatory benefits."

### Good for business

"I think there's been a paradigm shift in the fact that 50 years ago there was a perception that safety was a burden and there was a cost associated with safety," Backlund said. "The cost part is definitely true. But over the past 50 years, there's been a recognition that preventing injuries is good Business. By preventing those, especially serious injuries, fatalities, catastrophic events, it is good business from a cost standpoint and the humanitarian standpoint."

In recent years, businesses have found that collaboration is also important, Backlund said. During the decades that followed implementation of the OSH Act, companies learned that a good HSE performance provided a competitive advantage. That created some early reluctance to "share the secret sauce" behind the systems, processes and cultures that resulted in solid HSE performance.

That's no longer the case, Backlund said.

"Over the past 20 years, we've seen kind of another revolution in that we're all trying to protect the same people.



Tom Fox/Hart Energy

**Driller Jonathan Brown, below, and floor hand Ricky Salinas are equipped with advanced safety gear as they prepare Pioneer Rig 80 to be laid down and moved on a Carrizo Oil and Gas site in the Eagle Ford in 2015.**

The people that work on the rigs are the same people that work on the frac spreads and the same people that work at a tank gauges," he said. "It's the same labor pool. And ultimately, we all have to work together to try to keep each other's workers safe because at some point in time, it's likely that the individual will work for one of us."

James E. Smith, a principal focused on environmental and safety issues at

the law firm of Crain Caton & James in Houston, said that companies have come to recognize that excellence must apply throughout the business model.

"More organizations realize that excellence cannot be kept in one part of a business," he told Hart Energy. "Companies that make excellent returns to their investors tend to have a culture of excellence regarding

safety matters. Conversely, companies with poor safety records tend to be underperformers.”

In more recent years, federal initiatives have tracked safety concerns in the field. NIOSH created the Fatalities in Oil and Gas Extraction (FOG) database, a system composed of worker fatality reporting specific to the oil and gas extraction industry. Data collection ended in 2019 when grant funding ended, according to the CDC, the agency that oversaw the effort.

Nevertheless, continued surveillance of OGE worker fatalities is recommended by the agency “to help identify new safety and health hazards and guide research and prevention activities,” according to an agency report released in September 2023.

“Industry, academic institutions, and government can use findings from the FOG database to identify factors contributing to fatal injuries in OGE and develop interventions to improve worker safety and health,” the report said.

### Federal fixes

“NIOSH research [has] played a vital role in making the industry safer by bringing to light several exposures related to work in oil and gas extraction,” Hill said.

Among the agency’s key efforts to make oil and gas work safer:

- Occupational Exposures to Crystalline Silica During Hydraulic Fracturing: NIOSH researchers in 2013 identified the seven sources of silica dust exposures and made recommendations to eliminate or reduce them. Companies performing this work and the industry responded by implementing a wide range of engineering and administrative controls (training and policies and procedures) and personal protective equipment to help limit exposures to certain crystalline silica.

- Sudden Death Resulting from Oxygen Deficiency, Inhalation of Hydrocarbon Gases and Vapors: NIOSH research raised awareness about the risk to workers performing manual tank gauging. Opening “thief” hatches of storage tanks can lead to the rapid release of high concentrations of hydrocarbon gases and vapors, resulting in very low oxygen levels with toxic, flammable conditions around and over the hatch, NIOSH research found. The work can be performed safely with proper precautions.

Vehicle crashes have long been a top



P.C. Piazza/Hart Energy

***Roughneck Thomas Trail looks over the drilling deck he is cleaning to make sure all the tools are in place on the Ensco 99 drilling rig offshore Louisiana in 2012.***

cause of fatalities in the oil field. Since 1992, the earliest recording of OGE fatality data collection available from the Bureau of Labor Statistics, travel has been the most dangerous activity for these workers.

A NIOSH snapshot of 2018 showed that 40% of work-related OGE fatalities were the result of motor vehicle crashes. Driver fatigue—which may be a result of insufficient sleep, long distances traveled to well sites and long work shifts—is a factor in some of these crashes, Hill said.

Industry, the federal and local governments, and local leaders in the communities where OGE takes place have made several efforts to address the hazards. Hill noted that the Permian Road Safety Coalition is leading a collaboration between industry, local government and the community to prevent crashes and injuries.

### Culture shift

Most companies have improved their safety culture during the last decade, Hill said. Among the new protocols, many companies conduct journey management to evaluate the need for vehicle travel and use a voluntary in-vehicle monitoring systems to track their fleets and use the data to coach their employees on improved driving behaviors.

In some instances, it’s as simple as using a seat belt, Backlund said.

“If you think about how oil and gas

workers perform their work, the work is in remote locations frequently miles, hundreds of miles from either the office or their home, and the only way to get there currently is through motor vehicles,” he said. “So, as long as we’re going to have people on the highway driving hundreds of miles a day to perform their work, it’s going to be a risk.”

In addition to collaboration among governmental entities, trade groups, companies and the communities in which they operate, individual workers are also working together to keep people in the field safe.

“Oilfield workers are sharing information through social media about accidents and increasing awareness,” Backlund said. “It is pretty interesting to see them using technology— independent of the companies they’ve worked for—to share, ‘Hey, this accident just occurred here. Be aware of it.’”

But there is still work to be done, and the industry is preparing for the future, Backlund said.

“Increased mechanization and automation is next,” he said. “The job profile will be different in the next 20 years than it was today. And just as it’s different today as it was 100 years ago or 50 years ago, we continue to evolve and use new technology that [results] in improved safety performance by controlling and removing exposures that have impacted the lives and families of oil and gas workers.” ■



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# A Growing Market Presence

Rising hydrocarbon production has allowed the U.S. to join the world's leading energy exporters. Robust natural gas production will allow it to stay there.

**PIETRO D. PITTS, INTERNATIONAL MANAGING EDITOR**

Rising hydrocarbon production has solidified U.S. energy security in recent years, allowing the country to become a net energy exporter. And robust natural gas production—the so-called “transition fuel”—will allow the U.S. to maintain a leading export position in both the LNG and piped-gas spaces.

Global events have dominated the news in recent years, from the COVID-19 pandemic in 2020 to Russia's invasion of Ukraine in early 2022. While the former dealt a short-term blow to energy producers globally, the latter has benefitted U.S. shale gas producers and U.S. LNG exporters, and propelled the U.S. to the forefront as a prominent and secure supplier of energy to Europe, Asia and the rest of the world.

The U.S. did not enter the LNG exporting space until 2016, but only three years later, it was established as a net energy exporter, according to the U.S. Energy Information Administration (EIA). U.S. dry gas production—which continues to hover just above 100 Bcf/d with considerable contribution from the Marcellus, Permian and Haynesville shale plays—is expected to continue to anchor current production and support future growth.

LNG exports account for 13-14 Bcf/d of total U.S. dry gas production, while piped-gas exports to Mexico account for 5-6 Bcf/d, the EIA said in September.

The EIA expects U.S. gas production to continue to rise this year and next, as well as through 2050, supporting further rises in LNG exports.

The EIA forecasts annual U.S. gas production to rise 15% to 42.1 Tcf



***The Philippines began importing LNG in 2023 at AG&P's PHLNG terminal in Batangas Bay, Manila.***

(around 115 Bcf/d) and LNG exports to rise 152% to 10 Tcf (around 27 Bcf/d) between 2022 and 2050.

“Production growth is largely driven by U.S. LNG exports,” the EIA says in its 2023 “Annual Energy Outlook.” “Gas production growth on the Gulf Coast and in the Southwest reflects increased activity in the Haynesville formation and Permian Basin, which are close to infrastructure connecting natural gas supply to growing LNG export facilities.”

The Paris-based International Energy Agency (IEA) forecasts U.S. gas

production to continue to rise but at a slower pace compared to prior years due to lower domestic demand and limited LNG export capacity additions, the agency said in its “Global Gas Security Review 2023,” published in September. “We expect dry gas production to grow by 2% in 2023 and by less than 1% in 2024.”

However, future growth in U.S. gas production will not be without headwinds, especially those associated with lingering midstream constraints, analysts tell Hart Energy.

AG&P



How did the U.S. become a natural gas production powerhouse so quickly?

Moscow’s decision to invade Ukraine led to a drastic drop in Russian energy exports to Europe and the U.K., which prompted a massive energy crunch. The U.S., with its existing liquefaction capacity and ongoing capacity additions, was able to remedy that. Heavyweight LNG export players Australia and Qatar were unable to rapidly boost LNG shipments to Europe when demand was most pressing.

A combination of factors worked in Europe’s favor in 2022 to help avoid a worst-case scenario which could have seen many countries in the region go dark due to a lack of energy.

The first was a warmer-than-normal winter. The second was Europe’s ability to procure LNG cargoes, primarily from the U.S. This was possible because European countries could afford LNG when prices spiked. Numerous cargoes were diverted from Asia when the region was priced out of the market as energy-starved Europe scrambled to keep the lights on, whatever the cost.

**U.S. LNG for the world**

The U.S. is well-positioned to continue its fight for dominance with Australia and Qatar. Combined, the three countries accounted for 60% of global LNG output in 2022, according to the International Gas Union’s (IGU) “2023 World LNG Report.”

In 2022, the Aussies took the top spot as the world’s largest LNG exporter (80.9 million tonnes). They were followed closely by the U.S. (80.5 million tonnes) and Qatar (80.1 million tonnes). The fourth and fifth spots were held by Russia (33 million tonnes) and Malaysia (27.3 million tonnes) in the IGU’s ranking.

“The key impact of the energy crisis was the combination of the unprecedented surge in prices and volatility with the similarly

unprecedented shift in inter-regional LNG trade patterns,” the IGU said. “LNG volumes from the U.S. accounted for 44% of Europe’s total LNG imports while Europe accounted for 69% of total U.S. LNG exports last year. Moreover, rare cargo movements from Asia-Pacific to Europe, despite being a long distance with high shipping costs, were observed.”

Demand for LNG is expected to remain robust through at least the end of this decade. After that time, the outlook is uncertain, BP said in July in its “Energy Outlook 2023.”

“The U.S. and Middle East [will] establish themselves as the main global supply hubs for LNG exports, with the prospects for Russian LNG exports scarred by the effects of the Russia-Ukraine war,” BP said.

But looking forward, the U.S. will likely face formidable competition from the Middle East and Australia under BP’s net-zero, accelerated and new momentum scenarios, the U.K.-based company said.

“The world is decarbonizing and traditional alliances have fallen apart,” Cornerstone Government Affairs principal Jack Belcher warned in an interview with Hart Energy. “U.S. LNG exporters need to be looking at markets beyond Europe ... as the rhetoric coming out of Europe makes you think this is a temporary thing.”

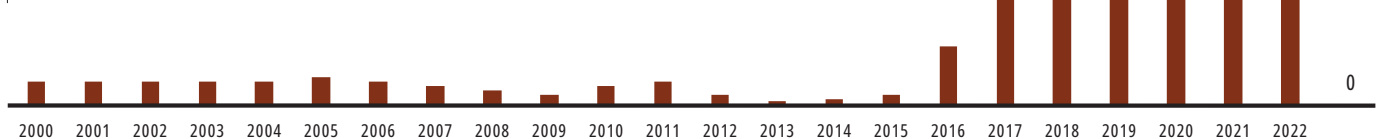
The surge in U.S. LNG exports is just a “Band-Aid for Europe ... a temporary thing,” Belcher said.

**The energy trilemma**

The geopolitical events of 2022 were an unexpected but seemingly necessary reminder that the energy transition to cleaner energies and net-zero emissions must take energy security and affordability into account.

The so-called energy trilemma—which encompasses energy security, affordability and sustainability—

**U.S. LNG exports**  
(2000-2022, Bcm/year)



Source: Energy Institute Statistical Review of World Energy, June 2023

must be addressed for the energy transition to be a success, and U.S. LNG and piped-gas exports factor heavily into that equation, BP's Chief Economist Spencer Dale wrote in the company's outlook.

The Inflation Reduction Act's (IRA) \$370 billion in investments include some two dozen tax provisions to lower energy costs for American families and small businesses, and accelerate the deployment of clean energy, vehicles, buildings and manufacturing. It provides billions of dollars in investments into grant and loan programs, and other investments for clean energy and climate action.

Growing U.S. gas production, coupled with the IRA, seemingly ensure that U.S. gas producers and exporters continue with efforts to move forward and build on what is already a solid foundation held together by robust U.S. shale production. This production has allowed U.S. gas producers to fulfill domestic gas demand and reduce worries around energy security.

With robust production and excess gas volumes, U.S. gas exporters are now focused on either dominating the U.S. liquefaction space or potentially expanding piped-gas exports to neighboring Mexico, just south of the U.S. border.



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**LNG tanker Arctic Discoverer, left, is anchored beside FSRU Independence at the Klaipeda, Lithuania, LNG import terminal in October 2022. U.S. LNG exports to Europe, including Lithuania, soared in 2022 when Russia cut off pipelined gas to European customers.**

### Piped gas for Mexico

In the piped-gas space, U.S. exporters continue to fill demand for gas in Mexico, home to sizable hydrocarbon reserves. Gas-short Mexico's next best option for a lack of domestically produced gas is imported U.S. gas. State-owned Petróleos Mexicanos (Pemex) has experienced difficulty boosting production owing to financial commitments tied to the government in the form of payments and investments in strategic projects.

Future plans to build out Mexico's liquefaction capacity—to around 32 million tonnes per annum, according to Rystad Energy, or upward of

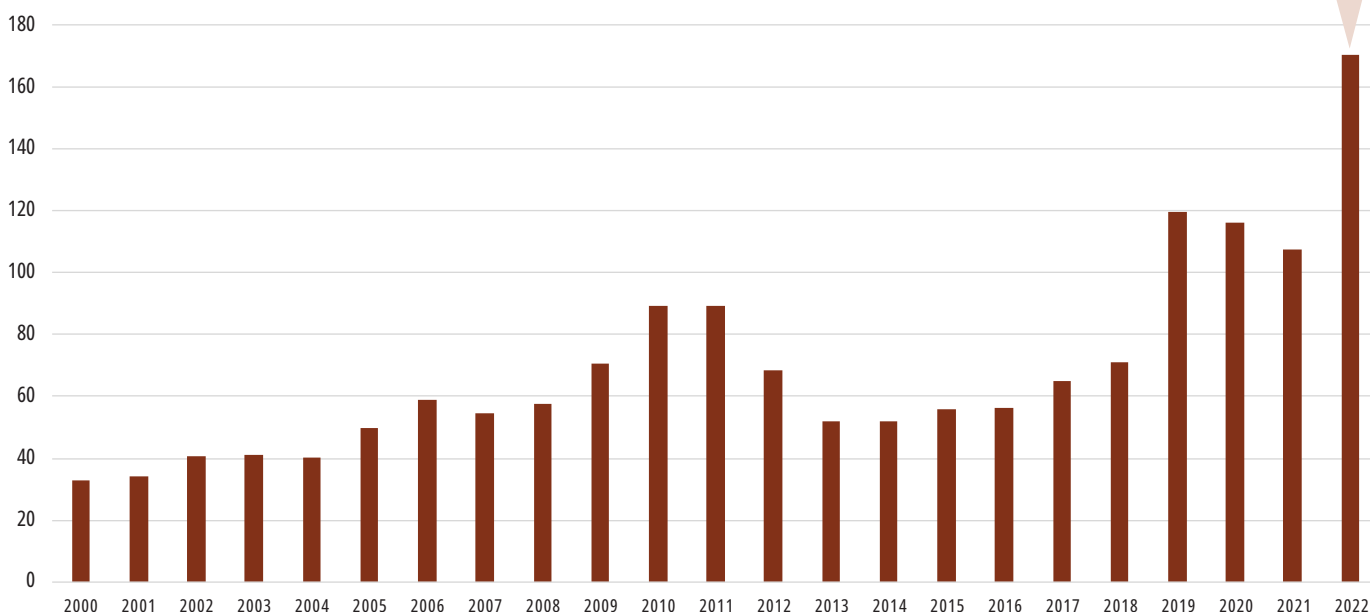
45 million, according to BTU Analytics—will only be possible with continued and higher volumes of U.S. piped gas.

And combining U.S. piped-gas exports to Mexico with potential demand tied to the Mexican LNG projects, gas volumes sent to Mexico could serve as a significant driver to boost exports and nearly double them over the short-to-medium term compared to the EIA's figures.

But U.S. producers' dreams to feed nine planned Mexican liquefaction plants continue to be overshadowed by a lack of pipeline transport capacity south of the border. ■

## European LNG exports

(2000-2022, Bcm/year)



Source: Energy Institute Statistical Review of World Energy, June 2023





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# Making Waves

More and better data, coupled with ever-increasing computing power, have revolutionized seismic processing.

**JENNIFER PALLANICH, SENIOR EDITOR, TECHNOLOGY**

Techniques and hardware for acquiring seismic data have evolved over the last 50 years, while computing advances have revolutionized data processing and interpretation.

“Everything that we’ve done in seismic over the last 100 years has been an evolution. And we do what we do because we can’t do it correctly,” said Sam Gray, who recently retired from his post as chief scientist at CGG. “Everything that we do is kind of an approximation, and we’re getting closer and closer and closer to being able to do exact science.”

Part of that evolution was a change in the source of the sound waves that geoscientists use to map the subsurface.

David Monk, SEG DISC instructor, said the industry moved away from dynamite as a regular source of sound waves in the 1960s, and began to use vibroseis around 1960.

“Onshore, vibroseis is pretty much the universal source,” he said.

Vibroseis uses controlled vibrations to send sound waves into the ground, which are received back at the surface and heavily processed to help map the subsurface features. In the early days, Monk said, it was common to shake the vibrators half a dozen times to ensure a good shot because of the cost of processing each individual shot. Now, it’s common to record lots of shots but without so much effort.

“We’ve replaced that heavy effort,” he said. “Today, the industry is typically just shaking a single vibrator one time, but we’re doing it in the same way, and the number of recording positions has gone up.”



*do it correctly.”*

—Sam Gray, CGG chief scientist, retired

That increase in recording positions has happened both onshore and offshore, with hardware for offshore acquisition via towed streamers becoming more plentiful and longer.

Gray said CGG introduced multi-streamer acquisition in the early 1970s with two or three streamers towed behind a seismic acquisition vessel.

“Gradually, over the next half-century, that evolved into many, many, many streamers with a crossline aperture of kilometers. Very, very wide,” he said.

Adding the longer streamers helped produce better and cleaner data, he said, and imaging was limited by computing power.

Marianne Rauch, second vice president of Society of Exploration Geophysicists and TGS principal technical adviser, said one of the more recent advances in offshore seismic acquisition is the use of ocean bottom nodes (OBNs) for the placement of geophones on the seabed. One draw of OBNs, she said, is that it removes the need to factor in the water column when processing the sound waves.

“It improves the data quality,” she said,

*“Everything that we’ve done in seismic over the last 100 years has been an evolution. And we do what we do because we can’t*

and it makes the survey more flexible.

OBNs also improve the quality of 4D, or time-lapse, seismic.

“OBN is fantastic because you can leave your nodes on the seafloor, and you record again after a year or half a year or two years, whatever. And this means that you will get actually one of the most accurate repeat services,” she said. “In the 4D environment, the problem is always seen that the repeat survey, they’re not really the same,” but using OBN removes that concern.

And while seismic acquisition vessels increasingly towed more and longer arrays, the hardware for onshore acquisition shrank in size.

In the 1970s, the industry was using geophones that were heavy and bulky, Gray said.

“Geophones were so heavy that you could only lay out so many in a day, and this limited the size of the seismic survey that you could perform,” he recalled.

Over time, they have been miniaturized.

“A geophone is now on a chip. And, of course, that chip has to be placed into the earth, so it needs a casing,” he said.





*CGG vessel acquiring a seismic survey before CGG exited the marine acquisition market in 2019.*

CGG



*“OBN is fantastic because you can leave your nodes on the seafloor, and you record again after a year or half a year or two years, whatever. And this means that you will get actually one of the most accurate repeat services.”*

—Marianne Rauch, *second vice president of Society of Exploration Geophysicists and TGS principal technical adviser*

“The chip might only be a quarter-of-an-inch wide, and the casing for it is much smaller than geophones were 50 years ago. So, it’s been miniaturized and it’s been made digital. This allowed higher channel counts and higher fold.”

That also enabled seismic acquisition in a variety of settings, including desert, mountain and Arctic areas.

“Mountain areas are still really tough

because you need mountain climbers to plant these geophones, so mountainous land acquisition tends to still be sparser than marine and arctic acquisition,” Gray said.

Currently, the geophone chips are recovered, he said, but there is research into sacrificial and biodegradable units that can be left behind.

### **Data explosion**

The digital revolution changed how seismic data was processed. Between the 1960s and 1980s, computing shifted from analog to digital, Rauch said, requiring the replacement of analog recording systems with digital systems. It also allowed better storage of data and the ability to better process the data.

“It just became much easier and more effective,” she said.

At the same time, the volumes of data were increasing. In the late ‘70s, every recorded shot provided data from under 100 channels, Monk said.

“That has grown exponentially, to the stage where there are crews now recording 200,000 or 300,000 channels for each shot. And by the end of 2024, perhaps 2025, it’ll be a million. So, every time we record, every time we take a shot onshore, we’re going to be recording a million channels of data and a million pieces of data,” he said.

The data itself, he said, hasn’t become more sophisticated or complicated—there is just more of it.



CGG/Sercel

**Evolution of size and portability of land seismic acquisition systems. Sercel SN368 cable telemetry system with station unit connected to a string of geophones (top) deployed in 1990s-2000, and today's ultramodern Sercel WING digital nodal system with integrated MEMS sensor for autonomous seismic data recording.**

"What do we do with all that data?" he asked.

Gray said the hardware that initially enabled major seismic processing advances was the world's first supercomputer, the Cray-1. Oil companies were among the first to take advantage of Cray-1's computing capabilities.

"It just blew people's minds, which was great. It revolutionized the computation," he said.

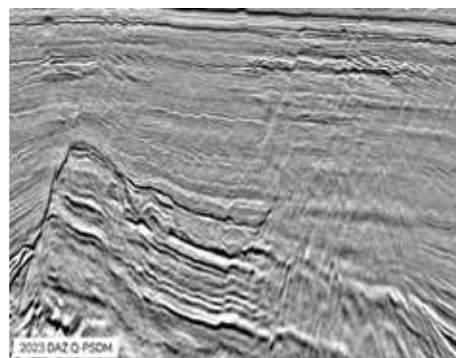
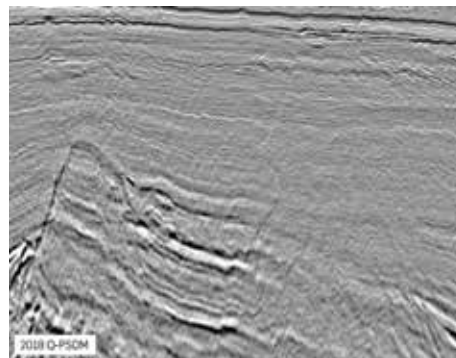
Over the years, Rauch said, high-performance computing became another game-changer. What once

had required many hours to process could now be processed in an hour, she said.

"The technology has really, really moved fast and from very slow computers to huge and powerful computers," she said.

Powerful tools able to process the data, she said, changed the seismic processing world. For example, the use of machine learning has enabled noise reduction and enhanced signals, she said.

Gray noted that access to high-powered computing changed the way



CGG/Sercel

**Northern Viking Graben dual-azimuth (DAZ) 2023 regional 14,000 sq km imaging (bottom) compared against the legacy 2018 single-azimuth imaging (top). With the 2023 data, reflectivity has been recovered above the Jurassic fault block highs, revealing fluid migration pathways not discernable on the legacy. The 2023 data included reprocessing of the legacy data along with a newly acquired perpendicular East-West azimuth survey through the latest advances in both signal processing, and a multi-parameter velocity model building. Key technologies included deblending, wedecon, ML denoise, intelligent DAZ combination processing, DAZ TLFWI and a comprehensive Q model build. These provided a step-change in imaging over this continually active exploration area with various ongoing discoveries being made using the data.**

the industry migrated data.

"Before we had big computers, migration was possible, but it was torture," he said.

Computational power also enabled full-waveform inversion (FWI), which revolutionized velocity model building for migration. The latest FWI imaging produces better seismic images and next-generation elastic FWI, which uses the full elastic wave equation, has in the last year produced the most reliable lithology estimates to date, he said.

The type of surveys also evolved



over the years, moving from 2D to 3D, and then adding in the time component for 4D seismic. 2D surveys yield a vertical cross-section image of the subsurface, while 3D surveys generate a cube, or stacked image of the subsurface.

While the concept for 3D seismic had existed for a while, Rauch said, "it became actually practical" in the 1980s. "3D was really a game-changer because now we could image the world as it more or less really is."

And visualization rooms, which gained popularity in the early 2000s, took seismic data out of the two-dimensional world of paper and helped geoscientists see the data in space.

Gray said the visualization center made it possible to share enormous data volumes with many people and help them "understand structurally" the data. It was, he said, an alternative to printing the images out on paper.

As sophisticated as the processing has become, the price to process hasn't changed that much since the



API Photograph and Film Collection, Archives Center, National Museum of American History, Smithsonian Institution

**The way it was: Joe Menou observes the recorder in a seismic recording truck near a swamp in Tangipahoa Parish, La., in the Tuscaloosa Trend area in 1980.**

early days of computing, Monk said.

"Compute capability has been coming up exponentially and the cost of compute has been coming down," he said. "The cost to actually

process seismic data has stayed almost constant over the entire time. But what we are doing with data is far more complex, and we are doing it on far more data." ■



On behalf of all the team at BKV,  
we would like to congratulate

# Chris Kalnin

on being recognized as one of

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# BIT BY BIT, DRILLING TECH HAS EVOLVED

The future is faster and more efficient, experts say.

**JENNIFER PALLANICH, SENIOR EDITOR, TECHNOLOGY**

**A**s drilling technology evolves, so do expectations. A half-century ago, drill bits were expected to wear out quickly. POOH, or pulling out of hole, was a frequent occurrence. Uncertainty about wellbore placement was common. Drilling was also a very hands-on activity, which raised the potential for accidents.

"The expectation 50 years ago was that it took a long time to drill a well," Andy Hendricks, chairman of the International Association of Drilling Contractors and president and CEO of Patterson-UTI, told Hart Energy. "Drill bits didn't last very long. You had multiple trips in and out. You would run multiple casing strings. Everybody accepted that it would take a long time to drill a well. I used to work in Venezuela when it took 420 days to drill a well."

And as the types of wells the industry drilled changed, new tools were necessary. "Fifty years ago, it was all about vertical wells, and then it became directional wells, and then directional turned into horizontal, and then all the tools for drilling those wells changed," Hendricks said.

From the drill bit at the end of the bottom hole assembly (BHA) to the world of data and heavy computing to optimize well placement in real time, technology has progressed alongside changing drilling needs.

Sure, drill bits still wear out, but they are more durable than ever, as are other ruggedized components on the BHA. While-drilling technologies provide insights into downhole conditions to reduce the need to pull out of hole. Rotary steerable systems (RSSs) minimize uncertainties around wellbore placement.

Innovations like the iron roughneck and automated handling made operations safer. Artificial intelligence and the ability to quickly access data are helping to make drilling more efficient. These and other technological advances mean drilling a mile a day in certain formations is expected, fewer people have hands-on roles in drilling operations, and driller's cabins are starting to move away from the drill floor.

Patterson-UTI Drilling Rig  
901 APEX XC drilling rig,  
with walking system.





Baker Hughes

**Typical tricone dull pile at a rig site in the 1990s.**

**Drill bits**

Bobby Grimes, reliability consultant at Baker Hughes, said drilling engineers “have a love-hate relationship with drill bits because they can make you a star or, if you tear one up or have issues with it, you cannot look so good.”



**Bobby Grimes**

A lot of technology goes into drill bits, from materials science for the metal and elastomer seals and cutting materials, to the engineering of the overall bit design, he said.

“We’re torturing drill bits. They’re the tip of the spear. We apply relatively high weights on the bit and RPMs (rotations per minute) to the bit” while drilling through various rock types for many thousands of feet, he said. “They have to be structurally strong enough to be able to handle these high loads and RPMs over long distances.”

Drill bits with tungsten carbide inserts—initially developed to drill the hardest formations—had their heyday in the 1970s and 1980s. The late ‘70s saw the introduction of the polycrystalline diamond compact (PDC) bit, which uses industrially-synthesized diamonds for the cutting elements. PDC bits, initially capable of drilling only the softest formations, showed potential for directional drilling, which was taking off in the 1980s due to the advent of directional drilling with mud motors, Grimes said.



Baker Hughes

**Baker Hughes introduced the Kymera hybrid bit in 2010.**

“Today, about 80% of all footage drilled is with PDC bits. They’re really the workhorse in the industry now,” he said.

In 2010, Baker Hughes introduced its Kymera hybrid drill bit, which combines roller cone and PDC technology into a single bit.

**While-drilling technology**

The advent of logging while drilling (LWD) and measuring while drilling (MWD) technologies gave drillers

visibility into the wellbore, which sped up drilling operations and enabled the avoidance of hazards, André Trébucq, strategic business manager for Halliburton’s Sperry Drilling Services, said.



**André Trébucq**

Before LWD and MWD, “there were two options. Either the drilling phase was completely blind, or it was extremely slow.”

If the goal was to not drill blindly, it was necessary to drill a portion, pull the drillstring out of hole, run measurement tools on a wireline, pull the wireline, and return the drillstring downhole to resume drilling, he said.

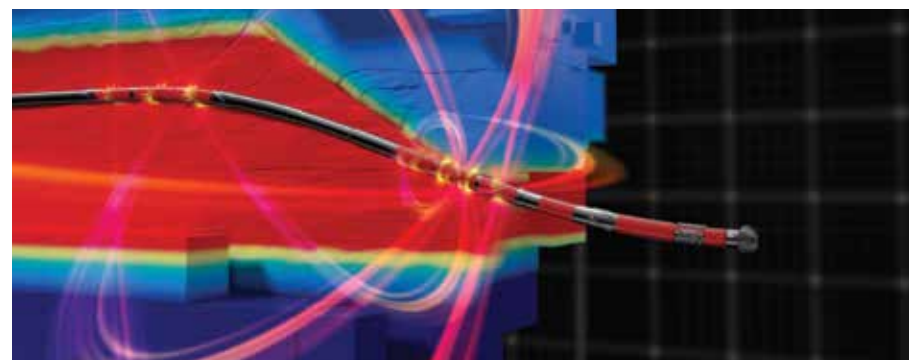
“If there’s multiple causes to do that during a well interval, then that takes several days, essentially. So, if we do make the decision to go ahead blind, then we don’t know if we’re drilling on target. We don’t know if we are in the correct formation. We don’t know if we’re near another well,” he said.

Sperry launched the first LWD technology in 1984 for gamma and resistivity logging, followed by porosity in



Halliburton

**Halliburton engineers work with the EarthStar X near-bit shallow and ultra-deep resistivity service in the field.**



Halliburton

**Navigating complex reservoirs by geosteering with near-bit sensing with Halliburton’s EarthStar X near-bit shallow and ultra-deep resistivity service.**



**Iron roughneck.**



**Top drive system.**

1986 and density in 1987, he said. Other tools followed, making it possible to see ahead of the bit in real time, he added.

“Look ahead” technology is a newer arrival on the while-drilling technology scene, Trébuq said.

### Directional control

When RSS technology came along in the late 1990s, it brought benefits like better drilling performance, higher quality wellbore and more accurate well placement, Lei Fang, director of drilling services at Baker Hughes, said.



**Lei Fang**

RSS, as an alternative to drilling with mud motors, reduces the risk of pipe sticking or buckling during drilling operations and improves hole cleaning, he said, because RSS makes it possible to continuously rotate and circulate.

“Due to better instrumentation, we have much more precise directional control in RSS that leads to a number of benefits,” Fang said. “You can drill a smoother wellbore, which translates to improved ROP as well.”

RSS and its ability to more precisely control the drilling trajectory also helps with better reservoir access, he said.

“Because you can better control the well trajectory, you can access thin sections of reservoir that otherwise would be very difficult” to maximize

reservoir contact, he said.

The predecessor of RSSs was an automated vertical drilling system funded by the German government for use in deep geological research, Fang said. Baker Hughes further developed the technology, ultimately releasing the industry’s first RSS, AutoTrak, in the late 1990s. This advancement made the current era of geosteering possible.

### Automation advances

The drilling industry has embraced mechanization and automation to improve performance and safety, Hendricks said, noting there has been a major effort of late to create software that will control drilling.



**Andy Hendricks**

“There’s so many things that can go wrong” just setting the drill bit back on bottom, he said. “If you go too fast, you can damage the drill bit, you can break off a cutter, you can stall the motor out and tear up the elastomer on the inside of the motor, and nobody wants to have to trip out of the well when you’re in the middle of a three-mile lateral in West Texas,” he said. “Every time you make a connection, you want it to be repeatable in the best way possible. And automation of the existing drilling systems allows you to repeat the best process over and over again.”

Starting in the mid-’70s, the iron

roughneck, which torques connections together, made it possible to remove some of the operational risks of drilling, although adoption was slow.

“That was a big breakthrough around the drill floor. Of course, it didn’t hit hard until the ‘90s,” and only around 2004 “became normal,” said David Reid, NOV’s chief technology officer. “The iron roughneck got people’s hands off of drill pipe, and that was the big win, really saving fingers and lives.”

In 1982, Varco, which later became part of NOV, launched the top drive.

“That changed the industry. That changed everything,” Reid said.

The top drive created the ability to drill with a 90-ft stand of pipe, rather than the typical 30-ft sections, which sped up the drilling process. It also provided the ability to ream backwards, paving the way to cleaner well walls while continuing to build a long section.

“Drilling with stands was very new to the industry. So, from an efficiency standpoint, it was faster. But most importantly, from an applied torque standpoint, having the load of a big machine on top that could apply direct torque into the string allowed us to actually build the horizontal wells that we wanted to do and start doing directional. Without that, you wouldn’t have been able to do it,” he said.

Reid said the driller chair, unveiled in the early 1990s, was the first digital integrated control system for drilling operations.

“Before that, we were doing integrated control systems, but they were just push





**Patterson-UTI's APEX XK drilling rig with walking system.**



Patterson-UTI

**Driller's chair in a Patterson-UTI drilling rig.**

button integrated stainless steel units. And then suddenly we had this drilling chair, which hasn't changed that much since then," Reid said.

The shift to alternating current (AC) control for rigs allowed software to control the rigs and made it possible to layer on automation, Hendricks said.

Rigs can now walk to relocate themselves on multi-well pads. And the speed at which that happens is faster than ever due to evolution in the rig structure design.

"Land rigs used to take two weeks to move. Now it takes two days from one pad to another, and it's because of the design of the structure. It disassembles and goes back together easier than it used to," Hendricks said.

### Offshore changes

Offshore drilling operations have also become faster and safer and entered deeper waters as technologies arrived and evolved. The offshore drilling rig environment, where the drilling packages are fixed on the vessels, has lent itself to a continued evolution of mechanization and automation of riser pipe and drill pipe handling, for safer and efficient operations, Hendricks said.

The integrated column racker, a computer-controlled machine that tripped pipe without humans having to directly handle the pipe, came on the scene in the mid-1980s, Reid said. Automated pipehandling on deck soon followed, as did legislation in some

countries, such as Norway, that required pipes up to 20 inches be handled by pipehandling systems rather than humans, he said.

Dynamic positioning came along in the 1970s, paving the way for drilling operations from drillships and semi-submersibles, rather than floating rigs that must be moored, Hendricks said.

"That was a huge upgrade," he said.

Subsea blowout preventer (BOP) technology has evolved from purely hydraulic to combinations of hydraulics, electronic controls and data systems to make them safer and more reliable.

For quite some time, offshore drilling was limited to about 5,000 feet due to a couple of technology hurdles, including the need to be able to close a BOP in under a minute, Reid said.

"Use of fiber optics was actually what enabled it," he said. In 1997, *The Diamond Clipper* was the first to go out into the deeper water sphere."

And fiber optics, combined with the modern-day multiplexer (MUX) which allows both analog and digital signals to travel along a communications pathway, opened up the possibility of drilling in 10,000 ft water depth, he said.

### Remote control

As the industry continued to aim for safer operations and better performance, it automated activities, turned to industrial robots and developed more ways to carry out operations remotely.

At NOV's Navasota, Texas, facility,

the company has replaced humans on the rig floor with robots that "do all the work of humans, and they do it the way humans do," Reid said.

The driller's cabin has also been removed from the rig floor at the Navasota facility, he said.

"There's no vibration distracting (them)," Reid said. "The first couple of days, the drillers were saying they missed the feel, and then on the third day they realized that the vibration and all the noise was actually bad for their focus."

Over the last 50 years, Hendricks said, the technology that has come into the industry has made operations safer and more efficient.

"It's allowed us to reach formations that we could never reach 50 years ago," he said. "Fifty years ago, you could drill a deep vertical well but it was going to take a long time. Today we can drill a vertical well pretty fast."

And now horizontal drilling is also fast and efficient, achieving drilling rates of about a mile a day.

"I think, going forward in the onshore basins, you're going to see more connections between what we do in drilling a horizontal well and how we design the hydraulic fracturing completion, how we make decisions on how we're going to fracture based on drilling information and data and parameters that makes that process even more efficient and more productive, which can lead to improving the overall production of the wells." ■

Halliburton's e-frac units burn natural gas, keeping greenhouse gas emissions lower than prior generations of hydraulic fracturing equipment.

# Looking Back at the Frac

Halliburton

It took a lot of trial and error over the decades to make hydraulic fracturing an overnight success.

**JAXON CAINES, TECHNOLOGY REPORTER**

Hydraulic fracturing may seem like a relatively new phenomenon that came along with the shale revolution in 2008, but it's been around since the 1940s. The first frac jobs were done in summer 1947, and Halliburton completed the first commercial frac in 1949. Since then, the industry has transitioned to massive hydraulic fracturing, with injections of over 300,000 pounds of proppant.

While massive fracturing dominated the industry, a lot of the methods used for drilling those wells were "not conducive to completing shale reservoirs," Lyle Lehman, founder of Frac Diagnostics and 50-year veteran in the oil industry, told Hart Energy.

"Shale reservoirs were considered to be the source rock for the formation above them. Over geological time, the thought was that the hydrocarbons in the shale would migrate up into the sand or limestone sitting above the shale and swap out some of the water that's in the sand or limestone," Lehman said. Mitchell Energy tested this theory in the Barnett Shale in Fort Worth, said Lehman, but they received "iffy" results.



*"Shale reservoirs were considered to be the source rock for the formation above them. Over geological time, the thought was that the hydrocarbons in the shale would migrate up into the sand or limestone sitting above the shale and swap out some of the water that's in the sand or limestone."*

—Lyle Lehman, *Frac Diagnostics*

The "iffy results" were due to Mitchell Energy pumping traditional, thicker fluids into the well to stimulate it. While the well was stimulated, it was much harder to clean up, making the well much harder to complete and not economically viable. It wasn't until Mitchell, which was acquired by Devon Energy in 2002, returned with a thinner fluid that the wells in the Barnett could be economical.

## Horizontal drilling

Eventually, production from shale

reservoirs became more common due to the introduction of horizontal wells.

"The first horizontal wells that were fractured in the North Sea were in the late '80s and early '90s. So, the sliding sleeve, the frac sleeve technologies were some of the first things, but really what's blown the North America market open has been the ... plug and perf operations," Ron Dusterhoft, Technology Fellow at Halliburton and 40-year oil industry veteran, told Hart Energy.

Zonal isolation techniques like "plug





Halliburton

**A Halliburton oil tanker at a reservoir in the 1940s.**



Halliburton

**Halliburton workers setting up a fracking development in the 1940s.**

and perf” cause a higher density of fractures by increasing the number of fractures per well and reducing the distance between those fractures.

“You have packers or a bridge plug. You put it in, you fracture a well, then

you move,” said Mohamed Soliman, department chair and The William C. Miller endowed chair at the University of Houston and named a 2023 Legend of Hydraulic Fracturing by the Society of Petroleum Engineers.

“When we started fracturing horizontal wells, we created fractures one at a time,” he said. “You go from toe to heel; you do it near the toe, then you move, you put another bridge, you plug, you perforate the oil cased wells. Then you



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Tom Fox/Hart Energy

**After the frac comes cleaning the rig. Joe Garcia and Jacob Olds clean the Carrizo Oil and Pioneer Rig 80 in the Eagle Ford Shale.**

perforate, you create one fracture, another bridge, you plug and perforate, and so on and so forth.”

The new techniques create multiple fractures at a time, making the process more efficient and allowing for numerous fractures to intersect a horizontal well.

Sliding sleeve is newer than plug and perf and speeds up multi-stage frac jobs because it allows multiple stages to be fractured with a single pumping session. Sliding sleeve tools are permanently placed in open holes with mechanically actuated sleeves before perforation occurs. The constant downhole pressure cuts out the plug, perf and repeat process, reducing completion time.

Plug and perf, and sliding sleeve completions were pivotal in the development of unconventional resources such as shale because they were more effective at opening wells than many of the previous methods. They were especially effective in horizontal drilling, which further advanced the oil industry.

Horizontal wells proved much more effective than vertical wells in producing oil from tight formations beds. Those



*“If you look at what Mitchell (Energy) did, they transitioned into a water frack, got rid of the polymer ... and as a result, that really was what opened the floodgates on the shale market.”*

—Ron Dusterhoft, Halliburton

beds are usually nearly horizontal, so horizontal wells have much larger contact areas with the target formation.

“If you know the orientation of those natural fractures, drilling horizontal wells will give you a lot higher probability that you intersect those fractures,” Soliman said.

### Shale revolution

Eventually, the wider adoption of horizontal wells led to the shale revolution in 2008. Prior to that, the U.S. economy was highly dependent on oil imports from countries like Venezuela and Saudi Arabia. Now the U.S. is a net

exporter of crude oil.

“Mitchell Energy in the Barnett Shale gets all the credit for the early shale wells because what we found early on ... is that the tight gas technology, the fracturing for tight gas, did not seem to work in shale, and we didn’t really understand why,” Dusterhoft said. “And if you look at what Mitchell did, they transitioned into a water frack, got rid of the polymer ... and as a result, that really was what opened the floodgates on the shale market.”

Another reason shale development took off was the implementation of drilling data analysis technology. Adding





Tom Fox/Hart Energy

**Marathon Oil workers trip pipe from the ground on the Salge Kinkler #1H wellsite being drilled by Helmerich & Payne Rig #430 in Karnes County, Texas, in 2011.**



*“If you know the orientation of those natural fractures, drilling horizontal wells will give you a lot higher probability that you intersect those fractures.”*

—**Mohamed Soliman, University of Houston**

computer technology to the drilling process the operator to predict the path a newly formed fracture might take. It could also determine the stress contrast of the well and enable operators to identify the best reservoirs.

“The incorporation of well data [helped the operator] understand where to place fractures along the horizontal so that they would all open equally,” Lehman said. “Just because I put a perforation here, here and here, it doesn’t mean they will all open up the same and take the same amount of fluid. We have to understand what the stress is along the wellbore so that we move

those perforations around and place them in a lower stress area so that the stress differential is minimal.”

Well data also makes the well stimulation process easier through the use of “proxy” data, a form of AI that takes drilling data and converts it to formation properties—particularly rock strength—so that the treatment of the well can be performed optimally.

But even with all the benefits that collecting well data provides, managing it can be difficult.

“Data is a wonderful thing, but it’s also a huge monster that we have to deal with,” Dusterhoft said. “The

challenge we have today is with the unconventional fracturing. We probably have an order of magnitude—maybe two orders of magnitude—more data coming in than we ever did in the past. So, managing that data and putting it in a useful format is a challenge and we’re making steps there.”

Operators are looking to use data through automation, machine learning and AI. Halliburton has been working on this technology since the 1990s, Dusterhoft said. Halliburton’s automatic remote control equipment allowed operators to run jobs without having to put people on the trucks or in the red zones.

The current mission in the fracking space is achieving sustainability. Even with the energy transition, production from oil and natural gas is still incredibly important to the energy industry, so operators are focused on safer ways to produce.

“Chemical containment, fluid containment are things that we’ve advanced tremendously on, but also emissions reduction, and things like dual fuel to power our trucks,” Dusterhoft said. ■

# DEEP DIVE

Deepwater development and installation technology has come a long way.

## JAXON CAINES, TECHNOLOGY REPORTER

It is not uncommon to see or hear news about billion-dollar offshore oil and gas projects submerged in thousands of feet of water, but that's not where the industry started. The energy industry had to crawl before it could walk, and walk before it could dive into deep water. It had to work its way up to these thousand-feet-deep projects.

"When I started this business in the late '60s, early '70s, a couple hundred feet was kind of the water depth [where we were] dealing with, maybe a few in the North Sea or here in the Gulf of Mexico," Peter Noble, a former naval architect with over 50 years of experience, told Hart Energy.



Peter Noble

During the early days of subsea exploration, jackups were the rig of choice. Having been around since the late 1940s, they were seen as reliable and more than suitable for shallow depth fields. And while jackups have been equipped with upgrades such as X-Y cantilevers, their overall design remains mostly unchanged, and they cannot operate in deep water. But the industry has adapted.

"Over the last 50 years, we've gone from a couple hundred feet out to 10,000 feet, and that's required quite a lot of technology development," Noble said. "But it's been driven by the market looking for oil sources and finding them in deep water."

One such development was the tension leg platform (TLP).

TLPs are platforms with excess buoyancy. These buoyant production facilities are vertically moored to the seafloor by tendons, which make them difficult to install but incredibly stable. This allows the platform to have

production wellheads on deck that connect directly to the subsea wells via risers, instead of on the seafloor. Because of this, TLPs have a simpler well completion, better control over the production from the reservoir and easier access for downhole intervention operations. Despite not being useful everywhere, they are normally situated for water depths between 1,000 and 5,000 feet.

However, it was the emergence of the dynamic positioning system that took deepwater exploration developments over the top, Noble said.

Dynamic positioning technology was first used by the *CUSS I* drillship during Project Mohole in 1961. While Project Mohole didn't achieve its initial goal of drilling through the Earth's crust, it unintentionally solved an age-old water depth problem in the oil and gas industry by developing a technology to drill holes in deep water with a rig that was not tethered to the seafloor.

"We could go and drill in 10,000 feet of water without having to put a mooring system down and hold the vessel on the surface, whether it was a semi or a drillship, using thruster systems guided by GPS and various navigation systems."

The results of Project Mohole were felt far and wide throughout the oil and gas industry. Dynamic positioning helped advance and bring success in



Richard D'Souza

deepwater drilling, which in turn led to the creation of TLPs, spars, semisubmersibles, floating production storage and offloading (FPSO) vessels and more

in the '70s, '80s and '90s. And as Richard D'Souza, retired naval architect and industry expert, said, "Most

of these breakthrough technologies were the result of smaller companies taking chances and the bigger boys then stepping in."

Created by Ed Horton of Deep Oil Technology (DOT), a small entrepreneurial company in the 1990s, the idea for production spar platforms came from the spars used in the North Sea for oil storage, such as the Brent Spar.

"There were spars in the North Sea, but they were used for oil storage, not for drilling and production. But [Horton] saw the potential of taking that concept because it's a vertical cylinder that is stabilized by putting a lot of ballast at the base and it barely heaves," D'Souza told Hart Energy. "It's so low that you can bring production risers to the surface.... The heave compensators work to 10 to 12 meters of heave and you can bring dry trees to the surface, just like you do with TLPs and fixed platforms."

In 1996, Oryx Energy, a sponsor for many of DOT's projects, partnered again with DOT to upend the world's first production spar platform, the *Neptune* spar in the Gulf of Mexico. That same year, Chevron and Exxon made their Genesis discovery in 2,600 feet of water. The only way to produce the field was to use dry trees, making it the perfect opportunity for spar platforms to prove their usefulness.

### Risky business

For all the advancements in the installation and development space, the oil industry is still a risky business and has endured a past with tragedies.

"You cannot completely avoid catastrophes ... initially we didn't have the technological sophistication to be able to design and understand the wave loads and hydrodynamic responses or the structural wherewithal to be able to design them safely," said D'Souza.



*“Most of these breakthrough technologies were the result of smaller companies taking chances and the bigger boys then stepping in.”*

—Richard D’Souza, retired naval architect

Photographic Services, Shell International

**Shell’s Perdido is the deepest floating platform in the world, operating in 8,040 feet water depth in the Gulf of Mexico.**



Peter Piazza/Hart Energy

**Jackup rigs, like the EnSCO 99 offshore Louisiana, were the primary method of offshore production for much of the 20th century.**

“But once we got there, most of the catastrophes have been human failures.”

In 1980, the *Alexander L. Kielland* drilling rig capsized in the North Sea, killing 123 and resulting in, at the time, the deadliest offshore rig disaster because of improper escape measures. In 1988, 165 people lost their lives when the *Piper Alpha* oil platform exploded as a result of improper maintenance on a condensate pump. In 2010, the *Deepwater Horizon* disaster resulted in 11 deaths and one of the largest environmental disasters in recorded history. Each of these disasters were the



Hart Energy

**The world’s first production spar, which Oryx Energy brought online in 1996.**

result of human error and could have been mitigated with proper protocol, D’Souza said.

“If you are classed, then there are certain requirements for inspection and maintenance that you have to comply with. ABS and DNV and Lloyds [Register], they all have the rules. So, you class a bunch society, then you have to satisfy those requirements,” he said.

While meeting these prerequisites can require a lot of operational expenditure, complying with inspection, maintenance and safety regulations of class societies and government



NOAA

**The Deepwater Horizon disaster is considered the largest marine oil spill in the world and is the largest environmental disaster in U.S. history.**

regulators have helped to make deepwater developments much safer. To assist with these inspections and protocols, newer safety technologies have been developed.

“We’ve developed offshore helicopter technology, which helps in transferring people back and we’ve got better lifesaving devices,” Noble said of the safety advancements around the industry. “On the drilling side, we’ve got better ways to control the drilling processes, which have often been the initiator of a problem or loss of control on a well.” ■

# All's Well That Ends Well

The industry has continually raised the bar for semisubmersibles, well intervention and artificial lift.

**JAXON CAINES, TECHNOLOGY REPORTER**

The industry's deep dive into production technology enhancements began with ... a deep dive.

"I'd say the first breakthrough was the industry's decision to actually put the wells on the bottom of the ocean to do subsea wells," Owen Kratz, president and CEO of Helix Energy Solutions, told Hart Energy.

But far from the last. From the installation of the first subsea trees in the early 1960s, the industry has continually pushed the limits of production tech in the realms of semisubmersibles, artificial lift and automation to extract every hydrocarbon molecule possible.

Kratz, who has been involved in the industry since the 1980s, has served as a director at Helix since 1990 and was the chairman of the board from 1998 to 2017.

The first vessel built specifically to execute well intervention was launched in 1987, he said. Prior to that, drill rigs were the only asset used.

Helix was the first company to implement riser-less well intervention and was a pioneer of the process. However, in the late 1980s, the company could only carry out wireline intervention.

Wireline intervention involves running and pulling tools and equipment into and out of the well with a continuous-length wire mounted on a powered reel at the surface. Typical wireline operations include perforating, logging, pulling, cleaning wells and dumping cement. While wireline is light, easy to assemble and move, and does not require the application of a drilling BOP or heavy equipment, it isn't the most effective



API Photograph and Film Collection, Archives Center, National Museum of American History, Smithsonian Institution

**A Mobil Oil offshore platform operates in the Gulf of Mexico in the pre-deepwater era.**



*"Now, it takes a while for the industry to accept new technologies but I think that, especially for decommissioning, we could be in a position to eliminate the need for a rig, on the vast majority of cases, by next year."*

**—Owen Kratz, president and CEO, Helix Energy Solutions**

form of well intervention.

Things turned around in 1998, Kratz said, when a vessel other than a rig was used to deploy a riser for the first time. This allowed coil tubing to be run into the well, which greatly increased what can be done in the well.

The door was now opened to a whole new world of well intervention.

"In '98, we were the first ones to run

a small-diameter high-pressure riser," Kratz said. "A drill rig uses low pressure; they use the mud and the riser to hold the pressure in the well. What we did was reduce the size of the riser to seven inches, and we took the high pressure all the way back up to the vessel and kept the blowout preventer on the vessel."

This small-diameter high-pressure





Helix Energy Solutions

**1. The Q4000 is the world's first deepsea intervention and construction vessel. 2. Built in 2016, the Siem Helix 1 is a purpose-designed, advanced well-intervention vessel capable of completing a wide range of subsea projects. 3. Built in 2019, the Q7000 is equally optimized for well decommissioning, including suspension, tubing removal, tree recovery and sea floor clearance. 4. Helix acquired the Uncle John in 1996. It was the world's first purpose-designed and built semisubmersible dive support vessel. 5. Built in 1987, the Seawell has been operating throughout the North Sea, providing subsea well intervention solutions and pioneering light well intervention.**

riser was run from the *Uncle John* and, while it yielded mixed results, the job was deemed successful enough for Helix to build around the idea. This led to Helix launching the Q4000, a multi-purpose oil field construction and intervention vessel, in 2002.

"[The Q4000] was a relatively small vessel and it was semisubmersible so that the motion characteristics were

beneficial," Kratz said. "We were able to use a smaller vessel for a couple of reasons. One, it also had the first, multipurpose tower. And, it was an open-sided derrick, whereas drill rigs all used Texas towers with V doors. So, there was a great efficiency gain by having a derrick that was open on three sides."

The Q4000 represented a welcome

milestone for both Helix and the energy industry as a whole, but the company has its sights set on a future in which rigs are no longer needed for interventions or decommissioning.

"We're hoping to introduce exciting technology this year," Kratz said. "Now, it takes a while for the industry to accept new technologies but I think that, especially for decommissioning,

we could be in a position to eliminate the need for a rig, on the vast majority of cases, by next year.”

**Artificial lift**

Another way to ensure that the majority of hydrocarbons have been extracted from the well is through artificial lift, a technology that has been around since ancient Egyptians invented the shaduf, a hand-operated device to lift water for irrigation. Closer to this century, the rod pump looks pretty much as it did when it was developed 150 years ago.

“The pump itself, for probably 150 years, has been very similar,” Rodney Sands, business development manager at ChampionX, told Hart Energy. “There are many advantages with the design, so there’s been very little design change. Metallurgically, the design has gotten better, but the basic pump is the one that was used 150 years ago.”

Rod lift is one of the most commonly used forms of artificial lift. The surface-pumping unit of a rod lift system consists of a prime mover (usually an electric motor) and a beam fixed to a pivotal post. This system allows the beam to rock back and forth, moving the downhole components up and down in the process.

Linked rods attached to a downhole pump are connected to the surface unit. The linked rods typically fit inside the tubing and are stroked up and down by the surface-pumping unit. This activates the positive-displacement pump at the bottom of the well. Each time the rods and pumps are stroked, a volume of produced fluid is lifted through the tubing annulus and discharged at the surface.

The second most common form of artificial lift is an electric submersible pump, or ESP. An ESP system consists of centrifugal pumps made up of multiple stages connected to a submersible electric motor. The motor is powered by heavy duty cables connected to surface controls. The motor rotates the shaft, which is connected to the pump, and the spinning impellers draw in fluid through the pump intake, pressurize it and lift it to the surface.

But while rod lift and ESPs are two of the oldest and most common forms of artificial lift, “they’re both really quite



ChampionX

**A ChampionX operator in 2019 uses a plunger lift, one of the most economical methods of artificial lift tools used to help operators in tight oil plays optimize production economics as horizontal wells mature and product output begins declining.**



*“Metallurgically, the design has gotten better, but the basic pump is the one that was used 150 years ago.”*

—Rodney Sands, business development manager, ChampionX

inefficient in terms of energy input,” said Terry Treiberg, senior engineering advisor at ChampionX. The use of variable speed drives is one of the biggest technology changes in rod pumping, and is now commonly implemented.



**Terry Treiberg**

“When I first started in the late ‘80s, we didn’t hardly have any variable speed drives on rod pumps,” Treiberg said. “Today, there are many companies that standardize on variable speed drives, and those are used to better control the well. If you can change the speed of the motor in different parts of the stroke, you can achieve even greater efficiencies and extend equipment life.”

Changing motor speeds allows

operators to avoid many of the problems that can occur during pumping. It enables the operator to precisely slow down the rods if production is not available and minimize rod compression that can happen during the downstroke of the pump.

But while system efficiency is important, the decision to pick a particular form of lift is “very complex,” said Brian Hicks, director of ESP and engineering for ChampionX, because the decision isn’t primarily driven by overall system efficiency.



**Brian Hicks**

“Part of [the decision] is around the time value of money and how quickly operators want to produce the



reservoir over the potential life of the reservoir,” Hicks said. “You’re balancing the early production versus the full lifecycle potential production.”

Operators must find a balance between meeting economic requirements and meeting certain technical factors. The complexity of the process increases with horizontal wells because of the added mechanical stress on the equipment.

With new wells, operators seek to access more of the reservoir, Hicks said. As they drill their lateral, they follow the natural geology.

“When operators fracture [the well], fluid starts to come into the wellbore and it travels through this hole that has all these direction changes,” he said.

As a result of the various changes in direction, the dynamics of the fluid moving into the wellbore are constantly changing. For example, slugs of gas accumulate on the high side of undulations in the horizontal section of the wellbore. When those slugs break free, they flush through the wellbore and hit the pumping

system. Pumps need to be able to adequately handle this rapid change of fluid composition or risk becoming damaged.

New materials are being tested to find ways to lessen the stress on the pumping equipment and decrease the pump’s chances of failure.

“Material science is advancing quickly in the industry overall and, even outside of oil and gas, there are learnings regarding different coatings, different metals and different elastomers that may improve the ultimate reliability and performance of the equipment,” Hicks said.

There has also been a push to incorporate automation, machine learning and artificial intelligence into artificial lift to increase efficiency.

“We can get data back much more quickly and store more data than we’ve ever had the ability to do before,” Hicks said. “Being able to store data and retrieve it faster, we can do a much more in-depth analysis. In the last five years, the big advancements have been in the

progression of analysis.”

While Hicks does admit that there is a long way to go, real-time adjustment can mitigate a lot of the artificial lift’s inefficiencies. ChampionX is working on embedding new sensors into its equipment to gain more real time analytics and use automated processes to adjust and enhance operations.

This may be the age of the energy transition to cleaner fuels, but the industry will be heavily reliant on automation and machine learning to get there.

“Looking towards the future, there is an energy transition happening, but every data source forecasts a substantial need for oil and gas in the future. There may not be as much capital to develop the fields as there was in the past, given the competition for capital amongst all these different energy sectors,” Hicks said. But, “it’s incredibly important to produce the oil and gas fields that you have or any new ones that you bring into production as efficiently as possible.” ■

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# LEGENDARY

## Congratulations Rod Lewis!

## From your team at Lewis Energy Group

# All the Pretty Oil and Gas

NISSA DARBONNE, EXECUTIVE EDITOR-AT-LARGE

Writing the history of Hart Energy for this month's 50th anniversary special edition, I learned more details about the 25 years preceding my joining the company in 1998. And it reminded me of the long conversations I've had the opportunity to have with the industry's leaders.

They've patiently taken time to teach me about mudstones and mud logs, sand-duning and sliding sleeves, volatile oil and dead oil, TOC (total organic content) and the TOE (tonne of oil equivalent).

And didn't mind that I had to ask some questions that were embarrassingly daft.

A Bakken operator, describing the completion recipe in 2016 and the company's overall success, said one of the ingredients was animal spirits. Yes, I had to ask: Were we talking Keynesian about the company's success or do completions engineers call the brew "animal spirits?"

The miracle of renewed American energy independence is magical, after all.

Shale wildcatter Dick Stoneburner, talking about the Eagle Ford in 2013, called it a crummy rock. Or did he mean "crumby?" We laughed about that again just the other day.

North Dakota Bakken pioneer Harold Hamm suggested in an email in 2019 that I ask him about "IMO" in an onstage fireside chat at an upcoming Hart conference. "IMO" to me meant text code for "in my opinion." Google suggested it might mean the annual International Mathematical Olympiad.

Hamm laughed, "No, I mean the International Maritime Organization."

The energy industry has been generous, too, with teaching in the field itself. And the oil and gas field is beautiful.

Two months into joining Hart Energy, I was off to the Sahara Desert with Anadarko Petroleum, securities analysts and institutional investors. The sun set for hours at base camp in Hassi Messaoud, Algeria, during an outdoor



**The January 2015 cover featuring cuttings from the Stack play in Oklahoma.**

buffet of paella, couscous, hummus, koshari, Méchoui, kebabs and salads.

In Hassi Berkine Field the next morning, a glimmering processing facility rose from the desert floor. A pair of camels without masters walked past. Departing later that day, the moon rose from behind the dunes to the east as the sun set behind dunes to the west. Georgia O'Keeffe would have liked it there.

On a trip to a coalbed-methane field in eastern Kansas, a first stop was in downtown Wichita where there are life-size statues on the sidewalks of ordinary people standing at street corners, playing hopscotch, walking a pony.

*Oil and Gas Investor* co-founder and Photo Editor Lowell Georgia snapped me interviewing one, a lady pointing at an apparently remarkable event in the skyline.

In the Gallup oil field in New Mexico, I was shown how to read ancient markings that operators take care to not disturb. In the hills of the Williston Basin, I was taught how to drive on ice.

On a field trip with Newfield Exploration Co., now part of Ovintiv, to

the Stack play in Oklahoma, a photo op appeared in the logger's cabin: a tray of cuttings.

They were beautiful. All in the gray-charcoal-black color spectrum, the magazine's freelance photographer, Tom Fox, understood my "suggestion" to photograph it: It was more important than what it may have appeared to him to be, which was 40 shades of gray.

He set it up next to the cabin's one window, so the morning light would give it depth and texture. The image was selected for the January 2015 cover. I came upon it again recently, staring at it even longer than the first time, each particle revealing its secrets.

Cody Campbell, co-founder of Permian wildcatter Double Eagle, said in an on-stage interview this year, "Every acre has a story." When I look at that tray of cuttings, I think every tray of cuttings tells a story, too.

The beauty of the oil and gas field, which I had witnessed growing up in in South Louisiana, is well known by more than a century of wildcatters and oilfield-service professionals. Hart Energy shared it with the world, beginning in 1981.

These same oil and gas professionals and thousands more who enter the industry each year continue today to make the beautiful possible—that is, mankind's existence on Earth.

They incessantly encounter the hypocritical: "End fossil fuels but not my YouTube channel. And don't forget to 'like' and 'subscribe'—from your own hydrocarbon-based products."

Four protesters glued their feet to the floor of the stands at the recent U.S. Open, disrupting play for 50 minutes while medical personnel dissolved the glue.

Toby Rice, president and CEO of EQT Corp., the No. 1 U.S. gas producer, was there. He said at an energy forum in Austin in September, "There's no better statement of how hard it is to live in a world without fossil fuels when you can't even protest fossil fuels without using fossil fuels." ■



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