



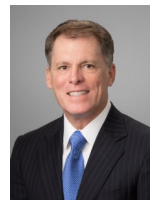
Weekly E&P Update

November 7, 2023

Vol. 44

Oilfield Know-How Enhances Lithium Supply Security

By Steve Hendrickson
President of Ralph E. Davis Associates

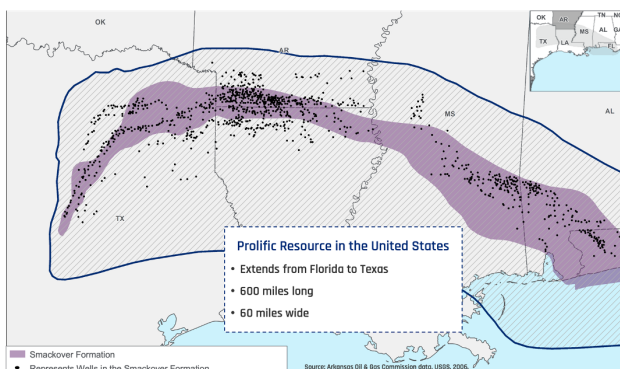


In an [earlier edition](#) of our newsletter, we commented on how the increased adoption of electric vehicles (EVs) and battery-based electricity storage solutions threatens to create a new form of energy insecurity: one that would be the result of vastly increased demand for the rare earth elements that are essential for rechargeable batteries but for which we lack any meaningful mining or processing capacity.

Despite [recent lower-than-expected sales in EVs](#), growth remains robust, with 50% more EVs sold in the US in the third quarter compared to last year. One of the critical elements in battery production is [lithium](#), and because we've seen some recent announcements regarding the extraction of lithium from underground brines in the US, we are going to take a closer look.

Approximately 75% of the world's known lithium reserves are in the "Lithium Triangle" countries: Chile, Bolivia and Argentina. These countries have [underground brines with high lithium concentrations](#) in regions that experience low rainfall and have high evaporation rates. This climate allows the lithium in the brine to be concentrated in large ponds at low cost before further processing. In addition to these brines, lithium is also recovered from [geothermal brines and oilfield brines](#), where oil industry technology can play a role.

In the US, certain deep oil reservoirs are relatively high in lithium, although at lower concentrations than those in South America. Such reservoirs can be found in North Dakota, Wyoming, and Oklahoma. Still, the Smackover formation that extends from East Texas through Arkansas and on to Florida is [one of the most promising](#). Because of years of oil and gas exploration and development, there is a great deal of technical data available and industry familiarity in handling the Smackover fluids, which can be deep and hot with varying amounts of carbon dioxide and hydrogen sulfide.



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(Source: Standard Lithium)

For example, on a recent investor call, Exxon [discussed its expansion into lithium](#) brine production and described it as "more and more promising." They have leased 100,000 acres in Arkansas for lithium production. [Standard lithium](#) is also working in the play, with two projects under consideration.

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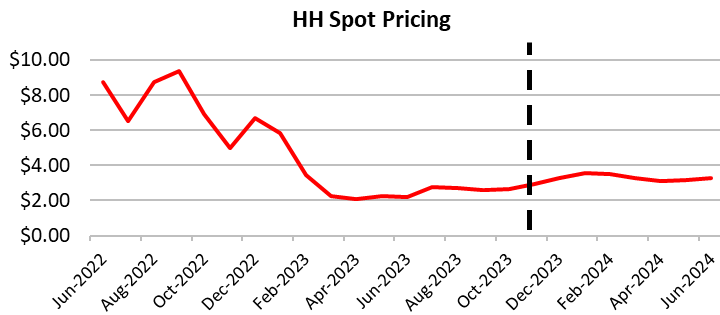
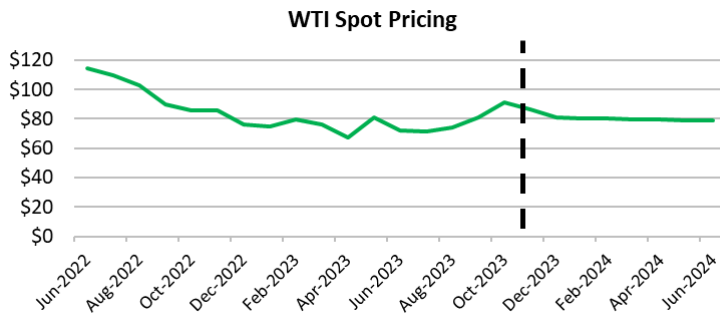
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NYMEX FUTURE PRICING



MONDAY'S MARKET CLOSE

NYMEX WTI CRUDE OIL FUTURES as of November 6, 2023 Close (\$/bbl)

Period	Current	WoW Change	Last Week	1 Yr Ago
2023	\$80.82	(\$1.49)	\$82.31	\$85.46
2024	\$78.67	(\$0.02)	\$78.69	\$77.13
2025	\$74.21	\$0.28	\$73.93	\$72.04
2026	\$70.64	\$0.15	\$70.49	\$68.04
2027	\$67.84	\$0.03	\$67.81	\$64.83

NYMEX HH NATURAL GAS FUTURES as of November 6, 2023 Close (\$/MMBtu)

Period	Current	WoW Change	Last Week	1 Yr Ago
2023	\$3.26	(\$0.09)	\$3.35	\$5.48
2024	\$3.50	\$0.07	\$3.43	\$4.71
2025	\$4.15	\$0.11	\$4.04	\$4.58
2026	\$4.23	\$0.15	\$4.08	\$4.53
2027	\$4.12	\$0.14	\$3.98	\$4.52

INDUSTRY METRICS—QUICK SNAPSHOT

	Current	Last Week	WoW Change	%Change
Crude Oil Near-Month Price (\$/bbl)	\$81.13	\$82.59	(\$1.46)	(2%)
Natural Gas Near-Month Price (\$/MMBtu)	\$3.37	\$3.33	\$0.04	1%
Weekly Upstream-Deal Transaction Value (\$MM)	\$73.50	\$60,000.00	(\$59,926.50)	(100%)
Weekly Number of Upstream-Deal Transactions	2	2	0	-
Current Total US Rig Count	618	625	(7)	(1%)
US Field Crude Oil Production (MMbbl/day)	13.2	13.2	0	-
US Field Dry Natural Gas Production (Bcf/day)	107.9	107.9	0	-
Commercial Crude Oil Stocks-Excluding SPR (MMbbl)	422	421	0.8	0.2%
Natural Gas Stocks-Working Gas Underground Storage (Bcf)	3,779	3,700	79	2%
Total Drilled But Uncompleted Wells (DUC-Last Month)	4,681	4,681	0	-

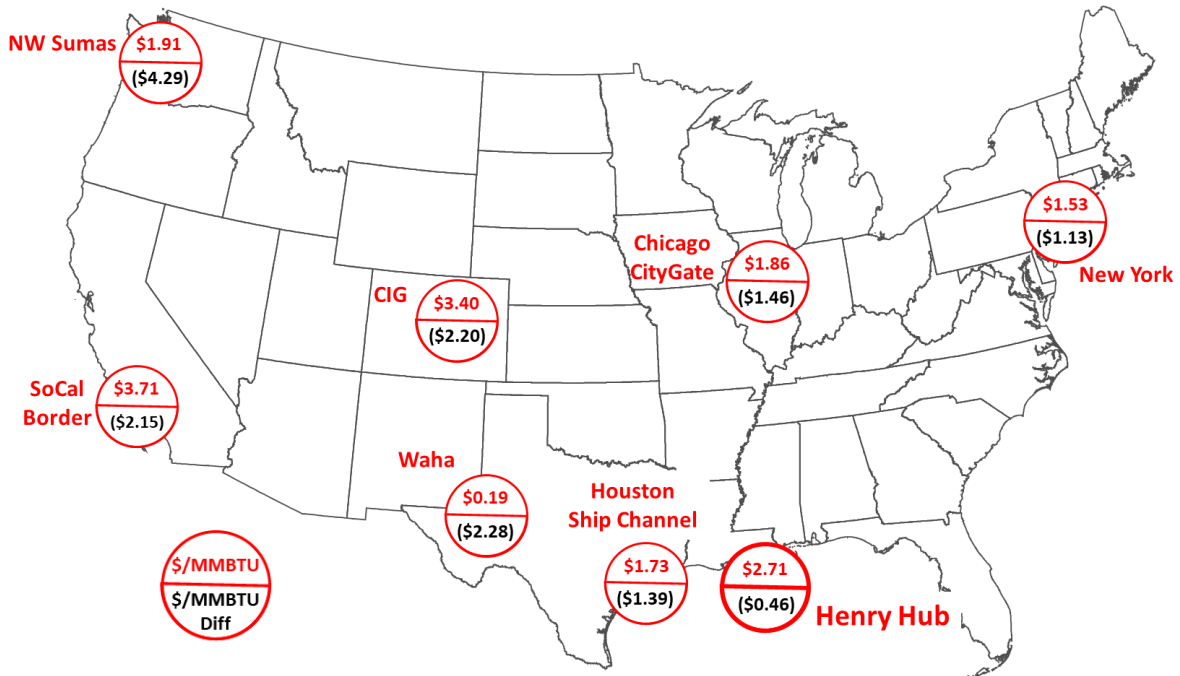
*Source—Energy Information Administration, United States (EIA)

*Source—Baker Hughes North America Rotary Rig Count & PLS M&A Database

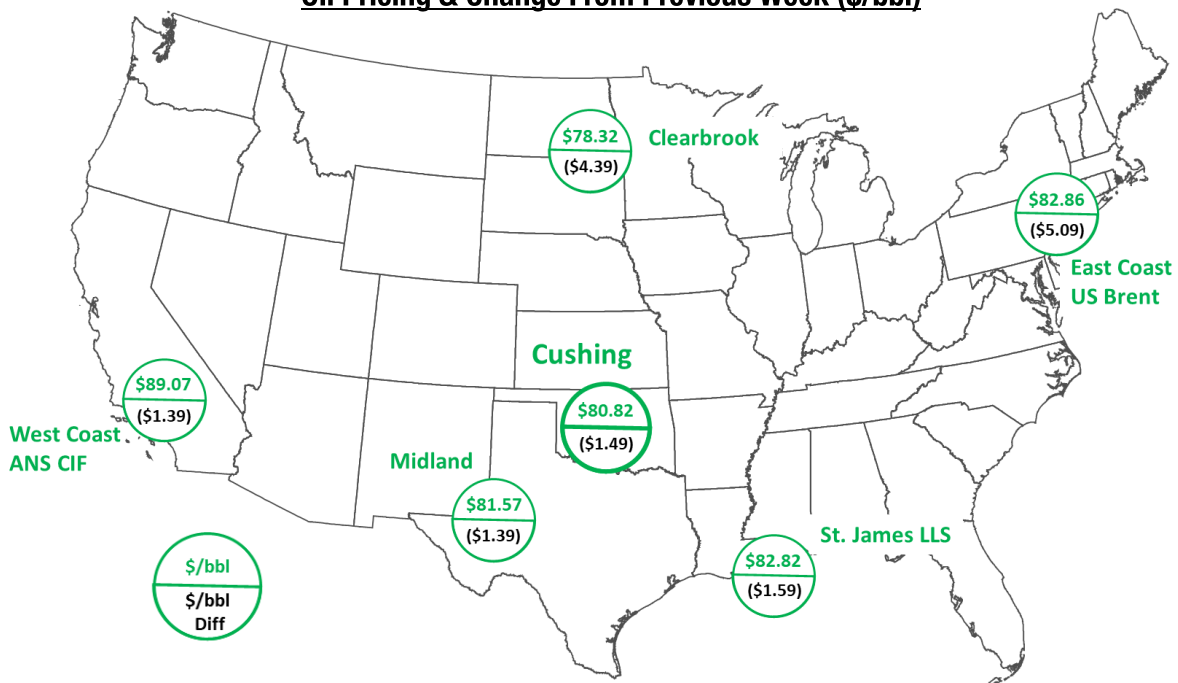


US COMMODITY PRICES CONTINUED

Natural Gas Pricing & Change From Previous Week (\$/MMBTu)



Oil Pricing & Change From Previous Week (\$/bbl)



*Source—Bloomberg LP



SELECTED INDUSTRY HEADLINES

US Oil Output Hits Record as Producers Boost Drilling Efficiency

U.S. oil and gas production has continued to rise as companies squeeze more from each well despite a fall in the number of rigs employed, with the industry boosting efficiency to offset the impact of lower prices.

US House Votes to Slash EPA Budget, Support Oil, Gas Output on Public Lands

The US House of Representatives' Republican majority is keeping up its fight against the Biden administration's climate and energy priorities.

US Drillers Cut Oil, Gas Rigs to Lowest Since Feb 2022

U.S. energy firms recently cut the number of oil and natural gas rigs operating to their lowest since February 2022, energy services firm Baker Hughes said in its closely followed report on Nov. 3.

Oil Settles Down, Posts Weekly Loss as Geopolitical Risk Premium Ebbs

Oil prices settled more than 2% lower recently as supply concerns driven by Middle East tensions eased, while jobs data raised expectations the U.S. Federal Reserve could be done hiking interest rates in the biggest oil consuming economy.

Oil Posts Second Weekly Decline as War Remains Contained

Oil was set for a second weekly loss recently after the risk premium from the Israel-Hamas war vanished, bringing signs of soft demand to the fore.

Oil-Merger Mania Threatens Crude's Liquidity as Hedgers Vanish

The recent wave of dealmaking by US oil producers — which may not be finished just yet — is hastening a decline in liquidity from the oil market.

Natural Gas, LNG Markets Clutch Onto Risk Premium Despite Ample Supply

Global natural gas and LNG prices are holding onto risk premiums accumulated in recent weeks, highlighting how jittery markets continue to be despite comfortable inventory levels and weak seasonal demand, according to traders and analysts.

Ample Production, Weak November Heating Demand Pummel Natural Gas Futures Early (LOGIN CREDENTIALS REQUIRED)

A weekend surge in production readings coupled with widespread warmth in updated forecasts had natural gas futures reeling in early trading Monday.

Natural Gas Prices Forecast: Futures Gap-Lower on Warm Weather Forecast

US Natural Gas futures kicked off the week on a bearish note, opening with a gap lower as the market braced for a potential dip to one-week lows.

US October LNG Exports Climb to Second Highest Level on Record

U.S. liquefied natural gas (LNG) producers ramped up exports in October, to 7.92 million metric tons, according to data provider LSEG, the second-highest monthly level on record.

'Investment Opportunity': Blue Hydrogen Sector to Spearhead Carbon Capture Deployment (LOGIN CREDENTIALS REQUIRED)

Employing CCS as an investment lever rather than just as a decarbonization tool would unlock the technology's full potential, say speakers

Can Solid-State Batteries Solve The EV Revolution's Biggest Problem?

As most major players and many new startups venture into the world of electric vehicles (EVs), many are racing to develop a solid-state battery that could vastly improve performance and safety.



SELECTED RECENT TRANSACTIONS

Phoenix Capital Acquires Mineral and Royalty Acreage in Colorado From Source Rock

Phoenix announced the completion of its purchase of 896 net royalty acres in Weld County, Colorado. The purchase encompasses mineral and royalty interests across a total of 96 permitted wells.

Earthstone Energy Sells Non-core Gulf Coast Assets in Texas

Earthstone recently agreed to sell certain non-core assets located in Karnes and Gonzales counties of Texas on approximately 2,800 net acres for a purchase price of \$66.5 million.

Chevron to Buy Hess Corp For \$53 Billion in All-Stock Deal

Chevron has agreed to buy Hess for \$53 billion in stock to gain a bigger U.S. oil footprint and a stake in rival Exxon Mobil's massive Guyana discoveries, the latest in a series of blockbuster U.S. oil combinations.

Trio Secures Option to Acquire Gas Prospect in Sacramento Basin

California-based Trio Petroleum Corp. has secured a four-month option with exclusivity to acquire a natural gas prospect in the Sacramento Basin, which has the potential to produce an estimated 40 billion cubic feet of gas.

Ellipsis U.S. Onshore Holdings Acquires Additional Assets Located in The Delaware Basin

Ellipsis U.S. Onshore Holdings LLC, a portfolio company of Westlawn Group LLC, recently announced the acquisition of additional assets located in the Delaware Basin of Texas and New Mexico

Exxon Mobil Agrees to Buy Pioneer Natural Resources for Nearly \$60 Billion in All-Stock Merger

Exxon Mobil said recently that it agreed to buy shale rival Pioneer Natural Resources for \$59.5 billion in an all-stock deal, or \$253 per share.

Kimmeridge Signs Deals for Eagle Ford Assets, Gas Transport

Kimmeridge Texas Gas, an affiliate of investment firm Kimmeridge, has signed a definitive agreement to acquire certain upstream assets from an undisclosed private seller in a bid to expand its footprint in the Eagle Ford shale play.

Vitesse Energy Acquires \$50 Million in Oil, Gas Interests in North Dakota's Williston Basin

Vitesse Energy has acquired additional oil and gas interests in the Williston basin of North Dakota that will result in approximately \$50 million of acquisition and related development capital expenditures, primarily in the third and fourth quarters of 2023, the company said recently.

Civitas Resources to Buy Permian Assets For About \$2.1 Billion

Civitas Resources will buy acreage in the oil-rich Permian Basin from global energy trader Vitol's U.S. upstream venture for about \$2.1 billion in cash and stock, the U.S. oil and gas producer said recently.

1979 Royalties, LP Announces Northern Midland Basin Minerals & Royalty Acquisition From Peacemaker Royalties

1979 Royalties, LP a subsidiary of Endeavor Energy Resources, announced it has closed the acquisition of oil & gas mineral and royalty interests from Peacemaker Royalties, a portfolio company of EnCap Investments, in the Midland Basin for \$61 million in cash.

W&T Offshore Acquires Eight Oil, Gas Producing Assets in Gulf of Mexico

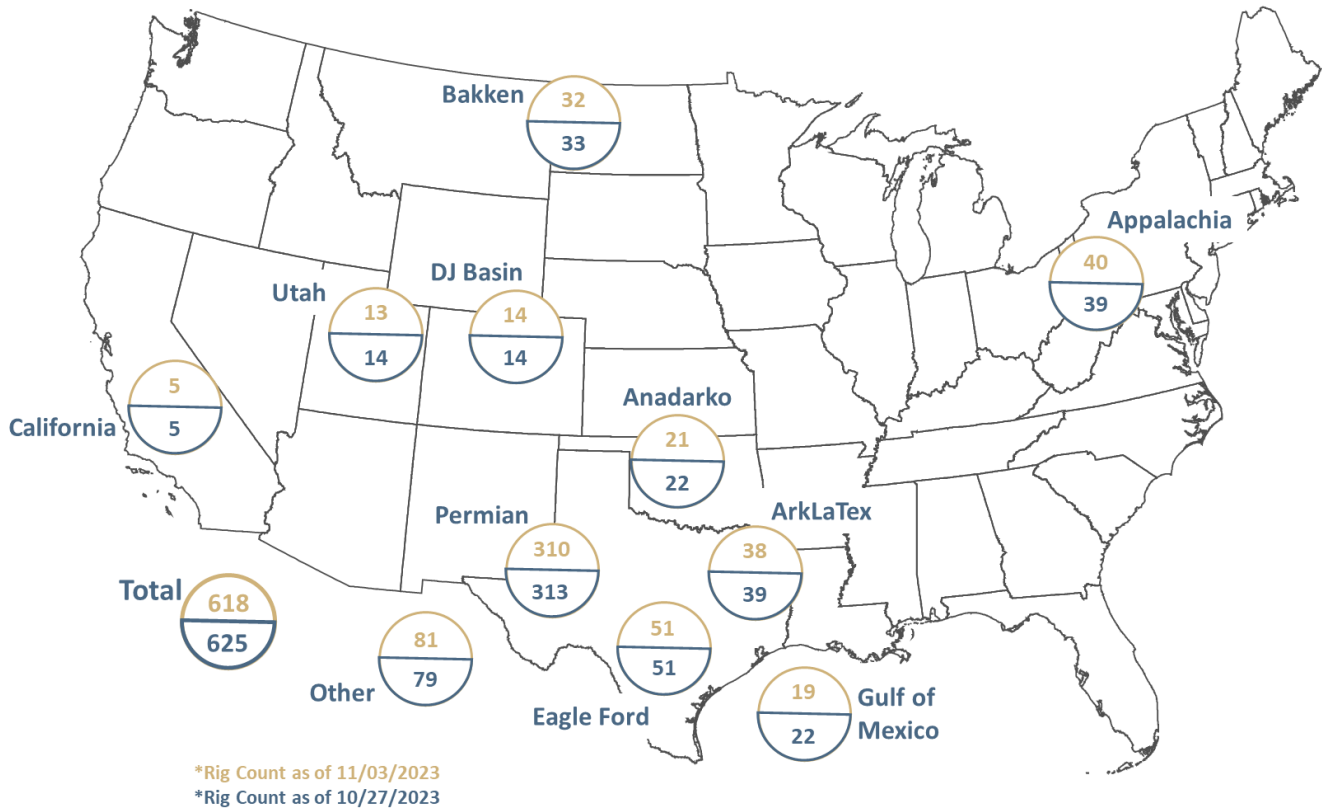
W&T Offshore, Inc. has completed the acquisition of working interests in eight shallow water oil and gas producing assets in the central and eastern shelf region of the Gulf of Mexico from an undisclosed private seller.

Santos to Divest Half of Working Interest in 148 Leases at Alaska North Slope

Australian oil and gas major Santos said recently it would divest half of its working interest in 148 exploration leases in the Langiappe area on the Alaska North Slope in a farm-down agreement with two U.S.-based companies.



RIG ACTIVITY BY US REGION

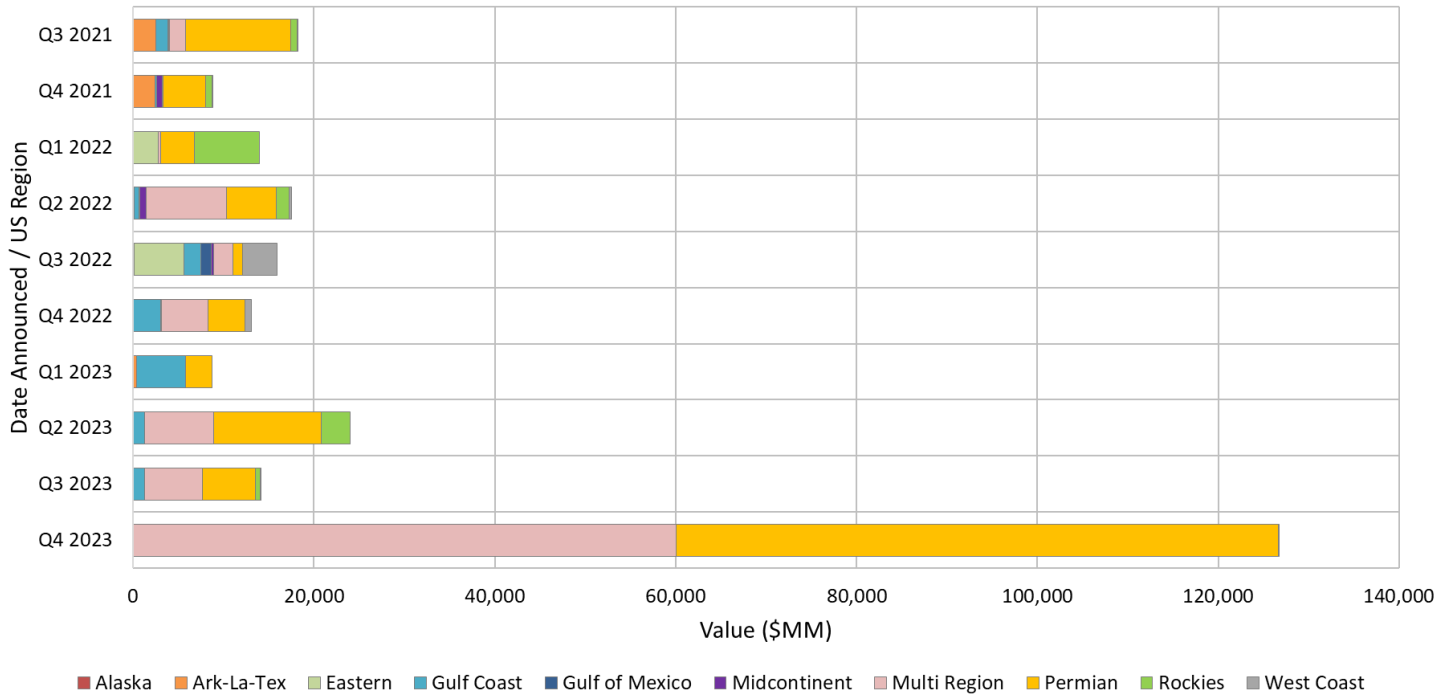


U.S. Rig Breakouts	Week Ending 11/03/2023			Week Ending 10/27/2023		Week Ending 11/04/2022
	Count	+/-	Count	+/-	Count	
Oil	496	(8)	504	(117)	613	
Gas	118	1	117	(37)	155	
Not Specified	4	0	4	2	2	
Directional	54	1	53	11	43	
Horizontal	549	(9)	558	(156)	705	
Vertical	15	1	14	(7)	22	
Land (Inc Others)	594	(6)	600	(160)	754	
Inland Waters	3	2	1	1	2	
Offshore	21	(3)	24	7	14	
US Total	618	(7)	625	(152)	770	

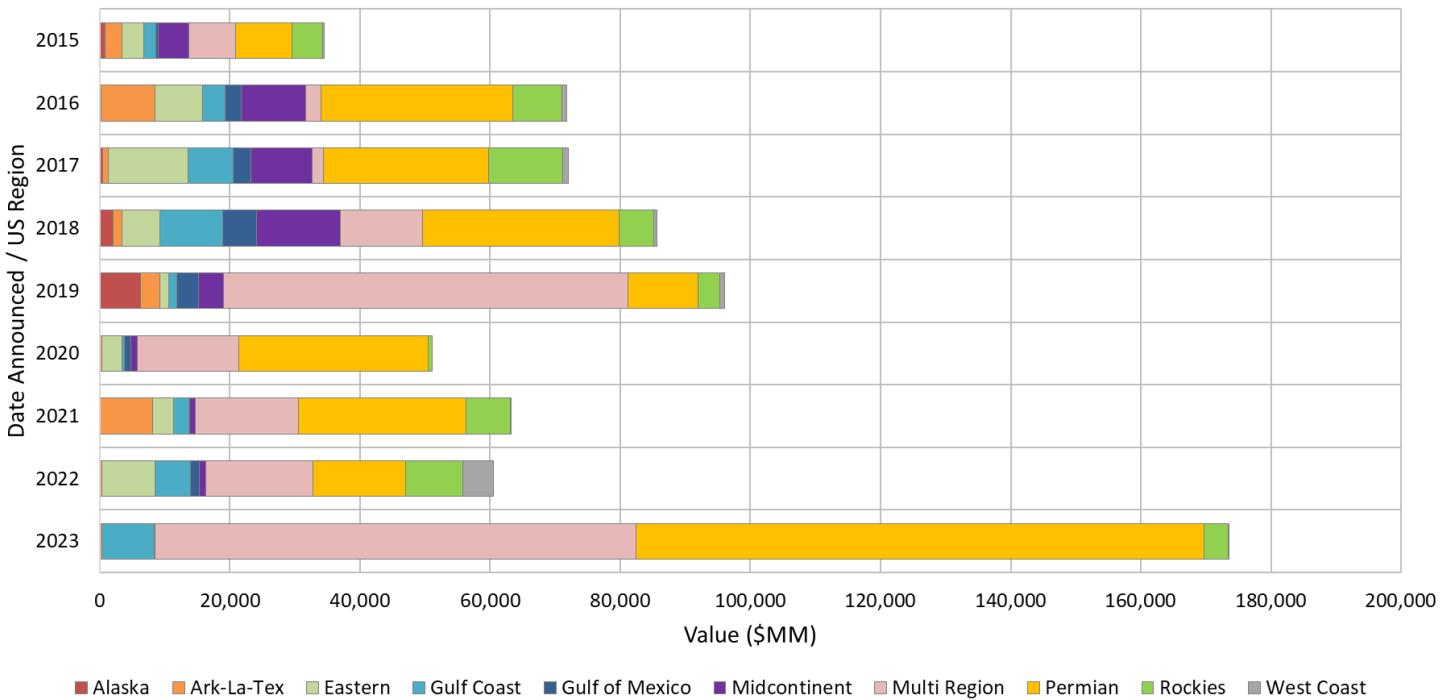
*Source—Baker Hughes Weekly Rig Counts



DEAL VALUE BY US REGION (BY QUARTER)



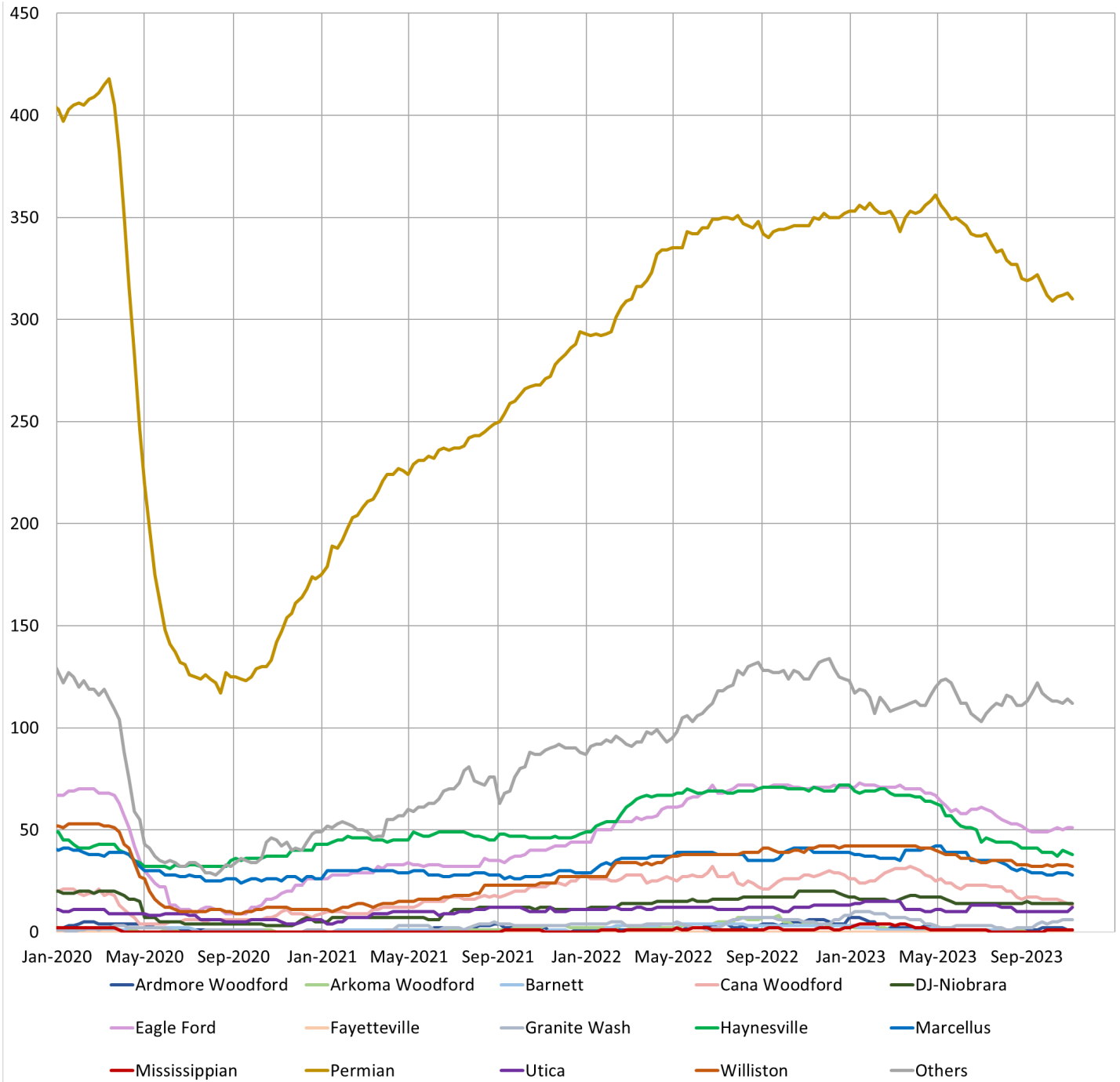
DEAL VALUE BY US REGION (BY YEAR)



*Source—PLS M&A Database (Charts exclude terminated deals)



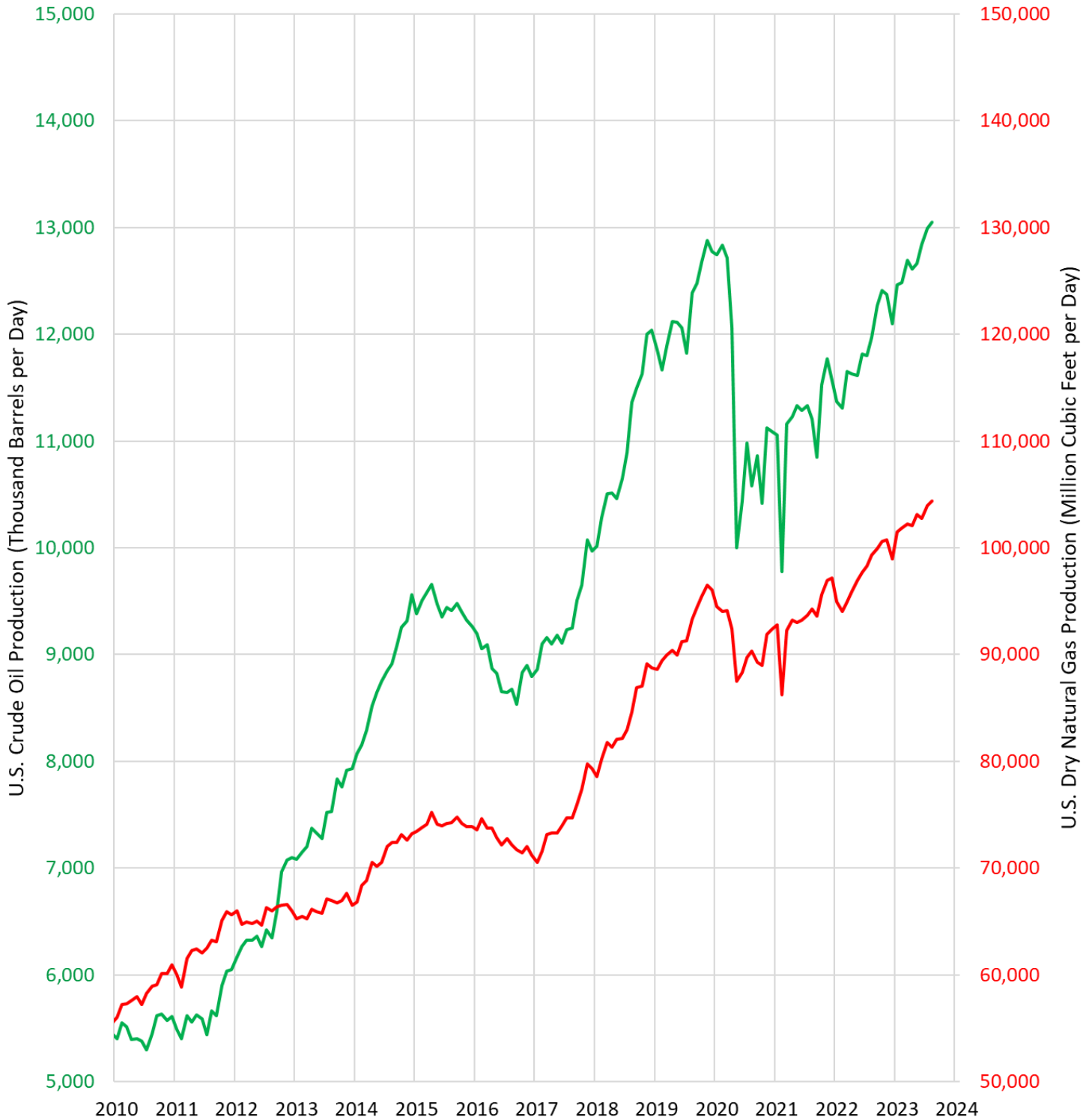
RIG ACTIVITY BY US REGION



*Source—Baker Hughes Weekly Rig Counts



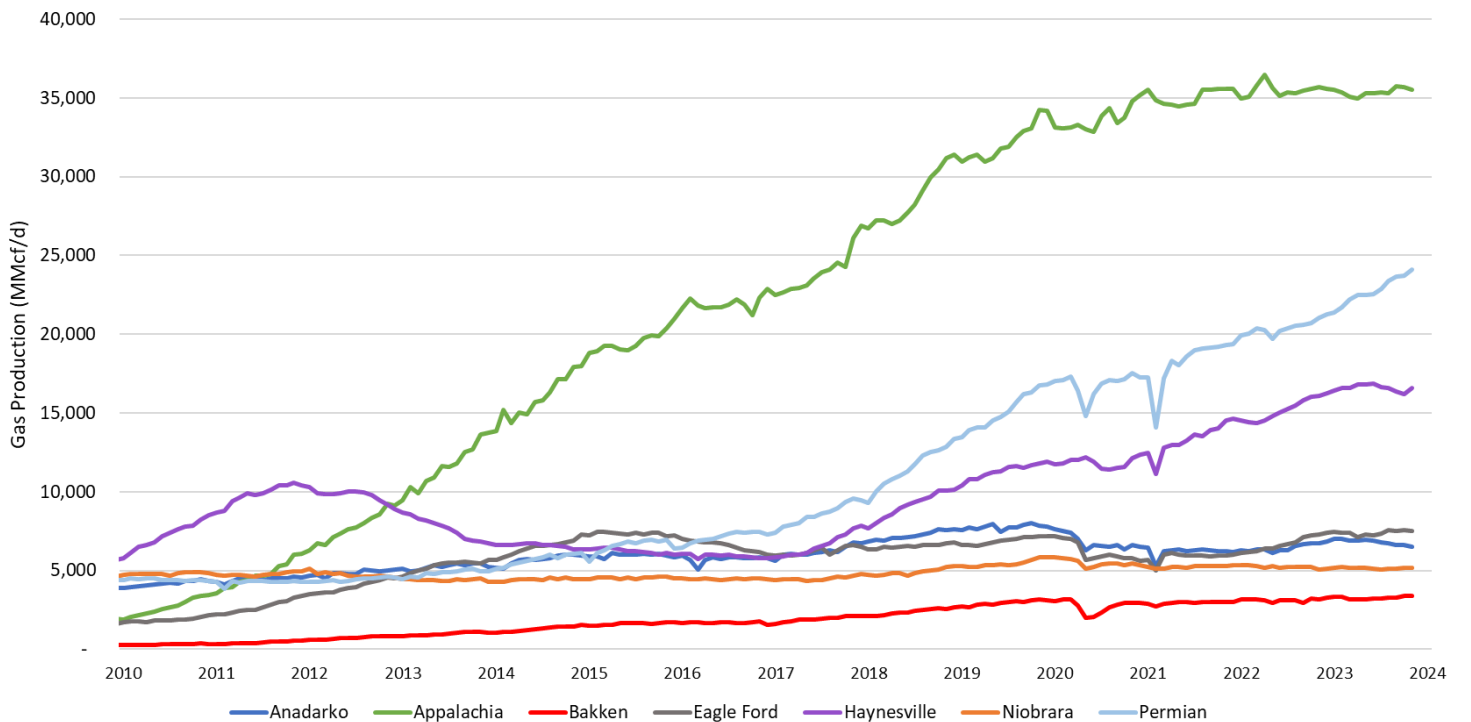
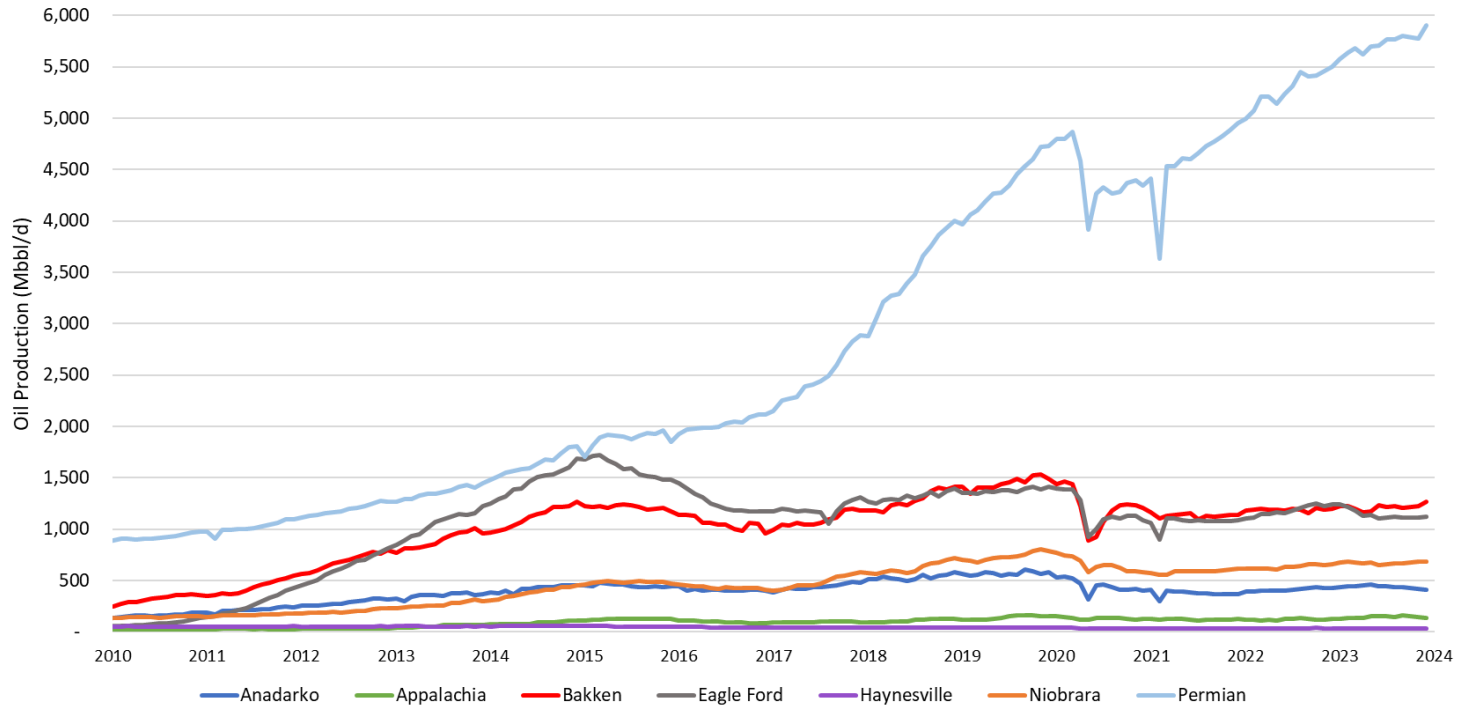
US DAILY CRUDE (MMbbl) & DRY NATURAL GAS PRODUCTION (MMcf)



*Source—Energy Information Administration, United States (EIA)



HISTORICAL PRODUCTION OF SELECTED US SHALE REGIONS



*Source—Energy Information Administration, United States (EIA)



UPCOMING EVENTS

November 2023

<u>IPAA Annual Meeting</u>	November 6-8	San Antonio, TX
<u>AICPA Oil & Gas Conference</u>	November 8-10	Las Vegas, NV
<u>A&D Workshop</u>	November 15	Houston, TX
<u>OSU Accounting and Financial Reporting Conference</u>	November 16	Tulsa, OK
<u>OSU Oil and Gas Accounting Conference</u>	November 17	Tulsa, OK
<u>Boys & Girls Club 8th Annual Sporting Clays Tournament</u>	November 17	Houston, TX
<u>IPAA Texas Hold'Em Tournament</u>	November 30	Houston, TX

*Denotes an Opportune Sponsored Event



ABOUT RALPH E. DAVIS ASSOCIATES

Ralph E. Davis Associates LLC (RED) is an industry-leading petroleum engineering and geosciences firm committed to satisfying the individual needs of clients. We accomplish this by holding ourselves to the highest standards of integrity and professionalism to deliver honest, direct and actionable insights to help clients achieve their strategic objectives. We distinguish ourselves by combining reservoir engineering, geoscience evaluation techniques and advanced data analytics with economic analyses to provide our clients with individual, customized solutions.

Banks, bondholders, private equity firms, financial institutions and law firms around the world trust in RED's diverse services and unrivaled upstream oil and gas expertise to deliver comprehensive solutions that help clients make informed decisions. We add value to every engagement by employing a team approach, leveraging Opportune LLP's experienced bench of experts in transactional due diligence, tax advisory, investment banking, restructuring and valuation.

We offer technical and economic analyses to deliver our clients a complete, independent, accurate and detailed assessment of the value of their assets. We apply a robust set of technical capabilities to assist our clients. Our capabilities include:

- Reservoir engineering and geosciences
- Economic forecasting and reporting
- Data analytics and geospatial analysis

KEY CONTACTS



Steve Hendrickson is the President of Ralph E. Davis Associates, an Opportune LLP company. Steve has over 35 years of professional leadership experience in the energy industry with a proven track record of adding value through acquisitions, development and operations. Steve is a licensed professional engineer in the state of Texas, and holds an M.S. in Finance from the University of Houston and a B.S. in Chemical Engineering from The University of Texas at Austin. He recently served as a board member of the Society of Petroleum Evaluation Engineers (SPEE) and is a registered FINRA representative.



John Beaird is Vice President of Ralph E. Davis Associates, an Opportune LLP company. John has 39 years of oil and gas management, reservoir engineering, and petroleum economics evaluation experience. Recent relevant experience includes the Permian, Western Gulf, Tx-La-Miss Salt, Mid-Continent, Denver-Julesburg, Wind River, Williston Basin, and Appalachian Basins. John is a registered Petroleum Engineer in the State of Texas and holds a B.S. in Petroleum Engineering from Louisiana Tech University. He is also an active member of the Society of Petroleum Evaluation Engineers (SPEE).



Yvonne Trujillo is a Senior Petroleum Engineer at Ralph E. Davis Associates, an Opportune LLP company. Yvonne has over 25 years experience in the oil and gas industry with extensive expertise in reserves engineering, SEC and PRMS/SPE reporting and economics and asset evaluation in conventional and unconventional reservoirs in the U.S. Lower 48. Yvonne earned a B.S. in Mechanical Engineering at Simon Bolivar University in Caracas, Venezuela and an M.S. in Petroleum Engineering at the University of Houston.



David Edwards is a Petroleum Engineer at Ralph E. Davis Associates, an Opportune LLP company. David has over three years of reserves engineering experience in conventional and unconventional reservoirs. Before RED, David was a Petroleum Engineer at a lower middle market A&D advisory firm where he handled the technical processes for marketed assets. He began his career with an operator in Dallas, where he contributed to its engineering, operations, and A&D teams. David holds an M.B.A. from The University of Texas Permian Basin and a B.S. in Petroleum Engineering from The University of Oklahoma.

