Dallas Fed Energy Survey

Second Quarter | June 27, 2018

Oil and Gas Expansion Hits Its Stride

What's New This Quarter

Special questions this quarter focus on labor market issues in the oil and gas sector and constraints impacting activity in the Permian Basin and other areas.

Energy sector activity expanded strongly in second quarter 2018, according to oil and gas executives responding to the Dallas Fed Energy Survey. The business activity index—the survey's broadest measure of conditions facing Eleventh District energy firms—rose from 40.7 in the first quarter to 44.5 in the second—the highest level since the survey began in 2016. The increase was driven by both exploration and production (E&P) and oilfield services firms.

Positive readings in the survey generally indicate expansion, while readings below zero generally indicate contraction. Almost all indexes in the latest survey reflected expansion on a quarterly basis.

Oil and gas production increased for the seventh quarter in a row, according to executives at E&P firms. The oil production index advanced from 34.3 in the first quarter to 39.0 in the second. Furthermore, the natural gas production index moved up from 25.0 to 33.4. Both indexes are at their highest levels since the survey began and suggest that oil and gas production rose at an accelerated rate relative to last quarter.

Utilization of oilfield services firms' equipment increased at a slightly faster pace than in the first quarter, with the corresponding index at 42.1, up two points. Input costs continued rising but at a slower pace than last quarter as the index of input costs fell from 46.8 to 36.3. The index of prices received for oilfield services ticked down from 27.9 to 23.2, suggesting prices are increasing but at a slightly slower pace.

Labor market indexes point to more rapid growth in employment and notably longer work hours in the second quarter, particularly in oilfield services firms. The employment index was 44.1 for services firms and 11.6 for E&P firms—the highest levels for both indexes since the survey began. The hours worked indexes were at or near all-time highs: 50.8 for services firms and 18.2 for E&P firms. The aggregate wages and benefits index remained positive but dipped from 33.8 to 27.9.

The company outlook index posted a ninth consecutive positive reading and increased two points to 45.3 in the second quarter. The index measuring uncertainty regarding firms' outlooks remained in close proximity to zero, suggesting that uncertainty regarding firms' outlooks was mostly unchanged this quarter.

On average, respondents expect West Texas Intermediate (WTI) oil prices to be $65.68 per barrel by year-end 2018, with responses ranging from $50 to $92 per barrel. Respondents expect Henry Hub natural gas prices to end 2018 at $2.91 per million British thermal units (MMBtu). For reference, WTI spot prices averaged $65.88 per barrel and Henry Hub spot prices averaged $2.96 per MMBtu during the survey collection period.

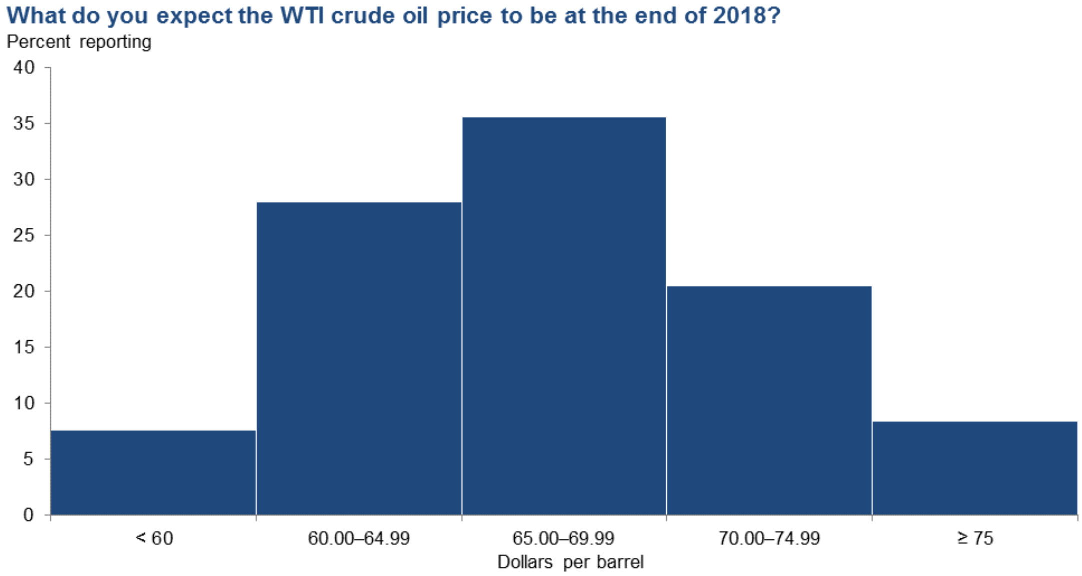
Next release: October 1, 2018

Data were collected June 13–21, and 137 energy firms responded to the survey. Of the respondents, 78 were exploration and production firms and 59 were oilfield services firms.

The Dallas Fed conducts the Dallas Fed Energy Survey quarterly to obtain a timely assessment of energy activity among oil and gas firms located or headquartered in the Eleventh District. Firms are asked whether business activity, employment, capital expenditures and other indicators increased, decreased or remained unchanged compared with the prior quarter and with the same quarter a year ago. Survey responses are used to calculate an index for each indicator. Each index is calculated by subtracting the percentage of respondents reporting a decrease from the percentage reporting an increase. When the share of firms reporting an increase exceeds the share reporting a decrease, the index will be greater than zero, suggesting the indicator has increased over the previous quarter. If the share of firms reporting a decrease exceeds the share reporting an increase, the index will be below zero, suggesting the indicator has decreased over the previous quarter.

Price Forecasts

West Texas Intermediate Crude

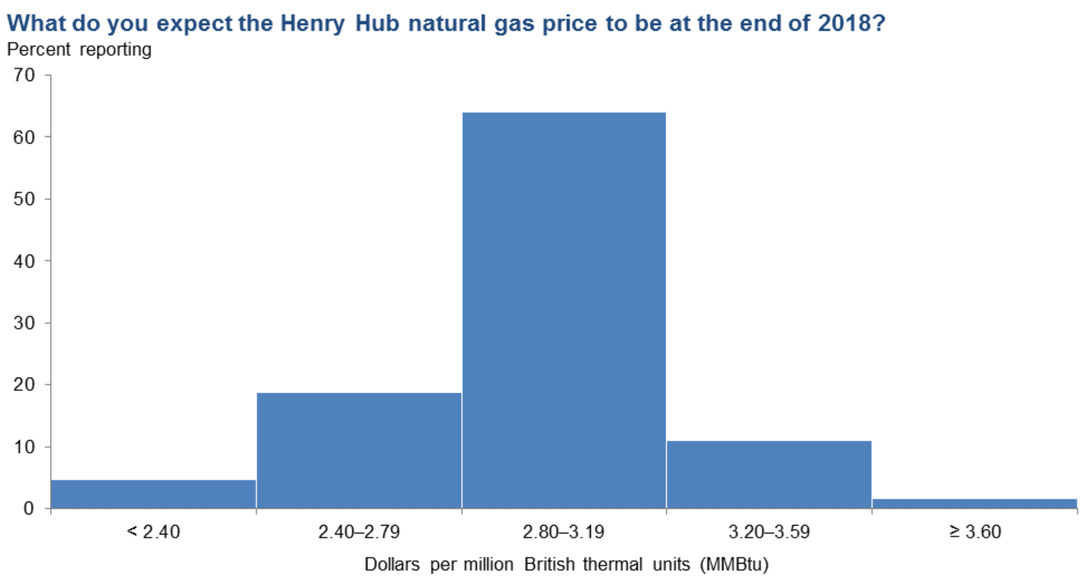


NOTES: Executives from 132 oil and gas firms answered this question during the survey collection period, June 13–21, 2018. For reference, WTI (West Texas Intermediate) spot prices averaged $65.88 per barrel during the period.
SOURCES: Federal Reserve Bank of Dallas; Energy Information Administration (reference price).

West Texas Intermediate crude oil price (dollars per barrel), year-end 2018

Indicator	Survey Average	Low Forecast	High Forecast	Price During Survey
Current quarter	$65.68	$50.00	$92.00	$65.88
Prior quarter	$63.07	$45.00	$77.00	$62.72

Henry Hub Natural Gas



NOTES: Executives from 128 oil and gas firms answered this question during the survey collection period, June 13–21, 2018. For reference, Henry Hub spot prices averaged $2.96 per MMBtu during the period.
SOURCES: Federal Reserve Bank of Dallas; *Wall Street Journal* (reference price).

Henry Hub natural gas price (dollars per MMBtu), year-end 2018

Indicator	Survey Average	Low Forecast	High Forecast	Price During Survey
Current quarter	$2.91	$2.00	$4.00	$2.96
Prior quarter	$2.91	$1.30	$4.00	$2.65

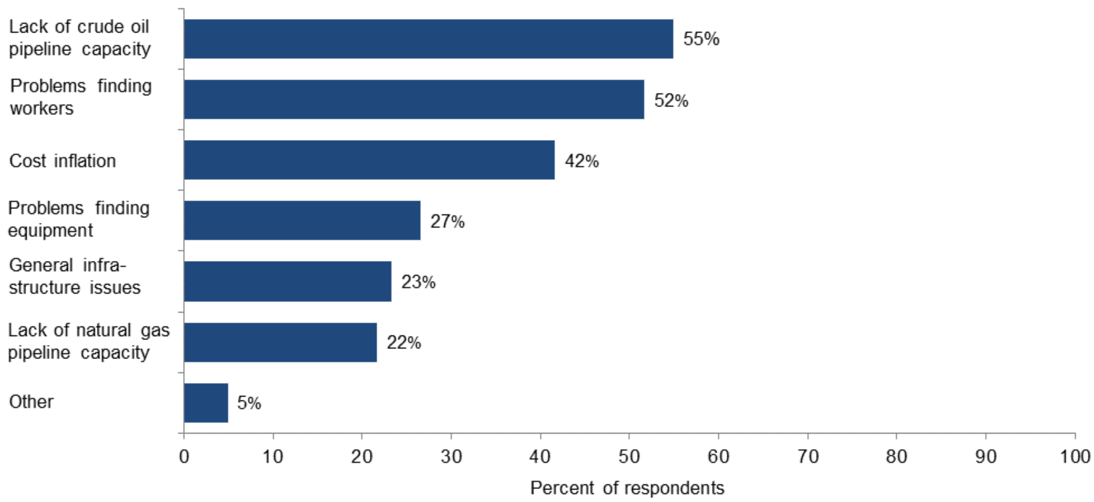
NOTE: Price during survey is an average of daily spot prices during the survey collection period.
SOURCES: Energy Information Administration; *Wall Street Journal*.

Special Questions

Data were collected June 13–21, and 135 oil and gas firms responded to the special questions survey.

Which of the following, if any, do you expect to limit near-term growth in activity in the Permian? Please check all that apply.

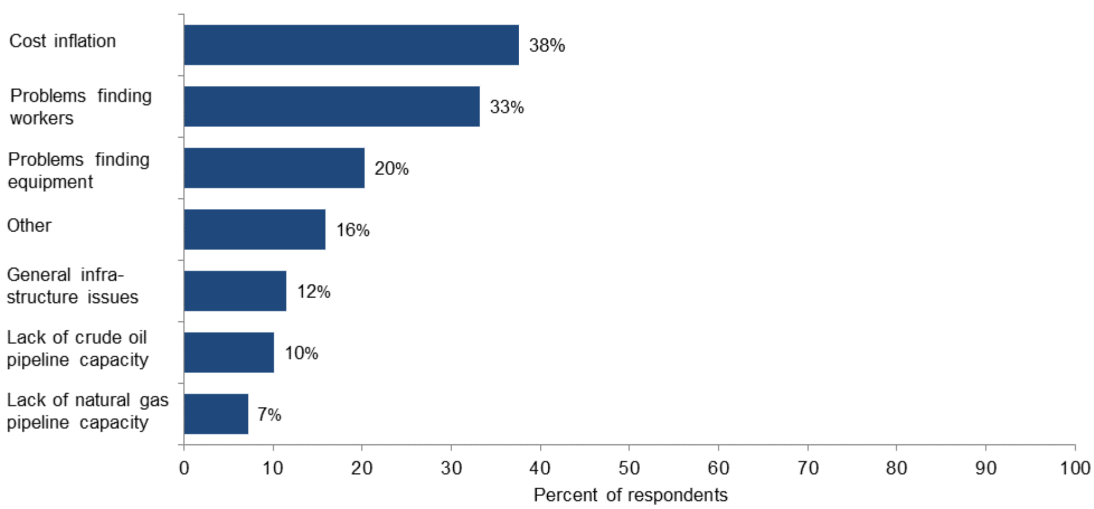
Executives were first asked to identify the top area in which their firm is active. Of the 60 executives who noted that their firm is primarily active in the Permian Basin, the most prevalent response was lack of crude oil pipeline capacity (55 percent of respondents), followed by problems finding workers (52 percent of respondents).



NOTE: Executives from 60 oil and gas firms noted that their firm is primarily active in the Permian and answered this question during the survey collection period, June 13–21, 2018.
SOURCE: Federal Reserve Bank of Dallas.

Which of the following, if any, do you expect to limit near-term growth in activity outside the Permian? Please check all that apply.

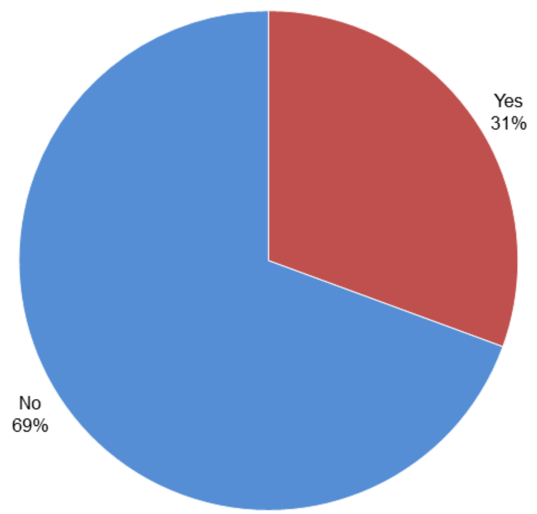
Of the 69 executives who noted that their firm is primarily active in a region outside the Permian, the most frequently identified constraint was cost inflation (38 percent of respondents), followed by problems finding workers (33 percent of respondents).



NOTE: Executives from 69 oil and gas firms noted that their firm is primarily active outside the Permian and answered this question during the survey collection period, June 13–21, 2018.
SOURCE: Federal Reserve Bank of Dallas.

Is your firm having problems hiring?

This question was posed to all executives, regardless of the region in which their firm is active. Thirty-one percent of executives noted that their firm was having problems hiring, while 69 percent of executives noted that their firm was not having problems hiring. Forty-seven percent of support services firms responded that they were having problems hiring, while only 18 percent of exploration and production firms noted problems hiring. *(See table for more detail.)*



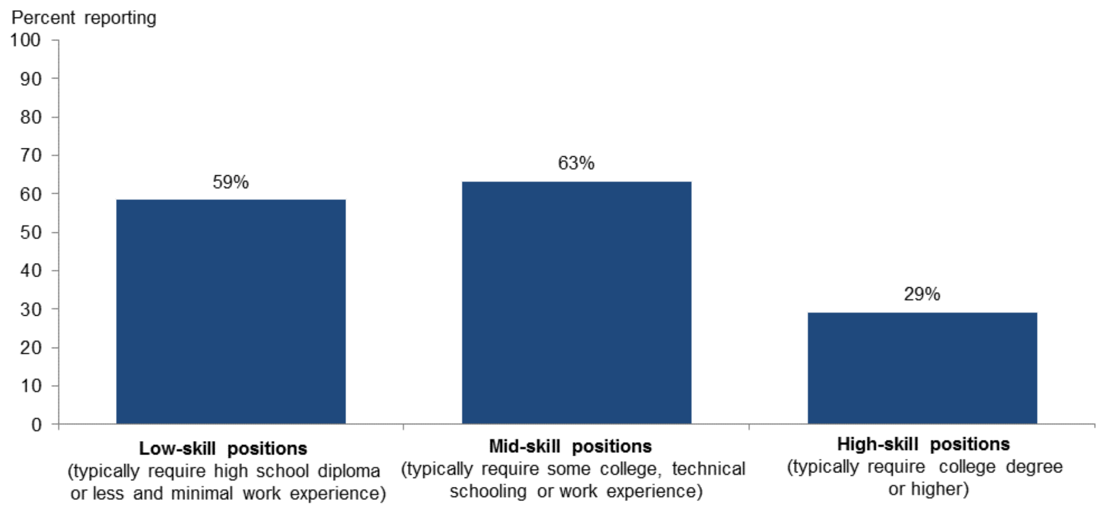
NOTE: Executives from 134 oil and gas firms answered this question during the survey collection period, June 13–21, 2018.
SOURCE: Federal Reserve Bank of Dallas.

Percent Reporting	All Firms	E&P	Services
Yes	31	18	47
No	69	82	53

NOTES: Executives from 77 exploration and production firms and 57 oil and gas support services firms answered this question during the survey collection period, June 13–21, 2018. The "All Firms" column reports the percentage out of the total 134 responses.
SOURCE: Federal Reserve Bank of Dallas.

If you are having problems finding workers, in which categories are you experiencing difficulty? Please check all that apply.*

Of the 41 executives who noted that their firm was having problems hiring, 59 percent checked low-skill positions, 63 percent checked mid-skill positions and 29 percent checked high-skill positions as the categories in which they were experiencing difficulty hiring. The percentages were similar across E&P and support services firms for low- and mid-skill jobs, but there was slightly higher demand (43 percent) for high-skill jobs from E&P firms.



NOTE: Executives from 41 oil and gas firms answered this question during the survey collection period, June 13–21, 2018. This question was posed only to executives who noted that their firm was having problems hiring.
SOURCE: Federal Reserve Bank of Dallas.

*This question was posed only to executives who noted that their firm was having problems hiring.

If you are having problems finding workers, what are the main reasons why? Please check all that apply.*

Of the 41 executives who responded that their firm was having problems hiring, 83 percent noted a lack of available applicants as a problem, followed by 49 percent who noted lack of experience.

Type of hiring problem	Percent reporting
Lack of available applicants/no applicants	83
Lack of experience	49
Lack of technical competencies (hard skills)	46
Looking for more pay than is offered	44
Inability to pass background check	32
Lack of workplace competencies (soft skills)	27
Inability to pass drug test	24
Other	2

NOTES: Executives from 41 oil and gas firms answered this question during the survey collection period, June 13–21, 2018. This question was posed only to executives who noted that their firm was having problems hiring.
SOURCE: Federal Reserve Bank of Dallas.

*This question was posed only to executives who noted that their firm was having problems hiring.

What, if anything, are you doing to recruit and retain employees? Please check all that apply.

This question was posed to all executives, regardless of whether they noted their firm was having problems hiring. The method to recruit and retain employees most frequently selected by energy executives was increasing wages and/or benefits (45 percent of respondents), followed by increasing variable pay, including bonuses (30 percent of respondents). See the chart file below for a further breakout of results between firms reporting problems hiring and firms reporting no problems hiring.

Recruitment/retention method (all firms)	Percent reporting
Increase wages and/or benefits	45
Increase variable pay, including bonuses	30
Intensify recruiting, including advertising, paying recruiting bonuses, utilizing employment agencies, etc.	24
Improve working conditions	20
Offer additional training	19
Other	7
Reduce education and other requirements for new hires	2

NOTES: Executives from 134 oil and gas firms answered this question during the survey collection period, June 13–21, 2018. This question was posed to all executives, regardless of whether they noted their firm was having problems hiring.
SOURCE: Federal Reserve Bank of Dallas.

Special Questions Comments

Exploration and Production Firms

- Ongoing Section 232 tariff developments continue to keep us on our toes. The uncertain steel environment could delay pipeline construction necessary to move oil to markets.
- Hiring from personal references and contacts has been possible because we maintain a respectful work environment with a long-term, growth-oriented opportunity for employees.

Oil and Gas Support Services Firms

- We are not having a problem staying busy.
- The labor shortage is getting critical. Overall unemployment is at record lows in most of the basins we work, especially the Permian.
- I would welcome the need to hire additional people. Our seismic business continues to be challenged. Although we are very thinly staffed (and getting older) and would need to increase head count with almost any improvement in business, we will wait for that to be a necessity before we grow.
- The business outlook for high-specification drilling rigs continues to improve. The second quarter gave us an opportunity to catch our breath before ramping up reactivation-related activity in third quarter 2018 and hopefully beyond.

Historical data are available from first quarter 2016 to the most current release quarter.

Business Indicators: Quarter/Quarter

Business Indicators: All Firms
Current Quarter (versus previous quarter)

Indicator	Current Index	Previous Index	% Reporting Increase	% Reporting No Change	% Reporting Decrease
Level of Business Activity	44.5	40.7	53.3	38.0	8.8
Capital Expenditures	32.1	36.5	47.0	38.1	14.9
Supplier Delivery Time	10.5	16.3	19.5	71.4	9.0
Employment	25.6	21.4	33.6	58.4	8.0
Employee Hours	32.3	28.1	38.2	55.9	5.9
Wages and Benefits	27.9	33.8	35.3	57.4	7.4

Indicator	Current Index	Previous Index	% Reporting Improved	% Reporting No Change	% Reporting Worsened
Company Outlook	45.3	43.2	55.5	34.4	10.2

Indicator	Current Index	Previous Index	% Reporting Increase	% Reporting No Change	% Reporting Decrease
Uncertainty	–1.5	0.7	16.4	65.7	17.9

Business Indicators: E&P Firms
Current Quarter (versus previous quarter)

Indicator	Current Index	Previous Index	% Reporting Increase	% Reporting No Change	% Reporting Decrease
Level of Business Activity	37.2	34.6	44.9	47.4	7.7
Oil Production	39.0	34.3	49.4	40.3	10.4
Natural Gas Wellhead Production	33.4	25.0	42.7	48.0	9.3
Capital Expenditures	30.3	28.2	46.1	38.2	15.8
Expected Level of Capital Expenditures Next Year	32.1	34.6	46.2	39.7	14.1
Supplier Delivery Time	8.0	19.1	17.3	73.3	9.3
Employment	11.6	9.0	23.1	65.4	11.5
Employee Hours	18.2	16.9	26.0	66.2	7.8
Wages and Benefits	22.1	28.6	32.5	57.1	10.4
Finding and Development Costs	30.3	20.8	34.2	61.8	3.9
Lease Operating Expenses	27.7	30.2	31.6	64.5	3.9

Indicator	Current Index	Previous Index	% Reporting Improved	% Reporting No Change	% Reporting Worsened
Company Outlook	44.4	40.3	56.9	30.6	12.5

Indicator	Current Index	Previous Index	% Reporting Increase	% Reporting No Change	% Reporting Decrease
Uncertainty	2.7	–1.4	16.0	70.7	13.3

Business Indicators: O&G Support Services Firms
Current Quarter (versus previous quarter)

Indicator	Current Index	Previous Index	% Reporting Increase	% Reporting No Change	% Reporting Decrease
Level of Business Activity	54.2	48.4	64.4	25.4	10.2
Utilization of Equipment	42.1	40.4	50.9	40.4	8.8
Capital Expenditures	34.5	46.7	48.3	37.9	13.8
Supplier Delivery Time	13.8	12.9	22.4	69.0	8.6
Lag Time in Delivery of Firm's Services	12.3	13.3	19.3	73.7	7.0
Employment	44.1	37.1	47.5	49.2	3.4
Employment Hours	50.8	41.9	54.2	42.4	3.4
Wages and Benefits	35.6	40.4	39.0	57.6	3.4
Input Costs	36.3	46.8	39.7	56.9	3.4
Prices Received for Services	23.2	27.9	28.6	66.1	5.4

Indicator	Current Index	Previous Index	% Reporting Improved	% Reporting No Change	% Reporting Worsened
Company Outlook	46.5	47.3	53.6	39.3	7.1

Indicator	Current Index	Previous Index	% Reporting Increase	% Reporting No Change	% Reporting Decrease
Uncertainty	−6.8	3.3	16.9	59.3	23.7

Business Indicators: Year/Year

Business Indicators: All Firms

Current Quarter (versus same quarter a year ago)

Indicator	Current Index	Previous Index	% Reporting Increase	% Reporting No Change	% Reporting Decrease
Level of Business Activity	55.3	52.3	67.2	20.9	11.9
Capital Expenditures	43.4	45.7	58.9	25.6	15.5
Supplier Delivery Time	16.4	21.2	25.0	66.4	8.6
Employment	29.3	25.8	40.6	48.1	11.3
Employee Hours	35.8	33.4	44.0	47.8	8.2
Wages and Benefits	44.8	46.5	53.0	38.8	8.2

Indicator	Current Index	Previous Index	% Reporting Improved	% Reporting No Change	% Reporting Worsened
Company Outlook	60.5	65.3	68.1	24.4	7.6

Business Indicators: E&P Firms

Current Quarter (versus same quarter a year ago)

Indicator	Current Index	Previous Index	% Reporting Increase	% Reporting No Change	% Reporting Decrease
Level of Business Activity	44.7	51.5	57.9	28.9	13.2
Oil Production	48.0	44.2	61.3	25.3	13.3
Natural Gas Wellhead Production	40.8	38.2	49.3	42.3	8.5
Capital Expenditures	38.4	42.0	56.2	26.0	17.8
Expected Level of Capital Expenditures Next Year	29.7	50.0	50.0	29.7	20.3
Supplier Delivery Time	13.7	24.6	23.3	67.1	9.6
Employment	16.0	11.5	30.7	54.7	14.7
Employee Hours	22.4	18.9	30.3	61.8	7.9
Wages and Benefits	43.4	44.9	52.6	38.2	9.2
Finding and Development Costs	40.0	36.8	46.7	46.7	6.7
Lease Operating Expenses	41.1	38.8	47.9	45.2	6.8

Indicator	Current Index	Previous Index	% Reporting Improved	% Reporting No Change	% Reporting Worsened
Company Outlook	56.8	62.3	67.2	22.4	10.4

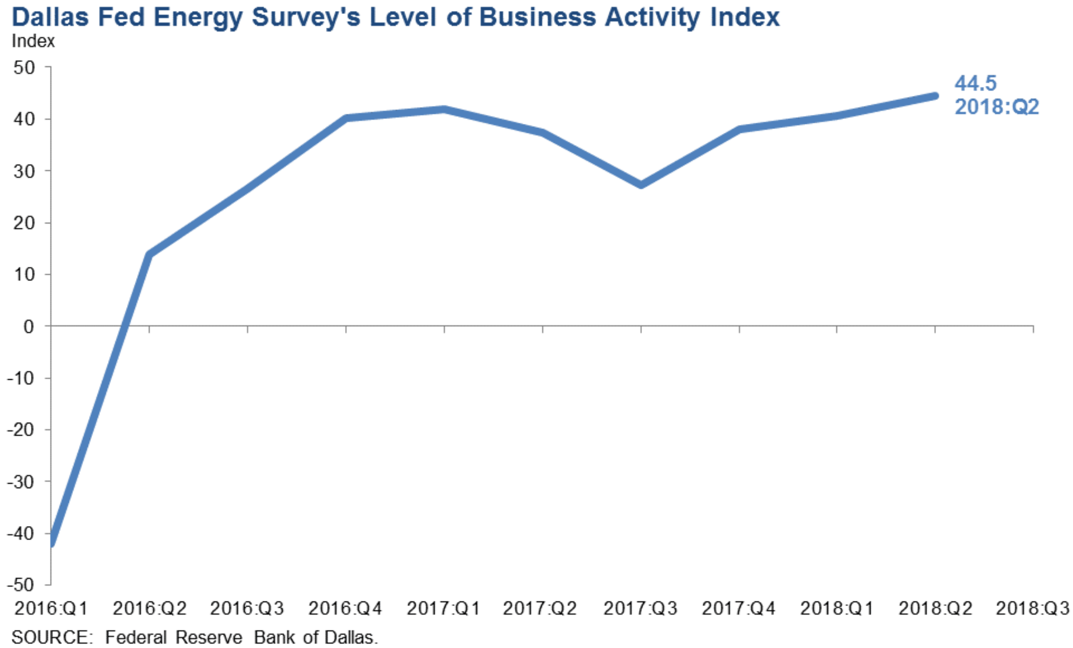
Business Indicators: O&G Support Services Firms

Current Quarter (versus same quarter a year ago)

Indicator	Current Index	Previous Index	% Reporting Increase	% Reporting No Change	% Reporting Decrease
Level of Business Activity	69.0	53.4	79.3	10.3	10.3
Utilization of Equipment	49.1	50.9	61.4	26.3	12.3
Capital Expenditures	50.0	50.0	62.5	25.0	12.5
Supplier Delivery Time	20.0	17.3	27.3	65.5	7.3
Lag Time in Delivery of Firm's Services	25.0	15.8	30.4	64.3	5.4
Employment	46.5	43.1	53.4	39.7	6.9
Employment Hours	53.5	50.9	62.1	29.3	8.6
Wages and Benefits	46.5	48.2	53.4	39.7	6.9
Input Costs	53.6	52.6	55.4	42.9	1.8
Prices Received for Services	38.8	35.7	48.1	42.6	9.3

Indicator	Current Index	Previous Index	% Reporting Improved	% Reporting No Change	% Reporting Worsened
Company Outlook	65.4	69.3	69.2	26.9	3.8

Activity Chart



Comments from Survey Respondents

These comments are from respondents' completed surveys and have been edited for publication. Comments from the Special Questions survey can be found below the special questions.

Exploration and Production Firms

- The negative crude price differential in the Permian Basin to West Texas Intermediate in Cushing is completely unexpected. In fact, it's really a double hit since predictions were for a new pipeline to bring higher prices in the Permian as it would bypass Cushing. Several new pipelines were scheduled to come online, so the expectation was there would be surplus capacity from the Permian for the foreseeable future. In the Delaware Basin, water disposal is creating a new issue. In addition to injection availability, issues are developing in the zones where injection is taking place. Depleted zones drilled in the early 1900s are becoming recharged, and old wellbores generally cannot handle the pressure, primarily due to age.
- The U.S. frac fleet count [equipment used in hydraulic fracturing] is at all-time high, having surpassed the 2014 peak in early June. This is significant because the current rig count is still about half of the peak. Efficiencies in drilling space require more frac fleets to commercially produce a well. If you want to know production levels, just follow the frac fleet. Ongoing Section 232 tariff developments regarding steel and aluminum continue to keep us on our toes.
- The backwardation in the futures curve is holding back activity in the offshore area. Activity will pick up when the five-year strip [annual average of the monthly futures for the first five years] flattens and averages $65 per barrel.
- The outlook has definitely improved. We are positive on our forecast for energy prices going forward, at least in the near term, which is six months to a year out. We are looking to buy production where possible and are still investing in drilling and development deals.
- There appears to be a shift underway as Wall Street realizes that conventional plays can give greater return on revenue than shale plays. In the meantime, big money is still practicing the balance-sheet shuffle and refinancing legacy shale companies in their portfolios. Tobin's q [the ratio between an asset's market and replacement value] is less than 1, and the initial public offering market is closed because of it. One private equity titan has completely exited the Permian. Daughter wells there appear to be less productive than anticipated. Hence, drilled-but-uncompleted-wells inventory is still rising.
- The "blend wall" hit two major Oklahoma oil and gas projects, both producing ultra-sweet, light crude oil, but which are NOT shale projects. One-fourth of wells selling oil in June sold at $65 per barrel, but three-fourths of wells sold oil at as low as $31 per barrel. The State of Alaska is hurting small independents by not coming through with their incentive reimbursements for exploration as were specifically promised in legislation passed by the state and signed by the previous governor. Earthquake lawsuits in Oklahoma continue to drain cash flow, forcing the premature sale of producing properties at distressed prices due to the huge geographic impact of forced plugging or drastically curtailed saltwater disposal volumes. Operating expenses have drastically increased due to increased saltwater disposal rates (farther distances), legal costs and supply/demand of services, equipment and experienced field personnel.

- The tax cuts have really helped. The reduction in regulation has also helped.
- Crude prices are more than ever subject to political conflicts both domestically and internationally, particularly with pending tariff impositions. In addition, there has been no reduction in the potential for escalation of military conflict in the Middle East. It is unrealistic to project significant crude price increases short of an event or events, considering the apparent strategic decisions of Russia and Saudi Arabia to increase production when coupled with the escalation of U.S. production. It may be difficult for crude to maintain pricing between $60 and $65 per barrel.
- The administration has stimulated the economy with regulation reductions and tax cuts. This, along with the red-tape cutting that is allowing liquefied natural gas (LNG) programs here to grow in order to help with the trade deficits we have with other countries, is placing more demand on natural gas. East Texas is a natural gas basin. Thank you to the administration for bringing a business model to Washington.
- The widening Midland–Cushing crude oil price differential and the widening Waha–Henry Hub natural gas price differential have reduced our cash-flow outlook and will reduce our cash flow from operations available to reinvest in drilling and completion expenditures.
- My vendor and supplier costs continue to increase. Even in areas outside of the shale plays, drilling, completion and vendor prices are at very high levels. There are no longer any low-cost operations in my area of activity.
- I think we are getting comfortable that the floor for oil prices is moving up. Although it is tough to call where the ceiling is, confidence in a higher floor than anticipated will help assets move and help create slightly more aggressive capital plans. However, this is with the backdrop of a more skeptical equity market and the reasonable expectations that we are running the business inside cash flow.
- Comments and actions by the administration on tariffs and oil supply have increased our uncertainty about the next six months, so we are limiting investment at the moment.
- The uncertainty in the Louisiana tax structure is frustrating.
- We are a conventional driller/explorer who is finding it difficult to attract capital and services because unconventional (shale) drillers are consuming most of the "oxygen."

Oil and Gas Support Services Firms

- Hangover from the last slump is making it hard to rebound. Field hands' and drivers' wages are steadily increasing, while our hourly and daily rates remain flat.
- Hiring and retaining the bottom 20 percent of labor is a significant challenge in busy oil fields like the Permian Basin. Employees will jump to a new job for as little as $1 more per hour. The more-tenured employees—those who have been through multiple down-cycles—understand loyalty and the benefits of working for companies with staying power and a good culture. However, younger workers have shorter memories and get caught up in the euphoria.
- Demand for seismic data continues at the reduced pace seen in recent years. Customers continue to chase the Permian Basin seemingly at any price. Until the appetite for assets reaches outside of the Permian, our space (seismic) will remain challenged.
- We are still busy in the Permian. East Texas has started to back up, and I have moved operations primarily back to East Texas.
- Who knows what the price of oil will do? There are so many variables in play at this time—political, pipeline capacity, drilling and completion obligations, Venezuela, Iran, Russia, Saudi Arabia, the cost of borrowing money. A change in any of them could significantly affect the price of oil.

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