A DEMOGRAPHIC AND ECONOMIC PROFILE OF OKLAHOMA'S MARGINAL OIL AND GAS WELL OPERATORS

Prepared for

OKLAHOMA COMMISSION ON MARGINALLY PRODUCING OIL AND GAS WELLS

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Introduction

This report provides an overview of the status of Oklahoma's marginal oil and gas well operators and the operating environment they faced in Oklahoma in 2006. A marginal producer operates low-volume "stripper" wells, typically defined as producing less than 10 barrels of oil per day or 60 mcf or less of gas per day.[1] The oil or gas extracted from these wells is referred to as "marginal" because the wells are only marginally productive and profitable and are at risk of being prematurely abandoned.[2] The sustainability of production from marginal wells is important because these wells collectively serve as an important component of national energy production.

The core of the report is a summary of the results from a recent survey of the state's marginal well operators. The survey assesses a broad range of topics related to marginal operators including well production activity, the investment outlook of operators, labor force concerns, and perceived market risk factors. Another section of the survey evaluates the business resources available to well operators, the use of technology in their business operations, and an assessment of the types of educational programs desired by producers. In addition, the survey provides a demographic profile of the small independent operators who typify the marginal well industry in Oklahoma.

In order to better understand the market conditions faced by marginal well operators, the report discusses conditions in the overall oil and gas industry at the state and national levels. This section further discusses the broader role played by marginal oil and gas producers in the state and national energy infrastructure, and examines the economic impact of the industry in the state economy. Finally, this section examines recent trends in oil and gas drilling and production in Oklahoma and provides production forecasts through 2010.

The Role of Marginal Wells in Oklahoma and U.S. Energy Production

Marginal oil and gas wells continue to generate a significant percentage of domestically produced crude oil and natural gas. As shown in Figure 1, there were more than 400,000 producing marginal oil wells in the U.S. in 2005 accounting for 31% of domestic oil production. More than 288,000 marginal gas wells produce more than 10% of the nation's natural gas output. The U.S. Department of Energy (DOE) estimates that approximately 77% of the producing oil wells and 62% of the producing natural gas wells nationwide are marginally productive.[3] In Oklahoma, 93% of oil wells are classified as marginal along with 58% of the state's gas wells.

[1] A stripper gas well is defined by the Interstate Oil and Gas Compact Commission (IOGCC) as one that produces 60 thousand cubic feet or less of gas per day, while the Internal Revenue Service uses 75 thousand cubic feet per day for tax purposes.

[2] Throughout this report the terms "stripper" and "marginal" are used interchangeably.

[3] See "Distribution and Production of Oil and Gas Wells by State." U.S. Department of Energy. http://www.eia.doe.gov.

A recent study of the nationwide impact of marginal oil and gas wells by the Interstate Oil and Gas Compact Commission (IOGCC) highlights the economic role played by marginal wells in many of the energy producing states. Stripper wells are predominantly located in the mature oil and gas fields of Texas, Oklahoma, Louisiana, Kansas, California, and the Appalachian gas-producing region of Ohio, Kentucky, West Virginia, and Pennsylvania, and play a key role in the production strategies of these states.

Oklahoma's 46,798 marginal oil wells comprise nearly 12% of the total number of stripper oil wells nationwide, ranking the state second behind only Texas (31%). The state's stripper oil wells produced 39.3 million barrels of crude in 2005 with average daily output of 2.3 barrels per well.

Figure 1. Marginal Oil Wells and Production by State (2005)

State	Marginal Oil Wells	Marginal Oil Production (bbls)	Total Oil Production (bbls)	Marginal as % of Total Production	Average Production Per Well (bbls/day)
California	26,444	35,563,813	255,676,000	13.9%	3.68
Colorado	5,982	7,001,499	22,918,000	30.6%	3.21
Kansas	38,692	25,827,950	33,592,000	76.9%	1.83
Louisiana	20,041	14,152,725	51,479,000	27.5%	1.93
Mississippi	1,858	895,452	17,917,000	5.0%	1.32
New Mexico	14,069	14,065,576	54,179,000	26.0%	2.74
North Dakota	1,416	2,217,706	35,672,000	6.2%	4.29
Oklahoma	**46,798**	**39,318,486**	**60,939,000**	**64.5%**	**2.30**
Texas	124,116	139,959,142	346,351,000	40.4%	3.09
Utah	1,163	1,618,810	16,658,000	9.7%	3.81
Wyoming	12,357	8,281,804	51,626,000	16.0%	1.84
Subtotal	**292,936**	**288,902,963**	**947,007,000**	**30.5%**	**2.70**
All others	108,136	32,858,607	77,938,000	42.2%	0.83
Total U.S.	**401,072**	**321,761,570**	**1,024,945,000**	**31.4%**	**2.20**

Source: *Marginal Wells: fuel for economic growth.* Interstate Oil and Gas Compact Commission. 2006 Report. Excludes Alaska and Federal off-shore production.

Oklahoma crude production is especially dependent upon the viability of marginal wells, with strippers accounting for approximately two-thirds (64.5%) of the 60.9 million barrels of crude oil produced in Oklahoma in 2005, the second highest percentage of total output from strippers among the states after only Kansas (76.9%). In fact, stripper production from the top six marginal oil producing states - Texas, Oklahoma, California, Kansas, Louisiana, and New Mexico – accounts for one-fourth of total U.S. onshore domestic crude production.

The importance of strippers in natural gas production is less critical relative to their role in crude production both nationally and in Oklahoma. Oklahoma ranks sixth in the number of marginal gas wells and fourth in the production of marginal gas. As shown in Figure 2, the state's 18,706 marginal gas wells produced 169.4 billion cubic feet (cf) of gas in 2005, or 10.6% of total state gas production of 1.6 trillion cf. While the historical shut-in rate for gas wells has trailed that of oil wells, concern remains that marginal gas wells may be plugged and abandoned at an increasing rate in future years.

The majority of stripper wells are owned and maintained by small independent operators as opposed to large, international integrated energy firms. Collectively these marginal well operators account for a large proportion of the jobs and economic activity generated by the energy industry in Oklahoma and nationwide. The limited financial reserves of many of the operators along with the marginal profitability of the wells make the accelerated shutdown of wells much more likely under low market prices. Marginal wells were abandoned at a steady pace as oil prices remained flat through the early and mid nineties. As prices collapsed to the low teens in the late 1990s, marginal producers began plugging stripper wells at a rapid pace. From 1994 to 2003, more than 140,000 marginal wells were plugged and abandoned

nationally.[4] These small operators have been aided by rising oil and gas prices the past few years, which has helped to slow the rate of shutdown of marginal wells.

Figure 2. Marginal Gas Wells and Production by State (2005)

State	Marginal Gas Wells	Marginal Gas Production (mcf)	Total Gas Production (mcf)	Marginal as % of Total Production	Average Production Per Well (mcf/day)
California	527	4,428,540	87,599,000	5.1%	23.0
Colorado	8,861	88,788,233	1,509,194,000	5.9%	27.5
Kansas	15,120	283,712,000	380,316,000	74.6%	5.1
Louisiana	10,035	42,130,824	1,184,330,000	3.6%	11.5
Mississippi	1,226	9,486,746	174,470,000	5.4%	21.2
New Mexico	10,858	97,358,159	1,353,776,000	7.2%	24.6
North Dakota	68	401,057	14,543,000	2.8%	16.2
Oklahoma	18,706	169,439,950	1,605,654,000	10.6%	24.8
Texas	37,396	302,083,547	5,120,528,000	5.9%	22.1
Utah	1,419	14,429,074	280,296,000	5.1%	27.9
Wyoming	23,221	89,043,042	1,821,365,000	4.9%	10.5
Subtotal	127,437	1,101,301,172	13,532,071,000	8.1%	23.7
All others	161,461	658,762,380	1,468,289,000	44.9%	11.2
Total U.S.	288,898	1,760,063,552	15,000,360,000	11.7%	16.7

Source: *Marginal Wells: fuel for economic growth.* Interstate Oil and Gas Compact Commission. 2006 Report. Excludes Alaska and Federal off-shore production.

The continued shutdown and abandonment of marginal wells remains a concern for future domestic production because large quantities of oil often remain behind when marginal wells are prematurely abandoned. From a technical point of view, these existing wells provide an easy access point to much of the nation's remaining oil and natural gas reserves as new technologies to enhance production are developed and deployed. DOE estimates suggest that wells plugged between 1994 and 2003 may have provided access to reservoirs containing 110 million barrels of crude oil still in the ground.[5] After a marginal well is plugged and abandoned, it becomes less likely that any remaining reserves will ever be produced due to the increased cost of drilling a new well.

Oklahoma Energy Industry Overview

The oil and gas sector continues to serve as the trademark industry of Oklahoma. Despite the contraction of the industry since the oil bust, the oil and gas sector remains a large and vital component of the state economy. Oklahoma likewise remains an important component of the U.S. energy infrastructure, ranking fifth among the states in crude oil production and second in natural gas production in preliminary 2005 data released by the U.S. Department of Energy.[6] Currently, the state produces an estimated 3.3% of the total national crude output and 8.8% of total natural gas output.

Oklahoma's oil and gas industry has undergone significant restructuring the past two decades in response to changing geological fundamentals and market conditions, with most Oklahoma counties experiencing a steady decline in total oil and gas production since the bust. The statewide decline in crude oil production on a relative basis was more than twice the decline for natural gas in the period. Despite the maturation of the state's oil and gas fields, the recent upward shift in oil and gas prices has stimulated another cyclical expansion of the industry.

[4] "Marginal & Stripper Well Revitalization." U.S. Department of Energy. Available online at http://www.fossil.energy.gov/programs/oilgas/marginalwells/index.html.
[5] Ibid.
[6] Energy Information Administration, U.S. Department of Energy. http://www.eia.doe.gov.

Employment and Income

Although the state's oil and gas industry has downsized from the height of the oil boom in 1982 when the industry employed nearly 160,000 workers, the sector remains an important source of jobs statewide. Total oil and gas employment expanded by more than 20% (10,500 jobs) between 2002 and 2005 and reached a reported 60,616 workers in 2005, or about 3.0 percent of the total state workforce. The workforce is classified by type as wage and salary workers estimated at 33,709 persons and self-employed workers estimated at 26,907 persons.

These workers earned income of $6.22 billion in 2005; employee compensation reached $2.83 billion while self-employed workers earned an additional $3.4 billion in income. The oil and gas industry continues to pay high wages relative to other state industries as wage and salary workers averaged more than $83,000 and self employed workers more than $126,000 annually in 2005.

Regional Concentration

Oil and gas deposits are found throughout most of Oklahoma's 77 counties, with the bulk of the state's oil production confined to three areas: a large block of counties stretching across much of the central and south central portion of the state; the Texas County area in the panhandle; and Osage, Creek, and Noble Counties in the north central portion of the state. Carter County and Stephens County, both located in south central Oklahoma, account for more than 20 percent of the crude oil production in the state. There is a relatively small amount of crude oil production originating in the extreme eastern portion of the state.

The major natural gas producing areas are found in the west central portion of the state (Anadarko Basin), Texas and Beaver Counties in the panhandle, and Latimer and Pittsburg Counties in the southeast. Few counties are large producers of both crude oil and natural gas. Grady and Texas Counties standout, with Grady ranked fourth in both crude oil and natural gas production and Texas fifth in crude oil production and seventh in natural gas.

Despite production occurring across most areas of the state, both employment and income are highly concentrated in Oklahoma and Tulsa Counties. Together, they account for more than one-third of state oil and gas employment and more than half of the income earned in the industry. In these two counties, oil and gas employment and income is heavily weighted by professional and technical workers employed within the headquarters and regional offices of oil and gas firms rather than production and technical workers in the field. Oklahoma County currently has nearly double the employment and income from oil and gas relative to Tulsa County, reflecting both the diminished role of the energy industry in Tulsa and the expanding presence of independent energy companies headquartered in Oklahoma City. Carter, Cleveland, Garfield, Kay, Stephens, and Washington counties comprise a second tier of counties with a substantial number of energy industry jobs.

Drilling Activity

Drilling activity in Oklahoma has responded to the recent upward shift in market prices for crude oil and natural gas. From 2000 to 2005, well completions have been on an upswing with a post-bust high of 2,369 wells completed in 2005 and an average of 2,294 wells completed annually in the 2001 to 2005 period. The mix of wells being drilled in Oklahoma continues to

shift in favor of natural gas relative to crude. The current ratio of nearly 4 to 1 gas to oil wells is in contrast to drilling activity in 1982 when oil wells comprised more than 50 percent of total well completions. However, given both the relatively measured response of drilling activity to the current price environment and the diminishing geological fundamentals of the state's fields, it is unlikely that the recent surge in drilling signals the onset of another major cycle of oil and gas exploration across the state.

Of the 2,369 wells completed across the state in 2005, 1,704 (71.9%) were gas wells, 415 (17.5%) were oil wells, and 250 (10.6%) were dry. The percentage of dry wells continues to decline as the industry posts increasingly higher success rates. Dry holes have averaged less than 14 percent since 2001, falling as low as 10.6 percent in 2005, ratios well below the historical state average of more than 30 percent dry wells since the 1950s.

Economic Impact – Industry Wide

The recent upward shift in oil and gas prices has stimulated the expansion of the industry after it began to languish as recently as 1999 in response to the decline of oil prices to below $11 per barrel. The industry has rebounded and expanded rapidly since the most recent bottom in prices in 2001, experiencing strong hiring gains and a resurgence in drilling activity.

The total value of industry output reached an estimated $23 billion in 2005, more than double the level at the recent bottom in 1999. More than 95 percent of total industry output is generated by production, which includes professional, administrative, and technical workers. Less than 5 percent of output is a result of drilling and exploration activities.

The activities of the industry have a large and pervasive effect on the Oklahoma economy and create significant economic multiplier, or ripple, effects. The ripple effects of the industry are triggered through employment and income generated by state energy firms and by purchases of the oil and gas industry from other state firms.

In terms of direct oil and gas employment, 56,142 workers were employed in production-related activities and 4,474 in drilling. These workers supported an additional 186,016 jobs statewide through economic multiplier effects. In total, an estimated 246,632 jobs statewide are either provided directly by the oil and gas sector or supported through multiplier effects generated by the industry. In other words, each direct job in the oil and gas sector supported 3.1 additional jobs in the broader state economy in 2005. Total direct labor income earned by workers in oil and gas is estimated at $6.22 billion in 2005; $5.86 billion for production and $357 million for drilling. Through multiplier effects, an additional $11.8 billion in labor income is supported statewide.

Direct purchases by the state's oil and gas firms reach most every industry sector of the state, including both the goods- and services-producing sectors. Total inputs purchased by Oklahoma oil and gas companies were an estimated $11.1 billion in 2005. From this amount, 63 percent or $7.0 billion in value was transacted with Oklahoma businesses.

Tax Revenue

The recent rise in energy prices has produced windfall amounts of oil and gas severance tax revenue to the state. An all time high in gross production receipts was achieved in fiscal year

2006 with a total of $1.07 billion; natural gas totaled $812.1 million (76.2 percent) and crude oil $254.1 million (23.8 percent). In fiscal years 2003 through 2006, total severance tax receipts averaged more than $775 million.

Oil and gas contributes to other tax streams as well. For state government, the personal income tax generated an estimated $196.3 million, the corporate income tax brought in $17.5 million, and the motor vehicle tax totaled $39 million. The industry directly and indirectly generated $169.4 million in sales and use tax for state government and $115.6 million for local government in fiscal year 2006.

Economic Impact – Marginal Operators

Marginal oil and gas well operators are responsible for a significant portion of the economic impact generated by the industry at the state level. Based on IOGCC data, marginal well operators produce 10.6% of the state's natural gas, and 64.5% of state crude oil, output. For 2005, these ratios of production translate into $1.25 billion in natural gas production and $2.14 billion in crude oil production, or $3.4 billion of oil and gas from marginal wells. This production represents 22.4% of the state's total value of $15.13 billion of oil ($3.32 billion) and gas ($11.81 billion) produced in 2005.[7]

Through economic multiplier effects, the $3.4 billion of oil and gas produced by marginal operators supports an estimated $2.31 billion in additional output in other industries statewide, for a total output impact of $5.7 billion. These producers employed an estimated 11,720 workers earning total labor income of $761.2 million in 2005. Marginal producers and their workers represent 20% of total oil and gas employment statewide and 12.2% of labor income earned in the industry.

Through multiplier effects, marginal producers support the jobs of an additional 18,518 workers statewide earning $677.4 million in income. In total, 30,238 total jobs across the state with earnings of $1.44 billion are supported either directly or indirectly by the production activities of the state's marginal well operators. Production from marginal wells also generated an estimated $230.5 million in oil and gas severance tax in 2005, more than 22% of the total received by state government.

Deep Gas Wells

An important trend in state drilling activity is the ongoing shift toward recovering deep reserves in the state's natural gas fields. Oklahoma has long played an important role in the development of deep drilling. The first well drilled below 30,000 feet for commercial production purposes was completed in Beckham County in 1972. From an economic impact point of view, drilling a deep well is a much more significant economic event than drilling a typical shallow well. Much greater capital investment is required and deep wells tend to produce significantly greater average quantities of gas, both of which lead to greater economic impacts. From a recent study of deep drilling in Oklahoma,[8] most wells less than 10,000 feet deep cost less than $1.5 million to complete, while deep wells below 15,000 feet can range from $5 million to $15

[7] Source is internal Oklahoma Tax Commission gas and oil production records.
[8] Snead, Mark C. "The Economics of Deep Drilling in Oklahoma." Center for Applied Economic Research, Spears School of Business, Oklahoma State University, February 2005.

million. On average, a deep well is estimated to have an economic impact six times that of a typical shallow well under 15,000 feet.

Forecasts of Industry Production and Employment[9]

Forecasts through 2010 suggest that state crude oil production is not expected to increase in response to a price level scenario below $90 per barrel, though natural gas production is expected to increase slightly in the near term at current or higher natural gas prices. State production of crude oil is expected to be predominately driven by geological fundamentals and to exhibit a steady decline rate through 2010. The base forecast for crude oil suggests a continuation of the ongoing decline in output, with crude production falling to 53.0 million barrels by 2010. The forecasted base case for crude equates to an expected decline rate of 3.0 percent annually through 2010. The base case forecast for natural gas calls for a small increase in gas production through 2007 before declining slowly to total production of 1.47 trillion cubic feet in 2010. Forecasts for employment suggest that the industry will add jobs through 2008 and peak at more than 74,000 total workers, and then retreat gradually to a lower long-run level of employment by 2010.

[9] See "The Economic Impact of Oil and Gas Production and Drilling on the Oklahoma Economy." Mark C. Snead and Dolores A Willett. Prepared by the Center for Applied Economic Research, Oklahoma State University for the Oklahoma Commission on Marginally Producing Wells. December 2006.

2006 Oklahoma Well Operator Survey Results

The Bureau for Social Research at Oklahoma State University recently conducted a mail survey of 1,500 randomly chosen well operators across Oklahoma to determine the role played by marginal oil and gas wells in the state energy industry. Respondents returned 463 completed surveys, of which 43 were eliminated as unusable (Figure 3), producing an adjusted response rate of 31.8%. An additional 30 surveys were eliminated from the sample for the purposes of tabulating the summary tables, leaving 433 completed surveys among possible respondents. Reasons for eliminating these additional surveys include: duplicate surveys from the same respondent, inconsistent responses, not meaningful responses, and respondents not involved in the oil and gas industry. The response rate equals 30.3% after adjusting for the 30 additional surveys eliminated.

Figure 3. 2006 Operator Profile Survey Response Rate

	Number	Percent
Completed surveys	463	30.87
Active	993	66.20
Physical/language problem	1	0.07
Eliminated	43	2.87
Deceased	2	0.13
Not correct address for respondent	9	0.60
Not a deliverable address	15	1.00
Not qualified	17	1.13
Total	1,500	100.00
Response rate = Completions/(Total - Eliminated) =		31.78

The survey covers the following five areas related to the operation of marginal wells in Oklahoma:

1. Oil well operations – ownership, production by range, workover procedures (cost and results), drilling, acquisitions, mineral rights, royalties
2. Gas well operations – ownership, production by range, workover procedures (cost and results), drilling, acquisitions, mineral rights, royalties
3. Operator demographics – age, gender, education, income, income from oil/gas production, family participation, other occupation, years of experience
4. Industry conditions and expectations – reinvestment, employees by age range, hiring conditions, future plans (own/operate, drilling, workover, investment), production and investment risk factors (environment and regulatory compliance, access to markets, workers' compensation costs, labor costs, production costs, legal environment, future energy prices), state tax rebates (eligibility, application, authorizations)
5. Management resources – sources of industry information, use of technology in business operations, educational programs desired, and professional associations

Among the respondents to the survey, 86.4% operate oil wells, 63.0% operate gas wells, and 49.4% operate both oil and gas wells.

Respondents by Type of Well Operated						
Operate Well Type	**Oil**		**Gas**		**Both**	
Yes	374	86.4%	273	63.0%	214	49.4%
No	59	13.6%	160	37.0%	219	50.6%
Total	433	100.0%	433	100.0%	433	100.0%

The results from each area of the operator survey are summarized and discussed in the following sections.

OIL WELL OPERATIONS

How many wells classified as oil wells do you operate? (372 respondents)

Wells	Responses	Percent
1-2	77	20.8%
3-5	52	14.0%
6-10	60	16.2%
11-25	79	21.3%
>25	103	27.8%
Total	371	100.0%

- 51% of the oil well operators in the survey operate fewer than 10 wells.
- 28% of the operators maintain more than 25 oil wells.
- 15 operators report more than 100 oil wells; the largest operates 958 wells.

Of the oil wells you operate, for what percentage do you contract outside day-to-day servicing? (359 respondents)

Outside Servicing	Responses	Percent
0%	127	35.4%
0-25%	48	13.4%
26-50%	18	5.0%
51-75%	9	2.5%
76-100%	157	43.7%
Total	359	100.0%
Average	48.6%	
Median	30.0%	

- Two-thirds of oil well operators perform at least some of the day-to-day servicing of oil wells.
- Most of the day-to-day servicing of oil wells is typically done by either the operator or by an outside contractor, but rarely shared in any significant way.
- 44% of oil well operators use outside contractors to perform the bulk of the maintenance.
- More than 35% of oil well operators in the survey performed all of the day-to-day servicing of the wells they operate.

For the producing oil wells you operate, how many wells produce the following amounts? (371 respondents)

Barrels per day	Wells	Percent
0-3	7,109	65.7%
4-10	1,857	17.2%
11-15	920	8.5%
15-20	530	4.9%
>20	404	3.7%
Total	10,820	100.0%

- 83% of the oil wells operated by the survey respondents produce 10 barrels of oil or less per day (stripper wells).
- 91% of the oil wells produce 15 barrels of oil or less per day.

In the past year, did you do any workover procedures on your oil wells (excluding routine maintenance)? (372 respondents)

Workover Procedures	Responses	Percent
Yes	198	53.2%
No	174	46.8%

- Approximately half (53.2%) of oil well operators performed workovers in the past year.
- Average cost of workover $26,297 (279 responses with cost)
- Types of workovers included: acid and chemical treatments; fracture stimulations; perforating and stimulating new zones; replacing tubing and rods; squeeze cementing; installing pumping units and plunger lifts; and cleaning paraffin and sand out of wells.

For the typical well worked over how much incremental production, in barrels per day, was realized? (191 respondents)

Production Increase (bbls/day)	Responses	Percent
0	66	34.6%
1-5	77	40.3%
6-10	33	17.3%
>10	15	7.9%
Total	191	100.0%

- While most workover procedures resulted in increased rates of oil production, more than one-third of the procedures did not.
- 40% of the workovers resulted in increased oil flows of 1-5 barrels per day.
- 8% of the workovers resulted in increased oil flows exceeding 10 barrels per day.

In the past year, how many new oil wells have you drilled? (369 respondents)

Wells Drilled	Responses	Percent
Yes	63	17.1%
No	306	82.9%
Average	0.6 wells	
Median	0 wells	
Maximum	20 wells	

- Only 1 in 6 operators in the survey drilled new oil wells in the past year.
- The average operator has drilled less than one well.
- The maximum number of wells drilled in the survey by an oil operator is 20.

In the past year, how many additional oil wells have you acquired to operate? (368 respondents)

Oil Wells Acquired	Responses	Percent
Yes	73	19.8%
No	295	80.2%
Average	1.5 wells	
Median	0 wells	
Maximum	100 wells	

- Only 20% of oil well operators in the survey acquired additional oil wells in the past year.
- The average operator acquired 1.5 new wells last year.

In the past year, how many oil wells have you transferred surety (using Form 1073 or by OCC Order)? (355 respondents)

Surety	Responses	Percent
Transferred surety	78	22.0%
Did not transfer surety	277	78.0%

- More than one in five (22%) oil wells transferred operatorship in the past year.

In how many counties of Oklahoma do you operate oil wells? (370 respondents)

Number of Counties	Responses	Percent
1	160	43.2%
2	83	22.4%
3-5	86	23.2%
6-10	35	9.5%
>10	6	1.6%
Total	370	100.0%

- Most oil well operators work within a single county in Oklahoma.
- 89% operate in 5 or fewer counties.

- Only a small percentage (1.6%) of oil well operators work in more than 10 counties.

GAS WELL OPERATIONS

How many wells classified as gas wells do you operate? (273 respondents)

Wells	Responses	Percent
1	49	17.9%
2	40	14.7%
3-5	60	22.0%
6-10	43	15.8%
11-25	36	13.2%
>25	45	16.5%
Total	273	100.0%

- 55% of the gas well operators in the survey operate fewer than 5 wells.
- 30% of the operators maintain more than 10 gas wells.
- 13 operators report more than 100 gas wells; the largest operates 1,200 wells.

Of the gas wells you operate, for what percentage do you contract outside day-to-day servicing? (264 respondents)

Outside Servicing	Responses	Percent
0%	92	34.8%
1-25%	20	7.6%
26-50%	13	4.9%
51-75%	6	2.3%
76-100%	133	50.4%
Total	264	100.0%
Average	54.2%	
Median	80.0%	

- Two-thirds of gas well operators perform at least some of the day-to-day servicing of gas wells.
- More than half of gas well operators use outside contractors to perform the bulk of the maintenance.
- More than one-third of all gas well operators in the survey performed all of the day-to-day servicing of gas wells they operate.

For the producing gas wells you operate, how many wells produce the following amounts? (273 respondents)

Gas Well Output (CF per day)	Wells	Percent
0-30,000	2,305	32.6%
31,000-60,000	1,691	23.9%
>60,000	3,078	43.5%
Total	7,074	100.0%

- One-third of the gas wells operated produce 30,000 CF of gas per day or less.
- 56% of the wells produce 60,000 CF of gas per day or less (stripper wells)

In the past year, did you do any workover procedures on your gas wells (excluding routine maintenance)? (273 respondents)

Workover Procedures	Responses	Percent
Yes	104	38.1%
No	169	61.9%

- More than one-third (38.1%) of gas well operators performed workovers in the past year.
- Average cost of workover $50,893 (140 responses with cost)
- Types of workovers included: acid and chemical treatments; fracture stimulations; perforating and stimulating new zones; repairing casing leaks; installing pumping units and plunger lifts; cleaning paraffin and sand out of wells; and adding compressors.

For the typical well worked over how much incremental production, in MCF per day, was realized? (104 respondents)

Production Increase (MCF/day)	Responses	Percent
0	31	29.8%
<50	39	37.5%
50-100	10	9.6%
>100	24	23.1%
Total	104	100.0%

- Most (70%) workover procedures resulted in increased rates of production.
- 38% of the workovers resulted in increased gas flows of less than 50 MCF/day.
- 23% of the workovers resulted in increased gas flows exceeding 100 MCF/day.

In the past year, how many new gas wells have you drilled? (267 respondents)

Gas Wells Drilled	Responses	Percent
Yes	57	21.3%
No	210	78.7%
Average	1.9 wells	
Median	0 wells	
Maximum	51 wells	

- Only 1 in 5 operators in the survey drilled new gas wells in the past year.
- The average operator drilled approximately two new gas wells.
- Among those operators drilling wells, the average of new wells drilled is 8.9.
- The maximum number of wells drilled in the survey by a gas operator is 51.

In the past year, how many additional gas wells have you acquired to operate? (265 respondents)

Gas Wells Acquired	Responses	Percent
Yes	60	22.6%
No	205	77.4%
Average	1.1 wells	
Median	0 wells	
Maximum	40 wells	

- Only 22.6% of gas well operators in the survey acquired additional gas wells in the past year.
- The average gas operator acquired roughly one new well last year.

In the past year, how many gas wells have you transferred surety (using Form 1073 or by OCC Order)? (254 respondents)

Surety	Responses	Percent
Transferred surety	49	19.3%
Did not transfer surety	205	80.7%

- One in five gas wells transferred operatorship in the past year.

In how many counties of Oklahoma do you operate gas wells? (262 respondents)

Number of Counties	Responses	Percent
1	115	43.9%
2	58	22.1%
3-5	53	20.2%
6-10	25	9.5%
>10	11	4.2%
Total	262	100.0%

- Nearly half of the gas well operators work within a single county in Oklahoma.
- 86% operate in 5 or fewer counties.
- Only a small percentage (4.2%) of gas well operators work in more than 10 counties.

OPERATOR DEMOGRAPHICS

What is your annual family income? (262 respondents)

Annual Income	Responses	Percent
<$25,000	12	3.0%
$25,000-50,000	42	10.5%
$50,001-75,000	64	16.0%
>75,000	282	70.5%
Total	400	100.0%

- Marginal well operators tend to have family income in excess of the average for households across the state.
- 70.5% of operators have family income in excess of $75,000.
- 86.5% of operators have family income in excess of $50,000.
- Only 3% of operators have family income below $25,000.

What percentage of your family income is from oil production? (360 respondents)

Earnings From Oil Production	Responses	Percent
<25%	174	48.3%
26-50%	88	24.4%
51-75%	35	9.7%
76-100%	63	17.5%
Total	360	100.0%

- The average oil well operator in the survey derives 38% of their family income from oil production.
- The typical (or median) oil well operator derives 30% of family income from oil production.

What percentage of your family income is from gas production? (358 respondents)

Earnings From Gas Production	Responses	Percent
<25%	237	66.2%
26-50%	58	16.2%
51-75%	25	7.0%
76-100%	38	10.6%
Total	358	100.0%

- The average gas well operator in the survey derives 25% of their family income from gas production.
- The typical (or median) gas well operator derives only 10% of family income from gas production.

How many of your younger family members are involved in the business? (406 respondents)

Younger Family Members Involved	Responses	Percent
0	270	66.5%
1	91	22.4%
2	28	6.9%
3	12	3.0%
4 or more	5	1.2%
Total	406	100.0%

- Only 33.5% of well operators report younger family members involved in the business.
- Across all operators, the average number of younger family members involved in the business is 0.5.

- Of those operators reporting the involvement of a younger family member, the average number of younger family members reported is 1.5.

Do you anticipate turning over the business to a younger family member? (411 respondents)

- Fewer than half (46%) of the operators anticipate turning over their well operations business to a younger family member.

If operating gas/oil wells is not your primary occupation, what is?

- 166 of the 433 respondents (37.5%) cite a primary occupation other than oil/gas well operator.
- Commonly reported occupations include agriculture/farming, financial services, professional services, and other areas of the energy industry.

How many years have you been operating gas/oil wells? (422 respondents)

Years	Responses	Percent
<5	36	8.5%
5-10	43	10.2%
11-15	53	12.6%
16-20	64	15.2%
21-30	135	32.0%
31-40	39	9.2%
>40	52	12.3%
Total	422	100.0%

- Oil and gas well operators in Oklahoma tend to be very experienced.
- More than half of the operators surveyed report at least 20 years of experience.
- The average operator has operated wells for 22.9 years.
- The median, or typical, operator has accumulated 22.0 years of experience.
- One respondent reports 70 years of experience.

What is your age? (422 respondents)

Age	Responses	Percent
21-30	2	0.5%
31-40	14	3.3%
41-50	104	24.6%
51-60	137	32.5%
61-70	106	25.1%
over 70	75	17.8%
Total	422	100.0%

- The average age of operators in the survey is 58.1 years.
- The average age of operators is consistent with the average reported experience in the oil/gas industry of nearly 23 years.
- The typical, or median, operator is 56.5 years old.
- The range of reported ages is 23 to 84 years, with only 3.8% of respondents 40 years old or less.

- 43% of operators report being above age 60; 18% report being above age 70.

What is the highest level of education you have completed? (429 respondents)

Educational Attainment	Responses	Percent
Less Than High School	10	2.3%
High School	68	15.9%
Attended Some College	94	21.9%
College Degree	257	59.9%
Total	429	100.0%

- Oil and gas well operators tend to have higher educational attainment than the general population statewide.
- 82% report having attended or completed college.
- 60% of operators hold a college degree.

What is your gender? (429 respondents)

Sex	Responses	Percent
Male	407	94.9%
Female	22	5.1%

- Males comprise 95% of the marginal oil and gas well operators in the survey.

INDUSTRY CONDITIONS AND EXPECTATIONS

Of the revenue generated from oil and gas production that you operate, what percentage was re-invested in your operations? (391 respondents)

- Operators report reinvesting an average of 52.8% of revenue from production back into operations.
- The typical (or median) operator reports reinvesting 50% of revenue.

How many people (beside yourself) do you employ? (306 respondents)

Employees	Responses	Percent
0	121	28.3%
1	83	19.4%
2	61	14.3%
3-5	79	18.5%
6-10	33	7.7%
>10	50	11.7%
Total	427	100.0%
Average	5.9	
Median	2.0	
Maximum	150	

- Operators in the survey report an average of 5.9 employees.
- Among the 72% of respondents with employees, the average number of employees is 8.2.

- The typical (or median) operator employs only two workers.
- The maximum number of workers employed by a respondent in the survey is 150.

How many of your employees are ages *...20-39? ...40-59? ...OVER 60***?** (306 respondents)

Age	Employees	Percent
20-39	629	25.2%
40-59	1,559	62.4%
60+	310	12.4%
Total	2,498	100.0%

- Most of the oil and gas employers report relatively few workers under the age of 40.
- 75% of the workers are age 40 and over; one in eight is over the age of 60.

How difficult is it to find qualified employees for your well operations? (368 respondents)

Hiring Conditions	Responses	Percent
Very Difficult	165	44.8%
Somewhat Difficult	154	41.8%
Somewhat Easy	38	10.3%
Very Easy	11	3.0%
Total	368	100.0%

- Well operators report tight labor market conditions for oil and gas workers.
- 87% of operators report that it is either somewhat difficult or very difficult to find qualified employees.

Based on your own expectations about the industry over the next 5 years, compared to your current activity, do you plan to *Own/Operate... Drill... Workover... Invest...* (Respondents below)

	Own/Operate		Drill		Workover		Invest	
	Responses	Percent	Responses	Percent	Responses	Percent	Responses	Percent
More	254	60.6%	198	56.6%	223	57.2%	237	59.7%
Same	130	31.0%	113	32.3%	135	34.6%	133	33.5%
Less	35	8.4%	39	11.1%	32	8.2%	27	6.8%
Total	419	100.0%	350	100.0%	390	100.0%	397	100.0%

- Well operators report positive expectations about the industry over the next 5 years.
- More than half of all operators expect to expand their operating, drilling, workover, and investment activities in the coming years.
- Approximately one-third expect future industry conditions to support the level of activity they are currently engaged in and have no plans to expand or downsize.
- Only roughly one in ten operators expects to reduce their future level of activity below the current level.

Please rank the top 3 sources of risk in making production and investment decisions. *Environmental compliance (DEQ, EPA); Regulatory compliance (corporation commission); Access to markets/purchasers; Workers' compensation costs; Electricity costs; Potential lawsuits; Future oil and gas prices; Labor costs; Other.* (Respondents below)

	Rank				Percent		
Risk Factor	**1st**	**2nd**	**3rd**	**Total**	**1st**	**2nd**	**3rd**
Environmental compliance	120	85	69	274	29.5%	21.1%	17.4%
Regulatory compliance	30	86	64	180	7.4%	21.3%	16.2%
Access to markets/purchasers	18	32	55	105	4.4%	7.9%	13.9%
Workers' compensation costs	4	21	26	51	1.0%	5.2%	6.6%
Electricity costs	3	12	24	39	0.7%	3.0%	6.1%
Potential lawsuits	23	38	56	117	5.7%	9.4%	14.1%
Future oil and gas prices	173	44	39	256	42.5%	10.9%	9.8%
Labor costs	16	62	45	123	3.9%	15.4%	11.4%
Other factors	20	23	18	61	4.9%	5.7%	4.5%
All risk factors	407	403	396	1,206	100.0%	100.0%	100.0%

- The two greatest risks to production and investment cited by well operators are environmental compliance and uncertainty about future oil and gas prices.
- Almost half of the operators (42.5%) report oil and gas price uncertainty as the single largest risk factor they face.
- Concerns over regulatory compliance, access to markets and purchasers, potential lawsuits, and labor costs comprise a second tier of risks to operators.
- Relatively few operators cite workers' compensation and electricity costs among their top risk concerns.
- Operators cite equipment costs and the lack of available sound prospects among other risk concerns.

Oklahoma has a program of tax rebates for deep well drilling, enhanced recovery investments, horizontal well drilling, opening of inactive wells, new discoveries, and economically at risk. Have you been aware of this program? Have you been eligible for any of these rebates? Have you filed for any of these rebates? Have you received an order authorizing any rebates? (Respondents below)

	Aware of Rebates		**Eligible for Rebates**		**Filed for Rebates**		**Rebates Authorized**	
Response	Responses	Percent	Responses	Percent	Responses	Percent	Responses	Percent
Yes	240	56.7%	122	29.0%	93	22.1%	82	19.5%
No	183	43.3%	131	31.1%	328	77.9%	339	80.5%
Don't Know			168	39.9%				
Total	423	100.0%	421	100.0%	421	100.0%	421	100.0%

- Only 57% of operators report being aware of existing state tax rebate programs aimed at enhancing oil and gas production.
- 29% of respondents report that they are eligible for the rebates, while 40% report not knowing if they are eligible.
- Only 22% of surveyed operators have filed for rebates; 19.5% have been authorized to receive them.

If you have performed operations that you feel would qualify for a rebate but have not filed for one, why not? (119 respondents)

- More than one in four (27.5%) operators provided a response as to why they have not filed for a rebate.
- The most common responses include not being aware of the rebate program, not fully understanding the program, and too many administrative requirements when applying for the rebates.

MANAGEMENT RESOURCES

How many days per month do you use the following sources of production information? (Respondents below)

	Days Per Month				
Information Source	**0**	**1-2**	**3-5**	**>5**	**Total**
Corporation Commission District Offices	104	74	30	16	224
Marginal Well Commission	124	39	12	4	179
Oklahoma Geological Information Survey	118	42	26	7	193
Petroleum Information/IHS	99	65	33	50	247
Trade Publications	99	76	24	27	226
Other	0	7	22	12	41

- Operators report that Corporation Commission offices, petroleum market information, and trade publications are the most frequently used sources of production information.
- Only 20% of operators report using any single information source at least 5 days a month.
- Other sources cited by well operators include Internet sources for drilling information and oil law records.

Please indicate which of the following are used in your business. (433 respondents)

Technology Used by Operator	Percent
Mobile telephone	92.6%
Computer	80.8%
Fax	75.3%
Telephone answering machine	74.8%
Internet	66.7%
E-mail	64.4%
CD Rom	43.4%

What types of educational programs would you find most beneficial in aiding your well operations? (433 respondents)

Educational Program	Percent
Well operations	58.9%
Technical	43.0%
OCC forms	27.0%
Due diligence in acquisitions	25.4%
Accounting	21.5%
Other	6.7%

- More than half of the well operators indicate that educational programs on well operations would be most beneficial.
- Nearly half (43%) report that programs on technical operations would be beneficial.
- Approximately one in four indicate that programs oriented toward the managerial functions of OCC reporting, due diligence in acquisitions, and accounting would be helpful.
- Operators responded that programs on compliance, financial management, and geology would also be beneficial.

What professional trade associations do you belong to? (433 respondents)

Trade Association	Percent
OIPA	31.6%
SPE	18.2%
Mid-Continent	5.8%
NARO	2.8%
OMOA	0.5%
NACE	0.5%
Other	18.0%

- The two most common trade association affiliations among well operators in Oklahoma are the Oklahoma Independent Petroleum Association (OIPA) and the Society of Petroleum Engineers (SPE).
- Other affiliations cited by fewer than 10% of well operators include the American Association of Petroleum Geologists (AAPG), the American Association of Professional Landmen (AAPL), the Independent Petroleum Association of America (IPAA), and the American Petroleum Institute (API).

References

Don J. Remson. “A Forecast of Marginal Natural Gas and Oil Well Data.” June, 2005 U. S. DEPARTMENT OF ENERGY, NATIONAL ENERGY TECHNOLOGY LABORATORY

U.S. Department of Energy. “Marginal & Stripper Well Revitalization.” http://www.fossil.energy.gov/programs/oilgas/marginalwells/index.html