A Demographic and Economic Profile of Oklahoma's Marginal Oil and Gas Well Operators

1998

• Executive Summary •

The historical importance of the energy industry in the economy of Oklahoma is widely understood. The early development in the first half of the century, the oil boom in the late 1970's and early 1980's, and the bust years from 1982 to 1987 have been frequently described.

Somewhat less known is the nature of the restructuring of the industry that has occurred in the last decade and a half, and even less well known still are the demographic and business characteristics of the firms, families and individual participants working in the oil patches and gas fields of the state.

As with any integrated industry, the energy industry consists of many different occupations and businesses integrated with contractual arrangements or through market channels to discover, extract, refine and distribute the basic resources to the final consumers. The operators of the oil and gas wells constitute one such group that plays a key role in the extraction of the state's energy resources and maintenance of the environment, both of which are important to the people of Oklahoma.

The purpose of this study is to obtain a demographic profile of characteristics perceived to be relevant to decision-making processes of the "marginal" oil and gas well operators in the state. For operational purposes, this group was defined to be the bonded operators on file with the Oklahoma Corporation Commission smaller than the top l50 business units ordered by volume of production. They number in excess of 3,000 operators and typically work other jobs and have other sources of income for their families. They operate a large share of the operating wells in the state, but like other small business units, they do not account for the majority of the oil and gas actually produced. They are likely, however, to play a significant role in making the decisions to keep low-volume wells operating or to remove them from operation. Those decisions have further impacts on the value of output from the state, on the employment in the localized rural regions where the wells are operated, and on the government revenues related to the severance taxes paid on these resources.

A survey questionnaire was sent to 1,500 "marginal operators" and 696 were returned. The response rate of 46.4 was considered remarkably good and indicative of the interest and concern to the operators for the future of their industry. Those responses, along with some research from non-survey, secondary sources are summarized and reported below.

Industry Overview:
Since total well completions in Oklahoma reached their peak in 1982 with over 12,000 wells, this measure of activity decreased to a current average of 1,633 wells per year during the period of 1992-96. The shares of gas wells and dry holes increased while that of oil wells fell in recent times. Well completion numbers and drilling activity that historically tended to move closely with oil and gas prices, now appear less dependent on current price as a critical determinant of activity. Oil production since 1980 follows a strong declining trend of about 3.2 percent per year regardless of current price. Gas production in Oklahoma is somewhat more constant in the range of 1.75 to 2.25 trillion mcf on an annual basis.

Employment in the state's mining sector that had once exceeded 100,000 workers is now at 31,500. The majority of these workers—29,300—work in oil and gas extraction with the vast majority split between jobs on the operating properties and those in oil and gas field services. The rate of decline in the employment has certainly slowed in recent years, but forecasts of the future indicate continued small employment losses.

While oil and gas production reaches a majority of the counties in the state, it is quite concentrated in two regions. Fifteen counties concentrated in the south-central area of the state account for two-thirds of the state's oil production. Only 19 counties in west-central and panhandle sections of the state yield four-fifths of the state's gas production. Operations of the well operators generally occur within a small number of counties in these regions and have a substantial majority of their multiplier impacts within the local area.

The Marginal Well Operator Segment of the Industry

Writers dealing with the energy industry use the concepts of "marginal wells" and "marginal well operators." The former relate to low-volume production wells whereas we have defined the latter—the marginal well operators—to be bonded well operators smaller than the largest 150 business units operating oil and gas wells. Defined in this manner, marginal well operators produce about 31.5 percent of the oil and 18 percent of the gas output in the state.

The total contribution of the marginal operators is an output of $1.2 billion of oil and gas in 1996 that is the basis of a multiplier of 1.5 yielding total state output of $1.9 billion. Employment related to this segment of the industry is estimated to be 8,180 jobs directly and 16,580 when multiplier effects are included.

As a small business unit, the median oil well operator controls 9 wells and generates a maximum of $300,000 of output and an average of just over 2 direct jobs. The median gas well operator controls only 4 wells and produces an average maximum output of $146,000 of gas and a single directly related job.

Demographic Profile of Operators from the Sample Survey:

The primary purpose of the survey requested by the Marginal Wells Commission was to obtain a demographic profile of the small well operators that might help the commission better represent the interest of these units as small businesses operating primarily in the rural areas of the state. Previous surveys of lease operators tended to describe the nature of the wells but little information exists on the operators themselves.

From the 1500 surveys mailed to the small bonded operators, a total of 630 responses came from operators who reported actually working oil and/or gas wells in the state. It is important to remember that it is only this segment of the industry operators that we are describing in the profiles below.

To better categorize the marginal well operators, two further categories were partitioned for additional analysis. One grouping was by size of operator where three groups were defined, the smallest were those who operated less than 10 wells (whether oil or gas or a combination), those operating 10 to 25, and those operating more than 25. The second grouping was made by age of the operator completing the survey, those less than 40 years of age, those 40 to 60 years old, and those over 60 years of age. A few of the key differences based on these categories will be highlighted below. Others can be observed in the tabular data that most completely describes the results of the research.

Several conclusions stand out from the tables of data describing the survey.

Nearly half, 299 of the 630, Oklahoma operators work less than 10 oil and gas wells. Another 28 percent operate only 10 to 25 wells.

539 of the 630 operators worked oil-producing wells. The number of wells operated ranged widely from 1 to over 200 so the average number of oil wells per operator was over 17. However, the operator in the middle of the range, the median operator, worked only 9 wells.

338 of the 630 operators worked gas-producing wells. The number of gas wells operated also ranged widely, from 1 to over 223. In this case, the average number of gas wells per operator was 12 with the median operator working only 4 wells.

"Marginal operators" do have a very high tendency to operate "marginal wells." Almost 95 percent of the oil wells worked by marginal operators were reported to produce 10 or fewer barrels of oil per day. Similarly, nearly 70 percent of the gas wells produced 60 or fewer mcf of gas per day.

Well operations of the respondents tended to be centralized in an average of just over 2.5 counties. Over 45 percent of the operators worked wells in

only one county and 4 of every 5 operators did not go beyond a cluster of 3 counties. Direct impacts and multiplier activity tend to be localized for this segment of the industry.

Well operators do tend to specialize in what they do and contract for certain services. Nearly 2 out of 3 operators have some or all routine servicing contracted to another service provider.

The 630 marginal well operators claimed approximately 382 oil and gas wells drilled in the past year. Only 11 percent of oil and gas well operators reported directly having the wells drilled. These active drillers accounted for an average of 2.25 oil wells and 3.2 gas wells per year.

Acquiring wells by means other than drilling was more frequent. Twenty percent of the oil well operators brought another 7.35 wells into their operations.

Well workovers were reported by 48 percent of the oil well operators and 35 percent of the gas well operators. In both cases operators with more than 10 wells were considerably more likely to make this investment than those operating fewer wells.

The typical marginal well operator has considerable years of age and experience. Only 10 percent of the responding operators were under 40 years of age whereas 38 percent were over 60 years of age. Viewed by the grouping defined for number of wells operated, operators working fewer wells tended to be more advanced in age. Operators over 60 years of age, for instance, accounted for 47 percent of the group with the fewest wells, 35 percent of the middle group and only 23 percent of those with more than 25 wells.

Perhaps surprisingly, 80 percent of the operators reported some college or a college degree. Even higher, 90 percent of the operators with more than 25 wells reached this level of educational attainment. (A 1996 "Profile of Independent Producers" by the Independent Petroleum Association of America indicates that backgrounds may include experience as engineers, geologists, accountants, landman, and so forth.)

Similarly, 2 out of 3 operators reported **family income** of $50,000 or more. Again, the likelihood of the greatest family income range, over $75,000 per year, rises considerably with the size of the well operations.

The share of family income derived from oil and gas also varied widely. Family income from oil production averaged 39 percent with over half (53 percent) of the operators receiving less than 1/3 of their family income from this source. Alternatively, only a little over 1 out of 4 operators had more than 2/3rds of their income from oil production.

As in other areas of society, family income for well operators derives from multiple sources and often multiple income earners.

Mineral rights owned by well operators tended to concentrate on the extremes. A little over 1/4th of the operators owned no mineral rights in the wells they worked. Whereas 46 percent of oil well operators and 39 percent of gas well operators had 75 percent of full ownership.

The average age of all operators was about 55 years old. Over 4 out of 5 had over 5 years of experience in the industry. Employees tended to be somewhat younger than operators.

The small size of many units and advancing average age suggested a concern for continuity of family businesses. Seventy percent of all operators reported no involvement with younger family members and only 10 percent worked with more than 1 other family member. Nevertheless, 40 percent of the operators reported "plans" to turn the business over to a younger family member.

Many of the demographic features of the marginal well operators invite comparisons with their rural working partners operating Oklahoma's farming and ranching units. Advancing average age, the small business nature of the operation, desired family involvement, part-time nature of the work and so forth can be seen as similar in these two segments of the state economy.

Operator Plans and Perspectives for the Future:

Despite the depressed conditions of the oil and gas industry during February-March of 1998 when these surveys were completed, the future outlook of the operators was generally for continuation of their operations as currently configured or some expansion. While there were variations to be sure, over half of the operators reported status quo or expansion expectations for drilling, acquiring wells workovers or further investments.

The expectation of remaining in business or expanding was perhaps in spite of considerable risk and uncertainty felt by people in the industry. Clearly, and certainly not surprisingly, the largest single source of risk to their futures was felt to come from future oil and gas prices. Uncertainty from environmental regulations and other regulatory features stemming from the Oklahoma Corporation Commission comprised the second largest source of concerns. The final group of problems on the minds of the producers related to input costs of labor, transportation, and electricity.

Trends, Forecasts and Economic Outlook:

Each year in January, OSU economists publish an Economic Outlook that forecasts economic activity for the year ahead. In January, gross state product in mining or value added was expected to reach $3 billion. That has been revised downward to $2.7 billion, primarily as a result of lower expected average prices for the year. Similarly, severance taxes that were expected to fall by 12 million ($399 million to $387 million) are now expected to fall by 16 percent for the year to around $340 million.

For a longer-range view of trends for the Oklahoma economy and its energy sector, the OSU econometric model was applied for a 5-year future projections. Using the DRI/McGraw Hill national and international forecast, U.S. Gross National Product is expected to average an annual growth of 2.4 percent per year from 1998 to 2002. The corresponding average of the 5 annual growth rates for the Oklahoma Gross State Product is 2.5 percent. The average Oklahoma oil prices ($/barrel) used in the projections are:

1998	$16.90
1999	16.40
2000	16.80
2001	17.40
2002	18.20

Based on these assumptions, and more importantly, long-run factors, oil production in Oklahoma is plotted to fall from about 80 million barrels per year to 63 million by 2002. Gas production is projected at a relatively flat 1.5 million mcf per year.

Mining employment in Oklahoma is likely to fall from current level of 31,500 by perhaps 2,000 to 3,000 workers if trends continue. Value added in mining would then decline by a much smaller 2-3 percent for the period when measured in constant dollar terms.

The public finance sector of the state has already greatly reduced its dependence on the severance taxes and allocated most of the tax revenue to the state's general fund. Over this period annual severance tax collections might vary from a low $300 million to a high $360 million.

Conclusions:

Demographic and business profiles obtained from survey responses can be used to better understand both the human and economic dimensions of an industry. In this instance, an understanding of the men and women who operate a large portion of the state's oil and gas wells begins to form in a way that was not previously known.

Readers of the numerical summaries of the survey responses will undoubtedly form different conclusions and implications based on their personal knowledge of, and experiences in, the energy industry. Those considerations will be important to make recommendations, analyze likely outcomes and ultimately inform and persuade those charged with public policy to provide an appropriate environment for the industry.

More generally, what emerges for those less familiar with the industry is the profile of small business units headed by an operator with a few helpers working relatively few wells to provide one source of family income. These units, like similar small farming and ranching units, are substantial contributors to localized economies in rural areas of the state. Their numbers are diminishing over time, and likely the volume of their production as well. Many work part-time in multiple occupations and rely on many difference sources to remain competitive, viable and attuned to new technologies for production, communication and management.

A survey such as this cannot make recommendations for the public policy issues of what incentives, research and support is needed and/or appropriate for the individual participants in this industry segment. Nevertheless, the new information provided by this profile should be helpful in designing the incentives, the educational programs and the public policy that most effectively achieves the energy objectives set for the oil and gas well operators of Oklahoma.

For more information about this survey, please contact the Commission on Marginally Producing Oil and Gas Wells at 1-800-390-0460.

www.marginalwells.com