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Drilling Boom

The U.S. oil and gas industry in recent years has shown that it responds to the incentive of higher prices. Drilling activity apparently set a new record in 1980, according to preliminary data for the year, and thereby surpassed previous highs reached in the mid-1950s. During the January-November 1980 period, the industry drilled nearly 54,500 wells of all types—about 21 percent above the comparable 1979 figure. Total footage drilled was up 18 percent, and the number of drilling rigs in operation was up 35 percent, in comparison with the 1979 pace of activity. Petroleum-industry expenditures for drilling equipment and services reached record highs—bringing prosperity to drilling-equipment manufacturers and suppliers, exploration companies, and drilling contractors.

Soaring prices

Domestic drilling activity actually has been rising sharply ever since fuel prices began rising in the wake of the 1973 Arab oil embargo. The number of new wells more than doubled over the 1973-80 period, rising at a 15-percent annual rate before accelerating even further in 1980. This uptrend in drilling activity represented a direct response to a sharp price uptrend: domestic wellhead prices of crude oil and natural gas rose five-fold and seven-fold, respectively, over the 1973-80 period (see chart).

Actually, domestic oil and gas prices remained far below free-market levels during this period, because they were subject to a complex system of Federal controls. In the absence of controls, these prices would have been based on the landed price of imported fuels of comparable quality, because of producers' heavy reliance on foreign sources to supplement domestic production. But Federal controls prevented wellhead prices from reaching world-market levels, and thus reduced the financial incentive for domestic producers to increase drilling activity.

Nonetheless, the price incentive increased substantially over the 1973-80 period—even with controls. The average domestic price for oil rose from \$3.89/barrel in 1973 to \$9.00/barrel in 1978, and then soared to an average \$21.00/barrel in 1980. The wellhead price for natural gas rose from \$0.22/thousand cubic feet in 1973 to \$0.91 in 1978 and then to \$1.46 in 1980. (The 1978-80 increases alone amounted to 133 percent and 61 percent, respectively.) Moreover, the use of average prices understates the incentive for exploration activity, because under the control program, newly discovered oil and gas received more favorable treatment than other categories.

The 1978-80 acceleration in domestic wellhead prices reflected two major factors: first, the upsurge in imported-fuel prices resulting from the tight world-supply situation created by the Iranian revolution, and second, the Federal government's decision to permit domestic prices to move gradually to world-market levels. In June 1979, the Department of Energy initiated a program to phase-out controls on domestically-produced oil by October 1981. Similarly, the Natural Gas Policy Act of 1978, passed late that year, called for the gradual removal of controls on most domestically-produced gas by the end of 1984.

In the case of oil, the windfall profits tax has removed some of the added revenue that producers otherwise would have gained through gradual decontrol. But even after the imposition of that tax last May, producers realized substantially higher returns than in the preceding year.

The level of drilling activity reflected the price trend not only during the 1973-80 period, but also during the 1956-73 period, when domestic prices remained nearly stable because of strong competitive pressures from lower-

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priced foreign oil. Drilling activity dropped steadily during that earlier period, so that less than one-half as many wells were drilled in 1973 as at the 1956 peak.

Reflecting that earlier downtrend in drilling activity, domestic crude-oil production peaked in 1970. Although drilling activity subsequently picked up, production trended downward through most of the following decade—except for the 1977-78 period, when Alaskan North Slope oil came on stream, and again during 1980, when the uptrend in drilling activity showed signs of paying off. Domestic production of natural gas followed a roughly similar pattern over the past several decades.

Impact of reserves

Unfortunately, increased drilling activity has not translated into an increase in "proved" reserves. Proved reserves are the known oil-and-gas resources considered recoverable at current prices and with current technology. They constitute the working "in the ground" inventory of the oil-and-gas producing industry. Proved reserves increase whenever additions to reserves during a given period exceed that period's production.

Proved reserves of both oil and gas have declined almost steadily since reaching a peak in 1967. (The one exception was 1970, when North Slope reserves were officially added to the national totals.) Despite the downward trend in production since 1970, the domestic oil-and-gas industry has consistently added less to reserves than it has extracted, and the decline in the stock of proved reserves actually accelerated in the 1975-78 period. During that recent period, proved reserves dropped at an average annual rate of 1.6 billion barrels, reflecting average production of 2.9 billion barrels and average additions to reserves of 1.3 billion barrels annually. During the 1971-74 period, in contrast, proved reserves dropped at a much smaller (1.2-billion barrel) rate, reflecting a much stronger addition to reserves during that period.

In 1979, however, the surge in drilling finally began to bear fruit. Gross additions to crude-oil reserves amounted to about 2.2-billion barrels, the highest figure since 1971. Although proved reserves still declined, the drop amounted to only 0.8-billion barrels, the smallest amount since 1968. The natural-gas industry reported similar promising results.

Throughout the 1973-80 period, the domestic industry concentrated its drilling efforts in traditional producing areas—mainly Texas, Oklahoma, Kansas and Louisiana. This is evident from the fact that development wells increased from 69 to 78 percent of all wells drilled over that period, whereas exploration wells dropped from 22 to 19 percent of the total. (Development wells are those drilled within the proven area of a reservoir, whereas exploration wells are those drilled to discover either new fields or new reservoirs in proven areas.) The remaining 3 to 4 percent of the total included service wells drilled to enhance recovery at old fields, through the injection of water, steam and chemicals.

Exploration activity nonetheless expanded sharply in the 1973-80 period—with the most active new areas being the Overthrust Belt of Utah and Wyoming, the Williston Basin of North Dakota and Montana, the Appalachian region, and the Tuscaloosa Trend in Louisiana. (Exploratory drilling was relatively light in Alaska, despite the great promise of that area, because of restrictive Federal land-use policies.) Offshore drilling also increased sharply, especially in the Gulf of Mexico. But to date, the Federal government has offered only about 4 percent of its offshore lands for lease, and challenges by environmental groups have forestalled drilling on some of those tracts.

Resource potentials

Industry analysts are widely divided about future production prospects, although most agree that increased drilling activity will not forestall an eventual decline in production.

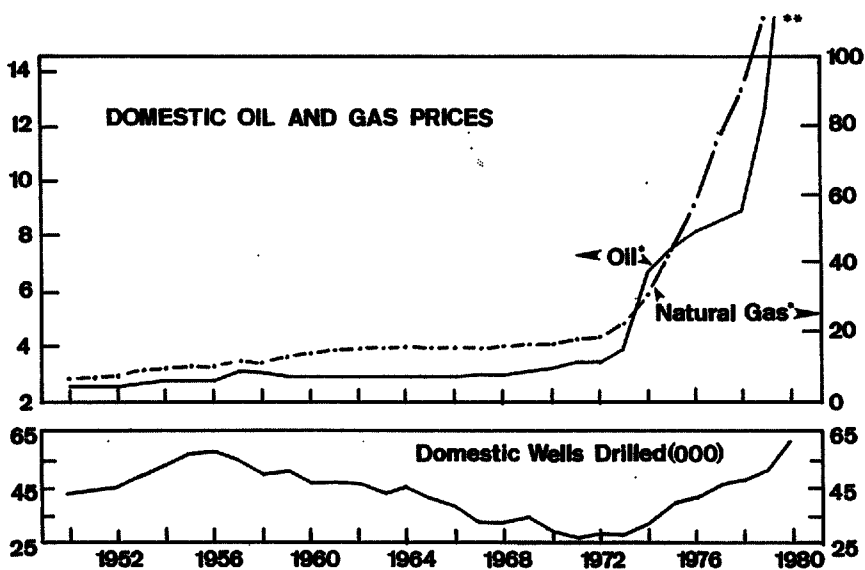
Some contend that production will trend upward over the next several years, while others argue that insufficient reserves will be added even to sustain current production over the 1980-85 period. These differences reflect widely varying estimates of undiscovered resources and of the potential for enhanced recovery from known reservoirs.

According to U.S. Geological Survey (1975) estimates, undiscovered crude-oil resources (on and offshore) range between 50 and 127 billion barrels, while undiscovered recoverable natural-gas supplies range between 322 and 655 trillion cubic feet. Another 30 billion barrels of oil and 200 trillion cubic feet of gas may be recoverable from known fields

through the use of advanced-recovery techniques. Even at the lower end of these estimates, the addition of these resources to current proved reserves could supply the nation's oil-and-gas needs for 36 years at current production levels.

But these resources are less accessible, and of poorer quality, than current proved reserves. If such resources are to be developed, higher energy prices (or lower taxes on oil production) will be required to encourage the necessary investments in enhanced recovery methods, offshore drilling, and other costly technologies.

Yvonne Levy and Alane Sullivan



*Prices: oil in dollars per barrel, and natural gas in cents per 1,000 cubic feet.

**Prices in 1980: \$21.00 for oil and 146.6 cents for natural gas.

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BANKING DATA—TWELFTH FEDERAL RESERVE DISTRICT

(Dollar amounts in millions)

Selected Assets and Liabilities Large Commercial Banks	Amount Outstanding 1/7/81	Change from 12/31/80	Change from year ago	
			Dollar	Percent
Loans (gross, adjusted) and investments*	147,482	204	10,228	7.5
Loans (gross, adjusted) — total#	124,990	332	10,408	9.1
Commercial and industrial	37,657	94	4,100	12.2
Real estate	50,416	350	6,751	15.5
Loans to individuals	23,919	62	— 517	— 2.1
Securities loans	1,364	— 17	264	24.0
U.S. Treasury securities*	6,777	— 137	— 361	— 5.1
Other securities*	15,715	9	181	1.2
Demand deposits — total#	47,287	— 2,400	446	1.0
Demand deposits — adjusted	33,671	542	— 434	— 1.3
Savings deposits — total	28,273	431	— 524	— 1.8
Time deposits — total#	74,054	— 328	14,956	25.3
Individuals, part. & corp.	64,390	— 147	14,149	28.2
(Large negotiable CD's)	28,843	— 792	6,920	31.6
Weekly Averages of Daily Figures	Week ended 1/7/81	Week ended 12/31/80	Comparable year-ago period	
Member Bank Reserve Position				
Excess Reserves (+)/Deficiency (—)	n.a.	n.a.		69
Borrowings	180	122		30
Net free reserves (+)/Net borrowed(—)	n.a.	n.a.		38

* Excludes trading account securities.

Includes items not shown separately.

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