Oil and gas discovery wells drilled in New Mexico in 1993

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Introduction

There was an increase in the number of oil and gas wells drilled in New Mexico during 1993. Data obtained from the New Mexico Oil Conservation Division indicate 1,289 wells were completed in 1993, an increase of 16% from the 1,110 wells completed during 1992. In the Permian Basin, southeast New Mexico, 848 wells were completed during 1993, up from 736 wells completed during 1992; 628 wells were completed as oil producers and 156 wells were completed as gas producers while 64 were plugged and abandoned, resulting in a success rate of 92%. Another 14 wells were temporarily abandoned in the Permian Basin. In the San Juan Basin, northwest New Mexico, 441 wells were completed during 1993, up from 374 wells completed during 1992; 26 wells were completed as oil producers and 388 wells were completed as gas producers while 27 wells were plugged and abandoned, resulting in a success rate of 94%. Another three wells were temporarily abandoned in the San Juan Basin. In addition, 70 carbon dioxide wells were drilled in the Bravo dome carbon dioxide gas field of south Union and east Harding Counties. Sixty-eight service wells were drilled in southeast New Mexico and two were drilled in northwest New Mexico.

Total footage of new holes drilled in 1993 was 5.829 million ft, up 24% from the 4.717 million ft drilled in 1992.

During 1993, there was significant exploratory activity in the Tucumcari Basin, the Chupadera Mesa area of east Socorro and west Lincoln Counties, and the north Albuquerque Basin. There was extensive oil and gas leasing in all three of these areas.

For the purpose of this report, a *significant wildcat discovery* is defined as a well in which commercial amounts of oil or gas were discovered in a stratigraphic unit more than 5 mi from the limits of previously discovered pools with commercial production from that stratigraphic unit. A *significant wildcat dry hole* is defined as a dry hole that was drilled in a not-yet-productive basin or a part of a basin and in which petroleum reservoirs were evaluated.

The locations of significant wildcat wells completed in 1993 are shown in Fig. 1. Table 1 summarizes the significant wildcat discoveries, and Table 2 summarizes the significant wildcat dry holes. Table 3 summarizes wells in which drilling with significant horizontal deviation took place in 1993. Table 4 lists other significant wildcat wells that were being drilled, were not completed, or were held "tight" at the end of 1993. Each well is designated by a number in parentheses that refers to its location in Fig. 1 and its description in Tables 1, 2, 3, or 4.

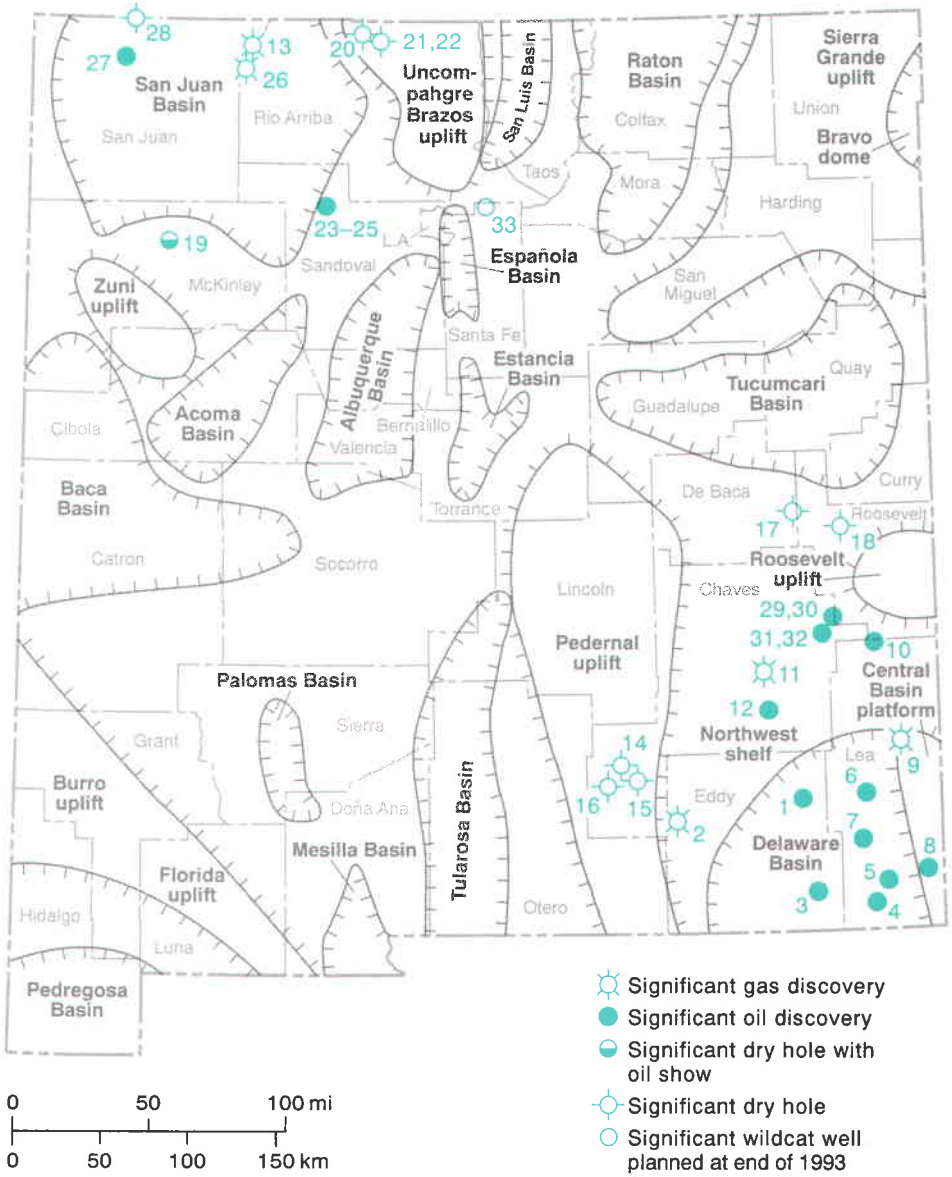

FIGURE 1—Significant oil and gas discoveries, frontier wildcat wells, and horizontal wells drilled in New Mexico during 1993. Major geologic features are from Broadhead and King (1988), Cather and Johnson (1984), Kelley (1978), Kottlowski and Stewart (1970), Meyer (1966), Molenaar (1977), Thompson and Jacka (1981), and Woodward et al. (1978).

Southeast New Mexico

Drilling activity increased in 1993 in the three geologic subdivisions of the Permian Basin: the Delaware Basin, the Central Basin platform, and the Northwest shelf. Twelve significant wildcat discoveries were made in the Permian Basin in 1993 (Fig. 1, nos. 1–12; Table 1, nos. 1–12). New Mexico Bureau of Mines and Mineral Resources et al. (1993) and McKamey et al. (1988) presented stratigraphic charts of oil- and gas-producing rock units in southeast New Mexico, as well as geologic and engineering summaries of oil and gas pools.

Six significant wildcat discoveries were made in the Delaware Basin during 1993 (1, 3–7). Oil was discovered in Wolfcamp carbonates and the Bone Spring Formation (Permian) in the Yates Petroleum No. 1 Benson Deep ET Com. (1). Oil was found in deep-water sediments of the Bone Spring Formation (Permian) in the Enron Oil and Gas No. 2 Diamond 7 Federal (4). Oil was found in allochthonous basinal sandstones of the Brushy Canyon For-

TABLE 1—Significant wildcat discoveries in New Mexico in 1993; the term formation is used in an informal sense. **BOPD,** bbls oil per day; **MCFD,** thousand ft^3 gas per day; **BCPD,** bbls condensate per day; **BWPD,** bbls water per day; **IP,** initial potential; **IPP,** initial potential pumping; **IPF,** initial potential flowing; **owwo,** old well worked over.

Number on Fig. 1	Location (section-township-range, county)	Operator, well number, and lease	Completion date (mo/yr)	Total depth (ft)	Formation at total depth	Producing formation	Producing interval (ft)	Initial potential	Oil gravity (degrees API)
1	33-18S-30E, Eddy	Yates Petroleum No. 1 Benson Deep Federal ET Com.	5/93	12,055	Mississippian	Wolfcamp Bone Spring (Permian)	9,563–9,580	IP 11 BOPD +59 MCFD +36 BWPD	41
2	36-19S-21E, Eddy	Mitchell Energy No. 1 State 36	2/93	8,150	Mississippian	Atoka (Pennsylvanian)	7,198–7,494	IP 56 MCFD	
3	21-24S-30E, Eddy	Perry R. Bass No. 41 Poker Lake Unit	1/93	15,100	Morrow (Pennsylvanian)	Brushy Canyon (Permian)	7,583–7,593	IPP 16 BOPD +16 MCFD +52 BWPD	39
4	7-25S-34E, Lea	Enron Oil & Gas No. 2 Diamond 7 Federal	12/93	12,600	Wolfcamp (Permian)	Bone Spring (Permian)	12,267–12,371	IPF 707 BOPD +750 MCFD +136 BWPD	42
5	1-24S-34E, Lea	Pogo Producing No. 1 Falcon Federal	12/93	14,150	Morrow (Pennsylvanian)	Brushy Canyon (Permian)	8,541–8,588	IPP 78 BOPD +91 MCFD +119 BWPD	41
6	28-18S-34E, Lea	Harvey E. Yates No. 38 EK 28 State	9/93	9,501	Bone Spring (Permian)	Brushy Canyon (Permian)	7,372–7,406	IPP 16 BOPD +136 BWPD	
7	17-21S-33E, Lea	Mitchell Energy No. 2 Comanche 17 State	2/93	8,980	Bone Spring (Permian)	Brushy Canyon (Permian)	8,753–8,786	IPP 39 BOPD +215 BWPD	43
8	9-23S-37E, Lea	Texaco No. 18 Harrison BFB	11/93	5,000	San Andres (Permian)	San Andres (Permian)	3,896–3,994	IPF 20 BOPD +550 MCFD +117 BWPD	27
9	9-15S-36E, Lea	VF Petroleum No. 1 Graham (owwo)	8/93	13,635	Devonian	Atoka (Pennsylvanian)	11,893–11,965	IPF 1,652 MCFD +3 BCPD +10 BWPD	61
10	5-9S-34E, Lea	Bright & Co. No. 1 Apache (owwo)	3/93	12,231	Devonian	Atoka (Pennsylvanian)	10,998–11,034	IPF 71 BOPD +1,625 MCFD +7 BWPD	54
11	21-10S-27E, Chaves	Yates Petroleum No. 6 Pathfinder AFT State (owwo)	1/93	6,900	Precambrian	Wolfcamp (Permian)	5,573–5,584	IPF 190 MCFD	
12	7-13S-28E, Chaves	Hanagan Petroleum No. 1 Charlie State	9/93	7,956	Devonian	Devonian	7,931–7,956	IPF 360 BOPD +13 MCFD	49
13	21-30N-7W, Rio Arriba	Blackwood & Nichols No. 405 NE Blanco Unit	1/93	3,798	Pictured Cliffs (Cretaceous)	Pictured Cliffs (Cretaceous)	3,624–3,656	IPF 1,500 MCFD	

mation of the Delaware Mountain Group (Permian) in four wells: the Perry R. Bass No. 41 Poker Lake Unit (3), the Harvey E. Yates No. 3 EK 28 State (6), the Mitchell Energy No. 2 Comanche 17 State (7), and the Pogo Producing No. 1 Falcon Federal (5).

Both oil and natural gas reservoirs were targets of exploratory drilling in the Delaware Basin during 1993. Increased wellhead prices for natural gas led to a mild resurgence in exploration for gas. Major targets for gas drilling were Morrowan and Atokan (Pennsylvanian) clastic reservoirs and Strawn, Canyon, and Cisco (Pennsylvanian) carbonate reservoirs. Exploratory drilling for oil was concentrated in basinal sandstones of the Delaware Mountain Group (Permian); approximately 20 oil discoveries were made in these sandstones during 1993. Eight oil discoveries were made in basinal sandstones and carbonates of the Bone Spring Formation (Permian). Other targets of exploratory drilling for oil were Wolfcamp (Permian) and Strawn (Pennsylvanian) carbonates.

Development drilling in the Delaware Basin was predominantly for oil during 1993. As with exploratory drilling, primary targets were shallow (5,000–8,000 ft) Delaware Mountain sandstones; approximately 200 development wells were successfully completed in Delaware sandstones during 1993. Activity was widespread, with significant numbers of wells drilled in the Sand Dunes West, Los Medaños, Ingle Wells, Brushy Draw, Herradura Bend East, and Nash Draw pools of Eddy County and the Corbin West, Geronimo, Hat Mesa, Lea Northeast, Quail Ridge, Livingston Ridge East, and Red Tank West pools of Lea County. Other major targets of development drilling for oil included the shallow (3,000–5,000 ft) San Andres and Grayburg Formations (Permian) in the Grayburg–Jackson, Artesia, and Millman fields, moderately deep (6,000–10,000 ft) basinal Bone Spring carbonates, and moderately deep (7,000–10,000 ft) Upper Pennsylvanian (Canyon, Cisco) carbonates. Canyon and Cisco carbonates were intensely developed in the Dagger Draw North, Dagger Draw South, and Indian Basin pools of west-central Eddy County. Deep (10,000–14,000 ft) Morrowan and Atokan (Lower Pennsylvanian) clastics were the main targets for gas development drilling in the Delaware Basin during 1993, but development of gas reservoirs remained slow.

One significant wildcat discovery was made on the Central Basin platform during 1993. Oil was discovered in San Andres (Permian) carbonates in the Texaco No. 18 Harrison BFB (8). There was also limited, but successful, exploration for hydrocarbons in carbonates of the Blinebry and Paddock zones of the Yeso Formation (Permian) and in Glorieta and San Andres (Permian) carbonates. Development drill- ☞

TABLE 2—Significant wildcat dry holes in New Mexico in 1993; the term formation is used in an informal sense. **D&A,** dry and abandoned; **TA,** temporarily abandoned.

Number on Fig. 1	Location (section-township-range, county)	Operator, well number, and lease	Completion date (mo/yr)	Total depth (ft)	Formation at total depth	Status	Comments
14	6-16S-17E, Chaves	James C. Thompson No. 1 State A6	12/93	3,946	granite wash (Ordovician?)	D&A	Lost circulation at 3,368 ft (Ellenburger) and 3,940 ft (granite wash). No details reported.
15	28-16S-17E, Chaves	James C. Thompson No. 1 Federal A28	1/93	4,860	Precambrian	D&A	No details reported.
16	3-17S-17E, Chaves	James C. Thompson No. 1 State A3	11/93	5,977	Ellenburger (Ordovician)	D&A	No details reported.
17	35-1N-28E, De Baca	Estacado E & P No. 1 Sumner 36 State	12/93	7,000	granite wash (Pennsylvanian?)	D&A	Pennsylvanian test. No reported shows.
18	36-1S-31E, Roosevelt	Santa Fe Energy No. 1 Cougar 36 State	12/93	7,425	granite wash (Ordovician?)	D&A	Drilled to test Paleozoic section.
19	16-18N-12W, McKinley	Acutest Corp. No. 1 Hogan State	4/93	1,219	Cretaceous	D&A	Tested Hospah (Cretaceous) from 1,084–1,129 ft with slight oil show; tested Gallup (Cretaceous) from 1,140–1,219 ft, recovered oil-cut water; tested Gallup from 1,154–1,160 ft, recovered oil and water.
20	2-31N-1E, Rio Arriba	Oexco, Inc. No. 3 Gonzales 2A	5/93	2,232	granite (Precambrian)	D&A	Drilled to test Entrada Sandstone (Jurassic). No reported shows.
21	13-31N-2E, Rio Arriba	Santa Fe Southern No. 1 Joe Garcia	8/93	980	Dakota (Cretaceous)	D&A	Drilled to test Entrada Sandstone (Jurassic). Objective not reached.
22	19-31N-3E, Rio Arriba	Deka Exploration No. Q4-1 Quinlan Ranch	9/93	771	Morrison (Jurassic)	TA	No reported shows.

TABLE 3—Wells drilled in New Mexico in 1993 with a significant horizontal deviation. (The amount of horizontal drilling is indicated by the difference between the total depth and the true vertical depth.) The term formation is used in an informal sense. **J&A,** junked and abandoned; **BOPD,** bbls oil per day; **MCFD,** thousand ft^3 gas per day; **BWPD,** bbls water per day; **IPF,** initial potential flowing; **IPP,** initial potential pumping; **IP,** initial potential; **perf,** perforated.

Number on Fig. 1	Location (section-township-range, county)	Operator, well number, and lease	Completion date (mo/yr)	Total depth (ft)	True vertical depth (ft)	Pool	Objective formation	Status	Comments
23	4-20N-2W, Sandoval	Gary-Williams No. 4 1 H Orquidea	2/93	5,116	3,818	Rio Puerco (Mancos)	Mancos (Cretaceous)	oil	Open hole completion 3,097–5,116 ft. IPF 41 BOPD + 100 MCFD + 20 BWPD.
24	5-20N-2W, Sandoval	Energy Development No. 5-2 San Isidro	11/93	6,714	4,877	Rio Puerco (Mancos)	Mancos (Cretaceous)	oil	Open hole completion, 3,564–6,714 ft. IPP 132 BOPD.
25	35-21N-2W, Sandoval	Bright & Co. No. 2 Cuba Mesa 35	11/93	7,073	4,414	Rio Puerco (Mancos)	Mancos (Cretaceous)	oil	Open hole completion 4,555–7,073 ft. IPP 98 BOPD + 63 BWPD.
26	30-30N-7W, Rio Arriba	Phillips Petroleum No. 498R San Juan 30-6 Unit	12/93	3,945	3,051	Basin (Fruitland)	Fruitland (Cretaceous)	gas	Open hole completion 3,379–3,475 ft.
27	20-30N-15W, San Juan	Meridian Oil, Inc. No. 1 Black Diamond Com. 20	10/93	7,560	4,185	Horseshoe (Gallup)	Gallup (Cretaceous)	oil	Perf Gallup 4,416–7,559 ft. IPF 96 BOPD + 295 MCFD.
28	15-32N-14W, San Juan	Meridian Oil, Inc. No. 8 Ute	7/93	10,751			Barker Creek (Pennsylvanian)	J&A	
29	25-7S-31E, Chaves	Petroleum Development Corp. No. 4 Strange Federal	6/93	4,770	4,076	Tomahawk (San Andres)	San Andres (Permian)	oil	Open hole completion 4,007–4,770 ft. IPP 14 BOPD + 4 MCFD + 10 BWPD.
30	25-7S-31E, Chaves	Petroleum Development Corp. No. 5 Strange Federal	7/93	5,007		Tomahawk (San Andres)	San Andres (Permian)	oil	Open hole completion 3,982–5,007 ft. IPP 168 BOPD + 150 MCFD + 42 BWPD.
31	6-8S-31E, Chaves	Petroleum Development Corp. No. 4 Wattam Federal	6/93	4,290	3,755	Cato (San Andres)	San Andres (Permian)	oil	Open hole completion 3,660–3,879 ft. IP 164 BOPD + 192 BWPD.
32	6-8S-31E, Chaves	Petroleum Development Corp. No. 7 Wattam Federal	6/93	4,521	3,673	Cato (San Andres)	San Andres (Permian)	oil	Open hole completion 3,586–4,521 ft. IPP 87 BOPD + 68 MCFD + 42 BWPD.

TABLE 4—Significant wildcat well scheduled to be drilled at the end of 1993.

Number on Fig. 1	Location (section-township-range, county)	Operator, well number, and lease	Comments
33	10-20N-9E, Santa Fe	Giant Exploration & Production No. 1 Española	Scheduled to drill to 5,400 ft to test Pennsylvanian. Location abandoned in early 1994.

ing was mostly for oil in the moderately deep (5,000–7,000 ft) Drinkard, Tubb, and Blinebry zones of the Yeso Formation where activity was most intense in the Justis field. There was also significant development of oil reservoirs in the Grayburg Formation (Permian) in the Eunice–Monument field. Gas and oil reservoirs were developed in shallow (2,000–4,000 ft) sandstones of the Queen, Seven Rivers, and Yates Formations (Permian) with activity concentrated in the Eumont field.

Five significant wildcat discoveries were made on the Northwest shelf in 1993 (2, 9–12). Gas was discovered in Atokan clastics on the south margin of the shelf in the VF Petroleum No. 1 Graham (9). The Atoka yielded gas with a condensate or a light oil farther north in the Bright & Company No. 1 Apache (10). Gas was also discovered in Atokan (Pennsylvanian) reservoirs in the Mitchell Energy No. 1 State 36 (2). Gas was discovered in Wolfcamp (Permian) carbonates in the Yates Petroleum No. 6 Pathfinder AFT State (11). Oil was discovered in Devonian carbonates in the Hanagan Petroleum No. 1 Charlie State (12).

Despite the success obtained by the five significant discoveries, exploratory activity on the Northwest shelf was limited during 1992. Major exploration targets were Ordovician, Siluro–Devonian, Wolfcamp, and San Andres (Permian) reservoirs. On the sparsely drilled southwest part of the shelf, James C. Thompson unsuccessfully completed three wildcat wells (14–16) that tested the lower Paleozoic section. Farther north in De Baca County, Estacado Exploration & Production No. 1 Sumner 36 State (17) was abandoned after unsuccessfully testing the Pennsylvanian section.

Development drilling on the Northwest shelf was relatively strong during 1993. Drilling was concentrated on shallow (2,000–4,000 ft) reservoirs in the upper San Andres, Grayburg, and Queen Formations on the south part of the shelf. Development of upper San Andres and Grayburg reservoirs was especially strong in the Artesia, Grayburg–Jackson, Maljamar, and Vacuum fields. On the north part of the shelf, development was strong in shallow (3,000–4,000 ft) oil reservoirs of the lower San Andres Formation; drilling activity was concentrated in the Cato and Acme Southeast fields. There was limited development of Devonian and Upper Pennsylvanian oil reservoirs. Development of gas reservoirs was mostly confined to the shallow (3,000–4,000 ft) Abo red beds (Permian) of northwest Chaves County.

Efforts were also made to drill development wells with significant horizontal deviation in lower San Andres reservoirs of north Chaves and west Roosevelt Counties. Petroleum Development Corp. drilled two horizontal wells (29, 30) in the Tomahawk pool of Chaves and Roosevelt Counties with fair success. Petroleum Development Corp. also drilled two successful horizontal wells (31, 32) in the Cato pool. These four wells are pioneering efforts to utilize horizontal drilling technology in the development of San Andres reservoirs on the Northwest shelf.

Drilling was limited on the Roosevelt uplift during 1993. No significant discoveries were made. Two exploratory wells unsuccessfully tested granite wash, and one well unsuccessfully tested Devonian strata.

Northwest New Mexico

Drilling activity increased during 1993 in northwest New Mexico; 441 wells were completed, an increase of 18% from the 374 wells completed during 1992. Drilling was mostly in the San Juan Basin and was dominated by development of coalbed methane in the Fruitland Formation (Cretaceous).

Exploratory drilling resulted in one significant discovery in 1993. Gas was discovered in the Pictured Cliffs Formation (Cretaceous) in the Blackwood & Nichols No. 405 NE Blanco Unit (13). That well is 6 mi northeast of gas production from the Pictured Cliffs Formation in the Blanco field. Other exploratory efforts concentrated on finding gas reserves in the Pictured Cliffs Formation of Rio Arriba, Sandoval, and San Juan Counties and in the Chacra zone (Cretaceous) of San Juan and Sandoval Counties. Oil exploration was limited mostly to extension of Gallup (Cretaceous) reservoirs in San Juan County. In the south basin, the Acutest Corp. No. 1 Hogan State (19) was abandoned after unsuccessfully testing Hospah and Gallup (Cretaceous) sandstones; oil shows were reported from both sandstone units.

Most development drilling in the San Juan Basin during 1992 was for shallow (approximately 2,000 ft) coalbed methane in the Fruitland Formation (Cretaceous). A total of 277 Fruitland wells were drilled in east San Juan and west Rio Arriba Counties; only four of these wells were plugged and abandoned. Proved developed and undeveloped reserves in Fruitland reservoirs in the New Mexico and Colorado parts of the basin are estimated to be 10 TCF (American Gas Association, 1992). In 1993, the Basin (Fruitland) pool produced 474 BCF, 52% of the gas produced from the New Mexico part of the San Juan Basin and 33% of the gas produced from New Mexico. Production from the Basin (Fruitland) pool has increased 114% from the 222 BCF produced during 1991. This increase resulted from drilling more than 500 development wells in the past two years.

Development drilling for gas in reservoirs other than the Fruitland increased markedly in 1993. Approximately 70 wells were drilled to develop reservoirs in Mesaverde (Cretaceous) sandstones in Rio Arriba and San Juan Counties. Approximately 25 wells were drilled to develop gas reserves in the Pictured Cliffs Sandstone in those same counties. More than 20 wells were drilled to develop gas reserves in the Dakota Sandstone and Graneros Shale (Cretaceous).

Development drilling for oil was subordinate to development drilling for gas. Only 25 development oil wells were drilled in the San Juan Basin during 1993, a decrease of 34% from the 38 wells completed during 1992. Targets included the Dakota and Gallup Sandstones and the Mancos and Niobrara Shales (Cretaceous). Most drilling was in the Lindrith West (Gallup–Dakota) pool.

Six wells drilled with significant horizontal deviation into producing reservoirs in the San Juan Basin in 1993 are listed in Table 3 (23–28). Three of these wells (23–25) were drilled into fractured Mancos Shales in the Rio Puerco (Mancos) pool. One well (26) was drilled to develop coalbed methane in the Fruitland Formation. Another well (27) was drilled in the Horseshoe (Gallup) pool. The Meridian Oil No. 8 Ute (28) was drilled horizontally into Barker Creek carbonates (Pennsylvanian); unfortunately, that well was junked and abandoned before a completion was established in the Barker Creek.

Three shallow wildcat wells (20–22) were drilled on the Chama platform, which forms the northeast border of the San Juan Basin. These three wells were drilled principally to test the Entrada Sandstone (Jurassic). All three wells were abandoned with no reported shows.

Elsewhere in northeast New Mexico, Giant Exploration & Production staked a location for an exploratory Pennsylvanian test in the Española Basin (33). However, that location was abandoned early in 1994. A lease play emerged in the north Albuquerque Basin. During the November 1993 state lease sale, Manuel Lang leased 7,527 acres of state trust land in the Sandoval County part of the basin. KHL, Inc. leased 3,190 acres of state trust land in the same area. ☞

Northeast New Mexico

Relatively little, but nevertheless significant, petroleum exploration took place in northeast New Mexico during 1993. Leasing continued in the Tucumcari Basin, plans were made to develop and produce coalbed methane in the Raton Basin, and there was additional development of the Bravo dome CO_2 field of Union and Harding Counties.

Although no wells were drilled in the Tucumcari Basin during 1993, the lease play of previous years continued. In the central Tucumcari Basin of north De Baca and south Guadalupe Counties, Labrador Oil Corp. successfully bid on 2,879 acres of state trust land during the September 1993 state lease sale. In the west basin in Guadalupe County, Margaret Perez successfully bid on 480 acres of state trust land during the November 1993 sale. Since 1990, several independents including Labrador Oil, Margaret Perez, Nerdlihc, Project Design Specialists, Ben Donegan, Lucille Pipkin, and Tenison Oil have leased oil and gas rights in the Tucumcari Basin.

Pennzoil announced tentative plans to develop and produce coalbed methane in the Vermejo Formation (Cretaceous) in the Raton Basin. From 1989 through 1991, Pennzoil drilled more than 30 wells as part of a pilot program to test and evaluate coalbed methane in the basin. Primary use of the gas will be for generation of electricity in the city of Springer.

Elsewhere in northeast New Mexico, Amoco continued development of the Bravo dome CO_2 field. Seventy wells were drilled in east Harding and west Union Counties to supplant production from existing wells.

Southwest New Mexico

No petroleum exploration wells were drilled in southwest New Mexico during 1993. However, a large lease play emerged in the Chupadera Mesa area of east Socorro and northwest Lincoln Counties. During the May 1993 state lease sale Ben Donegan leased 56,913 acres and Yates Petroleum leased 641 acres of state trust land in this area. During the October 1993 sale, Ben Donegan leased an additional 1,920 acres of state trust land.

Production and economics

In 1992, New Mexico was the seventh largest producer of crude oil and the fourth largest producer of natural gas in the United States (Energy Information Administration, 1993a). Production of crude oil and lease condensate in 1993 was approximately 69.5 million bbls, a decrease of 1.8% from the 70.8 million bbls produced during 1992 (New Mexico Oil Conservation Division data). Production of natural gas in 1993 was 1,424 billion ft^3 (BCF), an increase of 14.1% from the 1,248 BCF produced during 1992. In 1993, 93% of the state's oil and 36% of the state's gas were produced from the Permian Basin and adjoining areas of southeast New Mexico; 7% of the state's oil and 64% of the state's gas were produced from the San Juan Basin of northwest New Mexico.

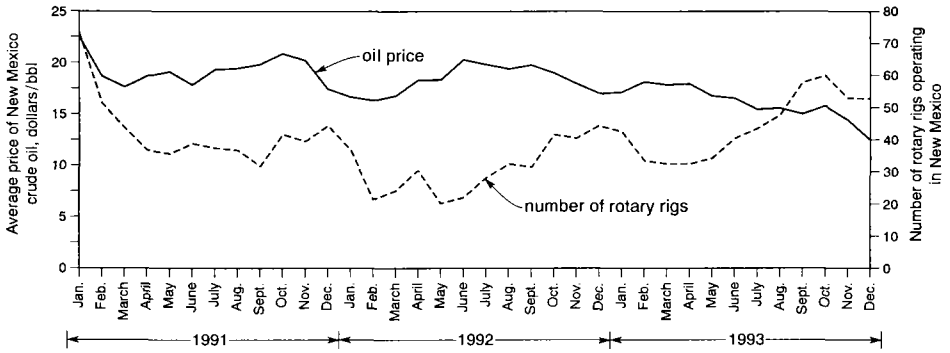

FIGURE 2—Average monthly crude oil price and number of active rotary drilling rigs in New Mexico during 1991, 1992, and 1993. Data from New Mexico Taxation and Revenue Dept. and Oil and Gas Journal (1991, 1992, 1993).

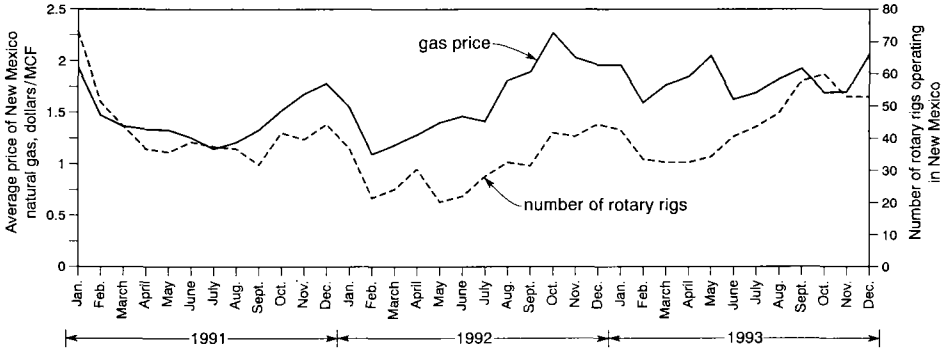

FIGURE 3—Average monthly natural gas price and number of active rotary drilling rigs in New Mexico during 1991, 1992, and 1993. Data from New Mexico Taxation and Revenue Dept. and Oil and Gas Journal (1991, 1992, 1993).

As of December 31, 1992, New Mexico had proved crude oil reserves of 757 million bbls (Energy Information Administration, 1993a); the Permian Basin contains 97% of the state's proved oil reserves and the San Juan Basin contains 3% of the state's proved oil reserves. Additionally, New Mexico had proved reserves of 72 million bbls of lease condensate (Energy Information Administration, 1993a); 74% of the condensate reserves are in the San Juan Basin and 26% of the condensate reserves are in the Permian Basin. Furthermore, there are an additional 293 million bbls of crude oil reserves in existing reservoirs that may be economically recoverable through implementation of existing enhanced recovery technology (Energy Information Administration, 1993a); virtually all of those reserves are in the Permian Basin. As of December 31, 1992, New Mexico had proved natural gas reserves of 20.4 trillion ft^3 (TCF; Energy Information Administration, 1993a); the San Juan Basin contains 83% of the state's proved gas reserves and the Permian Basin contains 17% of the state's proved gas reserves.

The estimated value of oil produced in New Mexico during 1993 was approximately $1.1 billion (New Mexico Oil Conservation Division data). The estimated value of produced natural gas was approximately $2.6 billion. The state derives a large amount of revenues from taxes and royalties levied on oil and gas production (Table 5). In 1993, New Mexico received $373 million from oil and gas taxes and from oil and gas royalities on state trust land. In addition, New Mexico received approximately $142 million as its share of revenues from leases on federal lands in the state; this value includes bonuses, royalties, and rentals derived from leases and production of oil, gas, and coal.

The decrease in oil production in 1993 resulted mostly from a continued slump in oil prices. The average sales price of crude oil decreased from $18.29/bbl in 1992 to $16.06/bbl in 1993 (Fig. 2). The price of oil is set primarily by actions in the international market and is driven largely by actions of OPEC. Because of the decrease in oil prices, an inadequate number of wells was drilled to find and develop sufficient new oil sources to replace waning production from older wells. Also, the

TABLE 5—State oil and gas production taxes and royalties collected in 1993. Data from New Mexico Taxation and Revenue Department, Oil and Gas Accounting Division.

Tax or royalty	Amount collected in 1993
Severance tax	$119,147,620
School tax	108,810,485
Ad valorem tax	33,317,322
Conservation tax	5,711,655
Royalty from state trust lands	106,390,131
TOTAL	$373,377,213

lower prices did not provide incentive to maintain maximum production from some older wells, and many stripper wells continue to be shut in because of high production costs. Oil production in New Mexico can increase if favorable economic changes lead to increased drilling and increased implementation of enhanced recovery techniques. Oil production will decrease if economic changes are unfavorable. Sustained low oil prices will lead to decreased exploration for, and development of, new reserves. Fewer enhanced recovery projects will be started in older oil reservoirs. Production will therefore decrease gradually unless prices rise moderately or unless a major discovery is made.

The increase in natural gas production in 1993 was caused by an increased demand for gas, as well as by increased productive capacity. Productive capacity rose primarily as a result of extensive development of coalbed methane reservoirs in the San Juan Basin. Primary markets for New Mexico gas are in California. However, the national demand for gas is expected to increase by 3.7% to 20.53 TCF in 1994 (Energy Information Administration, 1993b). Deliverability of gas from fields in the Gulf of Mexico is decreasing (Koen, 1994). Additional markets for New Mexico gas may develop in the midwest as the need arises to replace waning production from the Gulf. In California, New Mexico gas faces stiff competition from fuel oil, Wyoming gas, and Canadian gas. However, natural gas is replacing fuel oil and coal in many markets because it is a more environmentally desirable fuel. Additional markets for New Mexico gas may be developed in industrial areas of north Mexico with the signing of the North American Free Trade Agreement.

The average wellhead price of New Mexico gas in 1993 was $1.82/MCF, a substantial increase from the average price of $1.62/MCF in 1992. The average price attained a maximum of $2.09/MCF during December 1992 (Fig. 3). The price increase in 1993 appears to be due to a balancing of gas markets and a long-awaited reduction in the gas surplus.

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New Mexico Geological Society
1995 Spring Meeting
Call for papers

The annual spring meeting will be held on Friday, April 7, 1995, at Macey Center on the campus of New Mexico Tech in Socorro. Talks that focus on the geology of New Mexico or adjacent areas are being solicited for oral and poster presentation. A theme session addressing ground water and diagenesis in rift basins is being organized. Camera-ready abstracts must be received by **February 10, 1995**. The abstracts should be in GSA style and may include simple line drawings or graphs, but everything must fit on a single 8½ × 11" page. Abstracts will appear in a proceedings volume and later will be published (without illustrations) in *New Mexico Geology*. A $50 award will be presented to the winner of the best student paper competition (a voluntary competition, poster presentations are not eligible). Abstracts should be mailed to Maureen Wilks, Geoscience Dept., New Mexico Tech, Socorro, NM 87801 (505/835–5634). Meeting programs and registration forms will be mailed in early March. For registration information, contact Glen Jones, New Mexico Bureau of Mines and Mineral Resources, Socorro, NM 87801 (505/835–5243). For general information, contact general chairpersons Maureen Wilks or Dave Love (505/835–5146).