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New Mexico Geology, v. 5, n. 2 pp. 30-34, Print ISSN: 0196-948X, Online ISSN: 2837-6420.
https://doi.org/10.58799/NMG-v5n2.30

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Introduction

Drilling for oil and gas in New Mexico saw its second best year in history in 1982. Statistics obtained from the New Mexico Oil Conservation Division indicate that 2,313 wells were completed in New Mexico in 1982, a number surpassed only by the record of 2,867 wells completed in 1981. In the Permian Basin of southeast New Mexico, 1,529 wells were completed in 1982, up from 1,348 completions in 1981; 597 of the Permian Basin wells were completed as oil producers while 663 were completed as gas producers and 269 were plugged and abandoned resulting in a success rate of 82%. In the San Juan Basin of northwest New Mexico, 784 wells were completed in 1982, down from 1,379 completions in 1981; 577 of the San Juan Basin wells were gas producers, 165 were oil producers, and only 42 were plugged and abandoned for a success rate of 95%. In addition, approximately 10 wells were drilled in search of carbon dioxide on the Bravo dome of northeast New Mexico, down sharply from the 140 carbon-dioxide wells drilled in 1981. Wildcat wells were plugged in the not-yet-productive Raton, Hagan, and Albuquerque Basins of northeast New Mexico and in Luna County of southwest New Mexico. Wildcat wells drilled in the Tucumcari Basin of northeast New Mexico encountered encouraging amounts of hydrocarbon gas.

Almost 12,000,000 ft of hole were drilled in New Mexico in 1982, making it the second best year in history and surpassed only by the record 14,076,000 ft drilled in 1981. The average depth of wells drilled in 1982 is 5,188 ft, 278 ft more than the average depth of wells drilled in 1981.

Fig. 1 shows the locations of the significant wildcat wells drilled in New Mexico in 1982; table 1 summarizes the significant wildcat discoveries and table 2 summarizes the significant wildcat dry holes. For purposes of this report, a significant wildcat discovery is defined as a well in which commercial amounts of oil or gas from a formation have been discovered at a distance of more than 5 mi from the limits of previously discovered fields with commercial production from that formation. A significant wildcat dry hole is defined as a well drilled in an unproductive basin or part of a basin that encountered an encouraging show of hydrocarbons before being abandoned. Table 3 lists wildcats which were being drilled at the end of 1982 and which were located in unproductive basins.

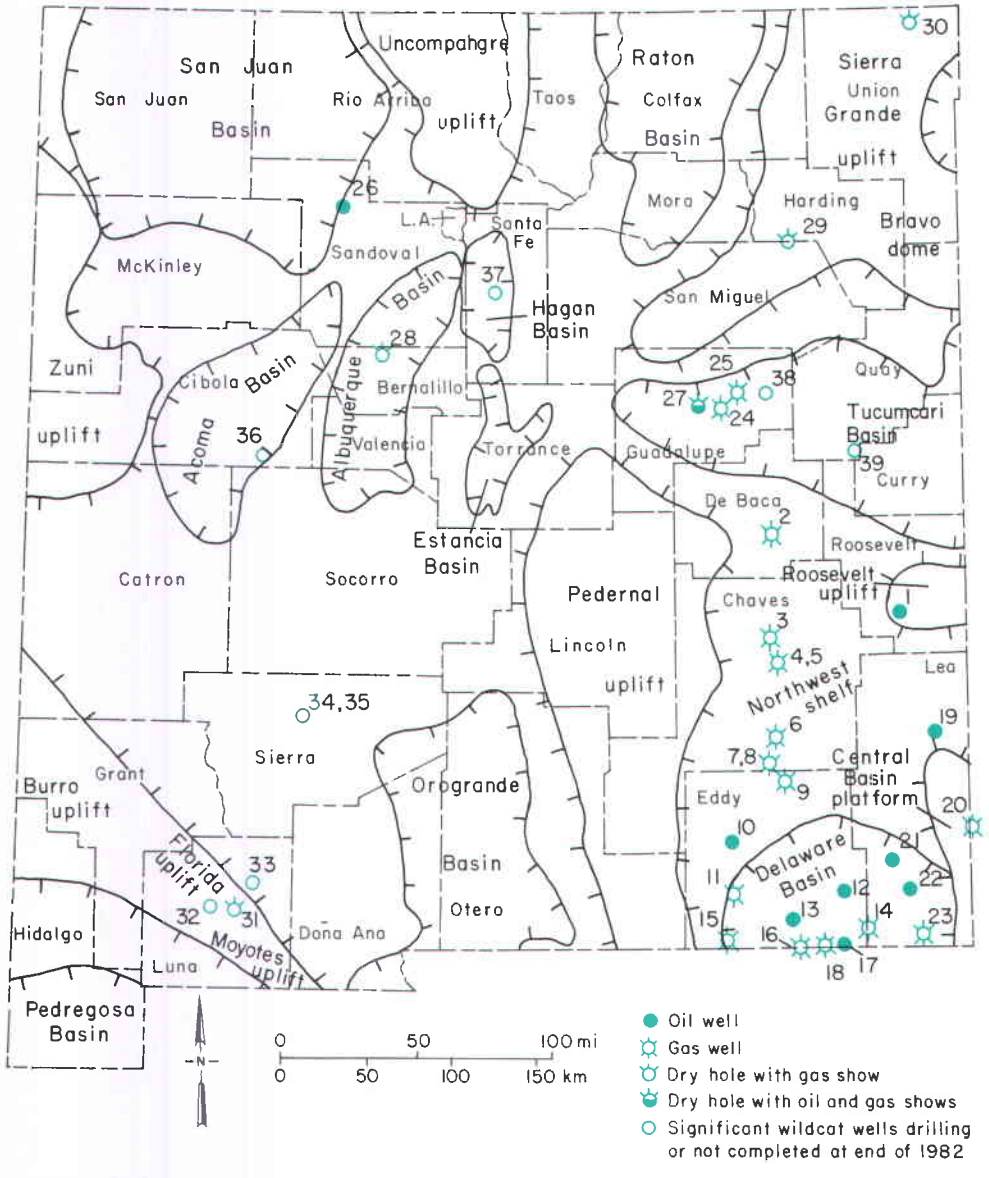

FIGURE 1—SIGNIFICANT OIL AND GAS DISCOVERIES AND WILDCAT DRY HOLES DRILLED IN NEW MEXICO DURING 1982. Major geologic features are taken from Black (1979), Kottlowski and Stewart (1970), Meyer (1966), Molenaar (1977), Roberts and others (1976), and Thompson and others (1978). See tables 1, 2, and 3 for details.

Southeast New Mexico

Drilling activity has been high in three of the four geologic subdivisions of the Permian Basin in southeast New Mexico: The Delaware Basin, the Central Basin platform, and the Northwest shelf. The Roosevelt uplift has seen only a moderate amount of drilling. The Permian Basin yielded several significant oil and gas discoveries in 1982 (fig. 1; table 1). Kinney (1967, p. 26–27) presented stratigraphic charts of oil- and gas-producing rock units in southeast New Mexico.

The Delaware Basin of Eddy and southwest Lea Counties had several significant wildcat discoveries. A great deal of development drilling in existing fields also took place. On the west flank of the Delaware Basin, the Cities Service Company No. 1 Federal 'Q' (fig. 1, no. 11; table 1, no. 11) found gas in the Canyon Series (Pennsylvanian) and Desana Corporation found gas in the Bone Spring Limestone (Permian) with their No. 1 Federal 'BH' (fig. 1, no. 15; table 1, no. 15); the Desana discovery is unusual because the Bone Spring usually produces oil, not gas. Further east toward the center of the basin, Bone Spring oil was found by three significant wildcats: the Getty Oil Company No. 1 Forty-niner Ridge Unit (fig. 1, no. 12; table 1, no. 12), the Wood & Locker No. 1 AMOCO Federal (fig. 1, no. 13; table 1, no. 13), and the AMOCO Production Company No. 1 State 'LT' (fig. 1, no. 21; table 1, no. 21); the Bone Spring discoveries in 1982 and previous Bone Spring discoveries made in 1981 (Broadhead, 1982a) indicate that the Bone Spring could become a major oil

TABLE 1—SIGNIFICANT WILDCAT DISCOVERIES IN NEW MEXICO IN 1982; the term "formation" is used in an informal sense. **NR,** not released; **BOPD,** barrels of oil per day; **BWPD,** barrels of water per day; **MCFGPD,** thousand ft³ of gas per day.

Number on fig. 1	Location (section-township-range, county)	Operator, well number, and lease	Completion date (month/year)	Total depth (ft)	Formation at total depth	Producing formation	Producing interval (ft)	Initial potential	Gravity (degrees API)
1	17-6S-34E Roosevelt	American Crude, Inc. No. 1 State '17'	5/82	8,232	Precambrian	Granite wash	7,610-7,714	2 BOPD + 12 BWPD	NR
2	17-1S-25E De Baca	Flag-Redfern Oil Co. No. 1 State '17'	1/82	4,500	Hueco (Permian)	San Andres (Permian)	826-872	565 MCFGPD	--
3	21-7S-26E Chaves	Sun Exploration & Production Co. No. 1 Chaves 'A' Federal	7/82	5,366	Precambrian	Hueco (Permian)	4,588-4,594	1,440 MCFGPD	--
4	12-9S-26E Chaves	Yates Petroleum Corp. No. 1 Whitworth 'RU' State	3/82	6,710	Precambrian	Mississippian	6,124-6,348	240 MCFGPD	--
5	13-9S-26E Chaves	Fred Pool Operating Co. No. 2 Eastland State	3/82	6,206	Fusselman (Silurian)	Fusselman (Silurian)	6,002-6,050	8,882 MCFGPD	--
6	36-13S-26E Chaves	Clements Energy Inc. No. 1 NM '36' State	2/82	6,918	Mississippian	Strawn (Pennsylvanian)	6,581-6,660	753 MCFGPD	--
7	33-14S-26E Chaves	Clements Energy Inc. No. 1 Drum Commission	6/82	6,940	Mississippian	Strawn-Atoka (Pennsylvanian)	6,678-6,770	1,213 MCFGPD	--
8	35-14S-26E Chaves	Clements Energy Inc. No. 1 King '35' Commission	6/82	7,294	Mississippian	Strawn-Atoka (Pennsylvanian)	6,925-7,010	7,189 MCFGPD	--
9	17-16S-27E Eddy	Husky Oil Co. No. 1 Husky Federal	4/82	8,640	Mississippian	Abo (Permian)	5,868-5,878	75 MCFGPD	--
10	11-20S-24E Eddy	Ralph Nix No. 1 Debbie	5/82	9,546	Mississippian	Canyon (Pennsylvanian)	7,754-7,766	55 BOPD + 162 BWPD	42
11	23-23S-23E Eddy	Cities Service Co. No. 1 Federal 'Q'	1/82	10,449	Mississippian	Canyon (Pennsylvanian)	8,123-8,205	722 MCFGPD	--
12	16-23S-30E Eddy	Getty Oil Co. No. 1 Forty-niner Ridge Unit	6/82	14,519	Devonian	Bone Spring (Permian)	7,564-7,589	95 BOPD + 65 BWPD	NR
13	26-25S-27E Eddy	Wood & Locker Inc. No. 1 AMOCO Federal	8/82	7,670	Bone Spring (Permian)	Bone Spring (Permian)	5,877-5,949	25 BOPD	41.8
14	35-25S-31E Eddy	AMOCO Production Co. No. 1 Big Sink Unit	6/82	15,700	Barnett (Mississippian)	Atoka (Pennsylvanian)	14,348-14,391	645 MCFGPD	--
15	8-26S-23E Eddy	Desana Corp. No. 1 Federal 'BH'	5/82	8,361	Barnett (Mississippian)	Bone Spring (Permian)	3,783-3,812	Gas well	--
16	13-26S-27E Eddy	Quanah Petroleum Inc. No. 1 Hay 'A' Federal	3/82	7,665	Bone Spring (Permian)	Bone Spring (Permian)	6,871-7,558	2,164 MCFGPD	--
17	25-26S-29E Eddy	J.C. Williamson No. 1 'UCBHWW' Federal	6/82	6,250	Delaware (Permian)	Brushy Canyon (Permian)	5,082-5,118	325 BOPD + 20 BWPD	NR
18	26-26S-29E Eddy	J.C. Williamson No. 2 EP-USA	3/82	4,034	Delaware (Permian)	Bell Canyon (Permian)	3,481-3,485	429 MCFGPD	--
19	3-14S-36E Lea	Harvey E. Yates No. 2 McDonald Unit	7/82	14,592	Devonian	Devonian	14,556-14,568	312 BOPD	56
20	5-20S-39E Lea	MGF Oil Co. No. 1 J. Wright	4/82	7,740	Hueco (Permian)	Seven Rivers (Permian)	3,004-3,121	1,792 MCFGPD	--
21	32-21S-33E Lea	AMOCO Production Co. No. 1 State 'LT'	2/82	15,140	Strawn (Pennsylvanian)	Bone Spring (Permian)	9,275-9,490	30 BOPD + 23 BWPD	NR
22	10-23S-34E Lea	Estoril Producing Corp. No. 2 Triple 'A' Federal	5/82	11,300	Bone Spring (Permian)	Cherry Canyon (Permian)	6,734-6,948	143 BOPD + 51 BWPD	NR
23	6-26S-35E Lea	AMOCO Production Co. No. 1 Perro Grande Unit	3/82	16,650	Morrow (Pennsylvanian)	Morrow (Pennsylvanian)	15,765-15,819	36,972 MCFGPD	--
24	20-8N-22E Guadalupe	O.H. Berry No. 1-X Tucumcari FNB	3/82	3,320	Hueco (Permian)	Abo (Permian)	2,796-2,802; 2,812-2,824; 2,916-2,926; 2,968-3,020	88 MCFGPD + 120 BWPD	--
25	2-9N-23E Guadalupe	Trans-Pecos Resources Inc. No. 1 Latigo Ranch Blk 'A'	7/82	7,202	Precambrian	Pennsylvanian	6,658-6,764	275 MCFGPD (see text)	--
26	4-20N-2W Sandoval	Lewis Energy No. 1 Lewis 4-20-2	1/82	4,300	Mancos (Cretaceous)	Mancos (Cretaceous)	3,494-4,300	120 BOPD + 180 BWPD	39

producer in the future. The Brushy Canyon Formation of the Delaware Mountain Group (Permian) yielded an impressive initial production of 325 bbls of oil per day (BOPD) and only 20 bbls of water per day (BWPD) from the J. C. Williamson No. 1 'UCBHWW' Federal (fig. 1, no. 17; table 1, no. 17) in south-central Eddy County. The Bell Canyon Formation of the Delaware Mountain Group yielded a gas discovery to the J. C. Williamson No. 2 EP–USA (fig. 1, no. 18; table 1, no. 18). The Estoril Producing Corporation No. 2 Triple 'A' Federal (fig. 1, no. 22; table 1, no. 22), located in Lea County on the northeast flank of the Delaware Basin, obtained an initial production of 143 BOPD and 51 BWPD from the Cherry Canyon Formation of the Delaware Mountain Group. In the southern part of the basin, the Quanah Petroleum No. 1 Hay 'A' Federal (fig. 1, no. 16; table 1, no. 16) found Bone Spring gas and AMOCO's No. 1 Perro Grande Unit (fig. 1, no. 23; table 1, no. 23) had an exceptionally high initial-calculated open flow of 36,972 thousand ft³ of gas per day (MCFGPD) from the Morrow Series (Pennsylvanian). Major targets of development drilling in the Delaware Basin in 1982 were gas in the Morrow, Atoka, and Strawn Series (Pennsylvanian) and oil in the Bone Spring Limestone and Pennsylvanian System.

The Central Basin platform of southeastern Lea County also saw a high level of drilling activity in 1982, but only one significant wildcat discovery was made, gas from the Seven Rivers Formation (Permian) by the MGF Oil Company No. 1 J. Wright (fig. 1, no. 20; table 1, no. 20). Development drilling of shallow oil reservoirs in the Yates, Seven Rivers, Queen, and Grayburg Formations (Permian) and the San Andres Limestone (Permian) predominates on the Central Basin platform. Several fields produce oil with the aid of waterflood operations.

The Northwest shelf of the Permian Basin was the most actively drilled area in southeast New Mexico in 1982. Several significant wildcat discoveries were made and the pace of development drilling was fast. On the southern part of the shelf, gas was discovered in the Strawn and Atoka Series by three wells drilled by Clements Energy Inc.: the No. 1 NM '36' State (fig. 1, no. 6; table 1, no. 6), the No. 1 Drum Commission (fig. 1, no. 7; table 1, no. 7), and the No. 1 King '35' Commission (fig. 1, no. 8; table 1, no. 8). The Ralph Nix No. 1 Debbie (fig. 1, no. 10; table 1, no. 10) found oil in the Canyon Series (Pennsylvanian) in west-central Eddy County. Further to the north in central Chaves County, discoveries were made in three pay zones by three different wells; Sun's No. 1 Chaves 'A' Federal (fig. 1, no. 3; table 1, no. 3) found Hueco (Permian) gas while the Yates Petroleum Corporation No. 1 Whitworth 'RU' State (fig. 1, no. 4; table 1, no. 4) found gas in the Mississippian System, and the Fred Pool Operating Company No. 2 Eastland State (fig. 1, no. 5; table 1, no. 5) found gas in the Fusselman Dolomite (Silurian). Still further north, the Flag–Redfern Oil Company No. 1 State '17' (fig. 1, no. 2; table 1, no. 2) found gas at a depth of 826 ft in the San Andres Limestone and is the first San Andres discovery in De Baca County. The main targets of development drilling on the Northwest shelf are the "tight" gas sands of the Abo Formation (Permian). Abo production is presently limited to north-central Chaves County but several wildcats drilled in 1981 and 1982 have encountered promising gas shows from the Abo in Lincoln and De Baca Counties and even as far north as Guadalupe County. The Abo play has been discussed by Wheatley (1981), Broadhead (1982b), and Scott (1982). Other development drilling on the Northwest shelf is mostly for oil in the San Andres Limestone and the Queen and Grayburg Formations (Permian).

Very few wells were drilled on the Roosevelt uplift in 1982. Chief drilling targets are Pennsylvanian and Mississippian rocks.

Northwest New Mexico

The San Juan Basin of northwest New Mexico has seen a high level of drilling activity in 1982, even though the number of wells drilled was down approximately 50% from 1981. As in past years, most of the drilling has been for gas and concentrated in San Juan and western Rio Arriba Counties. Few wildcats were drilled, but development activity was heavy. Major development objectives for gas in the San Juan Basin are the Dakota Sandstone (Cretaceous) and sandstones of the Mesaverde Group (Cretaceous), including the Chacra and Pictured Cliffs sandstones. The Gallup Sandstone (Cretaceous) is a major objective for development drilling of oil wells. The Hospah sandstone and Mancos Shale (Cretaceous), the Entrada Sandstone (Jurassic), and the Pennsylvanian System are minor development targets. The stratigraphy of targeted units was discussed by Molenaar (1977), Green and Pierson (1977), and Jentgen (1977); Vin-

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TABLE 2—SIGNIFICANT WILDCAT DRY HOLES IN NEW MEXICO IN 1982; the term "formation" is used in an informal sense; **D&A,** dry and abandoned; **SO,** suspended operations; **MCFGPD,** thousand ft^3 of gas per day; **NR,** not released.

Number on fig. 1	Location (section-township-range, county)	Operator, well number, and lease	Completion date (month/year)	Total depth (ft)	Formation at total depth	Status	Comments
27	21-8N-21E Guadalupe	Alta Energy Corp. No. 1 Walker	8/82	4,000	Pennsylvanian	D&A	Oil show in Abo (Permian) through perforations from 2,840-2,846 ft. Gas show in Abo through perforations from 2,514-2,609 ft.
28	24-11N-1E Bernalillo	Shell Oil Co. No. 1-24 West Mesa Federal	8/82	19,375	NR	D&A	Flared gas. See Black (1982, p. 317) for discussion of well.
29	25-18N-26E San Miguel	Sun Texas Co. No. 1 Upton	4/82	2,171	Precambrian	SO	Flowed 51 MCFGPD from Santa Rosa (Triassic) through perforations from 330-492 ft. Flowed 49 MCFGPD from Santa Rosa through perforations from 633-739 ft.
30	6-31N-34E Union	Mickey Blackwell No. 2 Farr	6/82	1,050	Glorieta (Permian)	D&A	Reported hydrocarbon show at 810 ft.
31	4-24S-8W Luna	Seville-Trident Corp. No. 1 McSherry	8/82	12,495	Precambrian	SO	Gas show reported in Ordovician through perforations from 9,875-9,904 ft. Gas show reported in Precambrian through perforations from 11,804-11,907 ft.

celette and Chittum (1981) recently discussed exploration for Entrada oil fields.

The lone significant wildcat discovery drilled in the San Juan Basin in 1982 was the Lewis Energy No. 1 Lewis 4–20–2, located in northern Sandoval County (fig. 1, no. 26; table 1, no. 26). The Lewis well was completed in the Mancos Shale (Cretaceous) for an initial production of 120 BOPD and 180 BWPD over an open-hole interval of 806 ft.

Northeast New Mexico

Two extremely important wildcats were drilled in the Tucumcari Basin in 1982. The Trans-Pecos Resources No. 1 Latigo Ranch Blk 'A' (fig. 1, no. 25; table 1, no. 25) found potentially commercial quantities of hydrocarbon gas. Although final reports indicate a gas flow of only 275 MCFGPD through perforations from 6,658 to 6,764 ft, the well reportedly flowed as much as 3,000 MCFGPD during difficult completion operations. The Trans-Pecos well is an extremely important discovery because it suggests that large amounts of gas, and possibly oil, may be present in the nonproductive Tucumcari Basin. The Trans-Pecos Resources No. 2 Latigo Ranch (fig. 1, no. 38; table 3, no. 38) was spudded late in 1982, and is scheduled to drill to 7,250 ft to test the Pennsylvanian System. Also in Guadalupe County, a gas discovery was reported in the Abo Formation (Permian) by the O. H. Berry No. 1 Tucumcari FNB (fig. 1, no. 24; table 1, no. 24). Although the small initial potential of 88 MCFGPD and 120 BWPD makes the economic viability of the Berry well extremely doubtful, it does indicate that the Abo tight gas play may extend as far north as central Guadalupe County, although probably not as a single continuous field. In the southeastern part of the Tucumcari Basin in Quay County, the Desana Corporation No. 1 Wichita (fig. 1, no. 39; table 3, no. 39) was spud in late 1982, and will drill to 7,350 ft to test the Pennsylvanian System.

In extreme northeast Guadalupe County, Corona Oil Company drilled several wells in T. 11 N., R. 25 E. and T. 11 N., R. 26 E. as part of an enhanced-oil-recovery pilot project. When complete, the pilot project will use a streamflood technique to produce heavy oil from the Chinle Formation (Triassic).

On the Bravo dome of Union, Harding, and Quay Counties, development drilling for carbon dioxide in the Tubb sandstone (Permian) continues. Only about 10 wells were drilled in search of carbon dioxide in 1982, down sharply from 140 wells drilled in 1981. Roberts and others (1976) discussed the stratigraphy of the Bravo dome; Foster and Jensen (1972) and Foster (1980, p. 33–34) discussed Tubb production. Completion of a pipeline to transport the carbon dioxide to the Permian Basin is scheduled for the near future. The pipeline will enable operators to produce and sell carbon dioxide from the currently shut-in Bravo dome wells. The carbon dioxide will be used in enhanced-oil-recovery operations in the Permian Basin.

In the Albuquerque Basin, Shell Oil Company plugged its eighth well in 1982. The Shell No. 1–24 West Mesa Federal (fig. 1, no. 28; table 2, no. 28) flared gas and was reported to have intermittently flowed large quantities of gas during drilling. The gas probably came from either Cretaceous or Tertiary rocks and confirms the shows reported by previously drilled Shell wells in the Albuquerque Basin. Shell continued its leasing program after abandoning the West Mesa well. Black (1982) discussed the petroleum potential of Cretaceous rocks in the Albuquerque Basin.

Elsewhere in northeast New Mexico, Solv-Ex Corporation announced plans to build a plant that will extract oil from the Santa Rosa tar sands (Triassic) in central Guadalupe County. Solv-Ex received approval of $20 million in loan guarantees from the federally funded Synthetic Fuels Corporation to help build the plant. The geology of the Santa Rosa tar sands has been discussed by Gorman and Robeck (1946) and Budding (1979, 1980).

Although no significant wells were completed in the Raton Basin in 1982, petroleum potential is present. Wells drilled in past years have encountered encouraging hydrocarbon shows (Speer, 1976; Broadhead, 1982a).

Several wells were drilled to follow up on the 1981 recovery of oil in the Hagan Basin by the Pelto Oil No. 1 Ortiz (Broadhead, 1982a) but without success. The John Gianardi No. 1 CKZ (fig. 1, no. 37; table 3, no. 37) was spudded in late 1982, and is scheduled to drill to 7,000 ft.

Southwest New Mexico

Six wells were drilled for oil and gas in southwest New Mexico in 1982. In Otero County on the west flank of the Pedernal uplift, the Marathon Oil Company No. 1 Mesa Verde Ranch was abandoned after reaching a total depth of 7,011 ft in Precambrian rocks. King and Harder (1982) and Black (1975) investigated the petroleum potential of Otero County. In Luna County, the Seville–Trident Corp. No. 1 McSherry (fig. 1, no. 31; table 2, no. 31) was abandoned at a total depth of 12,495 ft after reportedly encountering small gas shows in Cambro–Ordovician and Precambrian rocks. Also in Luna County, the Seville–Trident No. 1 City of Deming (fig. 1, no. 32; table 3, no. 32) suspended operations after reaching a total depth of 4,225 ft; rocks at total depth were reported as Ordovician but were probably Tertiary valley fill or volcanics (Sam Thompson III, personal communication, 1982). The May Energy No. 1 May Energy (fig. 1, no. 33; table 3, no. 33) had drilled below 5,000 ft at the end of 1982. In Sierra County, Getty Oil Company spudded two wells in the Rio Grande rift late in 1982. The Getty No. 1 Airport Ark Res '7' (fig. 1, no. 34; table 3, no. 34) drilled to a total depth of 9,600 ft without reporting any shows. The Getty No. 1 T25 Ark Res '3' (fig. 1, no. 35; table 3, no. 35) drilled to a total

TABLE 3—SIGNIFICANT WILDCATS DRILLING OR NOT COMPLETED AT END OF 1982 IN NEW MEXICO; **T.D.**, total depth.

Number on fig. 1	Location (section-township-range, county)	Operator, well number, and lease	Comments
32	6-24S-8W Luna	Seville-Trident Corp. No. 1 City of Deming	T.D. 4,255 ft. Plugged back to 3,651 ft. Suspended operations.
33	27-22S-7W Luna	May Energy Co. No. 1 May Energy	Drilling below 5,000 ft at end of 1982.
34	7-12S-4W Sierra	Getty Oil Co. No. 1 Airport Ark Res. '7'	Reached T.D. at 9,600 ft, "tight." Located in Rio Grande rift.
35	3-13S-4W Sierra	Getty Oil Co. No. 1 T25 Ark Res '3'	Reached T.D. at 10,200 ft, "tight." Located in Rio Grande rift.
36	27-5N-7W Cibola	Cities Service Co. No. 1 Santa Fe 'A'	Drilling below 5,000 ft at end of 1982. Located in Acoma Basin.
37	22-15N-8E Santa Fe	John Gianardi No. 1 CKZ	Scheduled to drill to 7,000 ft. Located in Hagan Basin.
38	6-9N-24E Guadalupe	Trans-Pecos Resources Inc. No. 2 Latigo Ranch	Scheduled to drill to 7,250 ft to test the Pennsylvanian System. Located in Tucumari Basin.
39	36-5N-30E Quay	Desana Corp. No. 1 Wichita	Scheduled to drill to 7,350 ft to test the Pennsylvanian System. Located in Tucumari Basin.

depth of 10,200 ft also without reporting any shows. In the Acoma Basin of southernmost Cibola County, the Cities Service No. 1 Santa Fe 'A' (fig. 1, no. 36; table 3, no. 36) was drilling below 5,000 ft at the end of 1982 and was scheduled to drill to 5,170 ft to test the upper Paleozoic section. Wengerd (1959) and Foster (1964) discussed the petroleum potential of areas adjacent to the Cities Service well. Although no production currently is taking place in southwest New Mexico, potential is present (Foster and Grant, 1974; Greenwood and others, 1977; Thompson, 1981; Thompson and Jacka, 1981); several wells drilled in past years encountered promising shows of both oil and gas (Thompson and Bieberman, 1975; Thompson and others, 1978; Thompson, 1982).

Effect of discoveries on oil and gas production

New Mexico's oil and gas production and reserves have been declining in recent years, but the state continues to be a major producer of both crude oil and natural gas. In 1981, New Mexico was the seventh largest producer of crude oil and the fourth largest producer of natural gas in the United States (New Mexico Energy and Minerals Department, 1982, p. 13). Production of crude oil in New Mexico in 1981 was 66.90 million bbls, a 4.4% decline from 69.90 million bbls produced in 1980. Total gas production was 1.12 trillion ft^3, down 1.2% from 1.13 trillion ft^3 in 1980. In addition, 5.26 million bbls of gas condensate were produced in 1981, down 2.2% from 5.38 million bbls produced in 1980 (New Mexico Energy and Minerals Department, 1982, p. 19). Data obtained from the New Mexico Oil Conservation Division indicate that the decline in oil production decreased to about 2% in 1982, but that gas production declined by at least 10% in 1982. The gas-production decline was caused mostly by a decreased demand for gas and not by a decreased capability to produce gas. Steeply declining production from the Empire–Abo oil field in southeast New Mexico is the largest reason for the decline in the state's oil production; production in the Empire–Abo field dropped from 9 million bbls in 1980 to 5.2 million bbls in 1981 (New Mexico Energy and Minerals Department, 1982, p. 18). Oil production from all other fields in the state increased by 739 thousand bbls in 1981. In 1981, the Permian Basin of southeast New Mexico produced 93% of the state's oil and 50% of the state's gas; the San Juan Basin of northwest New Mexico produced 7% of the state's oil and 50% of the state's gas (New Mexico Energy and Minerals Department, 1982, p. 19). As of January 1981, New Mexico had reserves of 929 million bbls of oil and 17.3 trillion ft^3 of gas (New Mexico Energy and Minerals Department, 1982, p. 17–18), a slight increase over the January 1980 reserves of 904 million bbls of oil and 13.4 trillion ft^3 of gas (Arnold and others, 1981, p. 19).

Production from the new fields discovered by the wells listed in table 1 will help slow the production decline of oil and gas in two ways. First, the new fields will be developed and the oil and gas obtained from them will replace waning production from older fields. Second, the discovery of the new fields will encourage the drilling of more wildcats, leading to the subsequent discovery of more fields.

The present decline of oil production in New Mexico will be lessened or stopped not only by the new oil found by the wildcat discoveries but also by the extensive development drilling and by enhanced-recovery programs in the Permian Basin. Also the Bone Spring oil discoveries in Lea and Eddy Counties indicate that a large amount of oil is yet to be found in the Bone Spring Limestone. The Devonian, Pennsylvanian, and Permian Systems all yielded significant oil discoveries in 1982.

The future of gas production in New Mexico is promising, provided that a market is created for the gas. The Morrow Series in the Delaware Basin was a major producer of natural gas in the 1960's and 1970's; wildcat discoveries and extensive development drilling in 1982 indicate that the Morrow will contribute significantly to gas production in coming years. The 'tight' Abo gas sands of Chaves County and Cretaceous sandstones in the San Juan Basin will also contribute significantly to future gas production.

For the more distant future, good promise to replace depleted reserves of the Permian and San Juan Basins exists in the not-yet-productive frontier areas: the Tucumcari, Albuquerque, Hagan, and Raton Basins of northeast New Mexico and the Pedregosa Basin, Acoma Basin, and adjacent parts of southwest New Mexico. All of these basins have the potential to be hydrocarbon producers. Peak development of any of these basins that proves to be productive may not occur for several decades.

ACKNOWLEDGMENTS—Prentiss Childs of the New Mexico Oil Conservation Division provided the well-completion statistics. Robert A. Bieberman, Frank E. Kottlowski, and Sam Thompson III reviewed the manuscript.

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Gallery of Geology

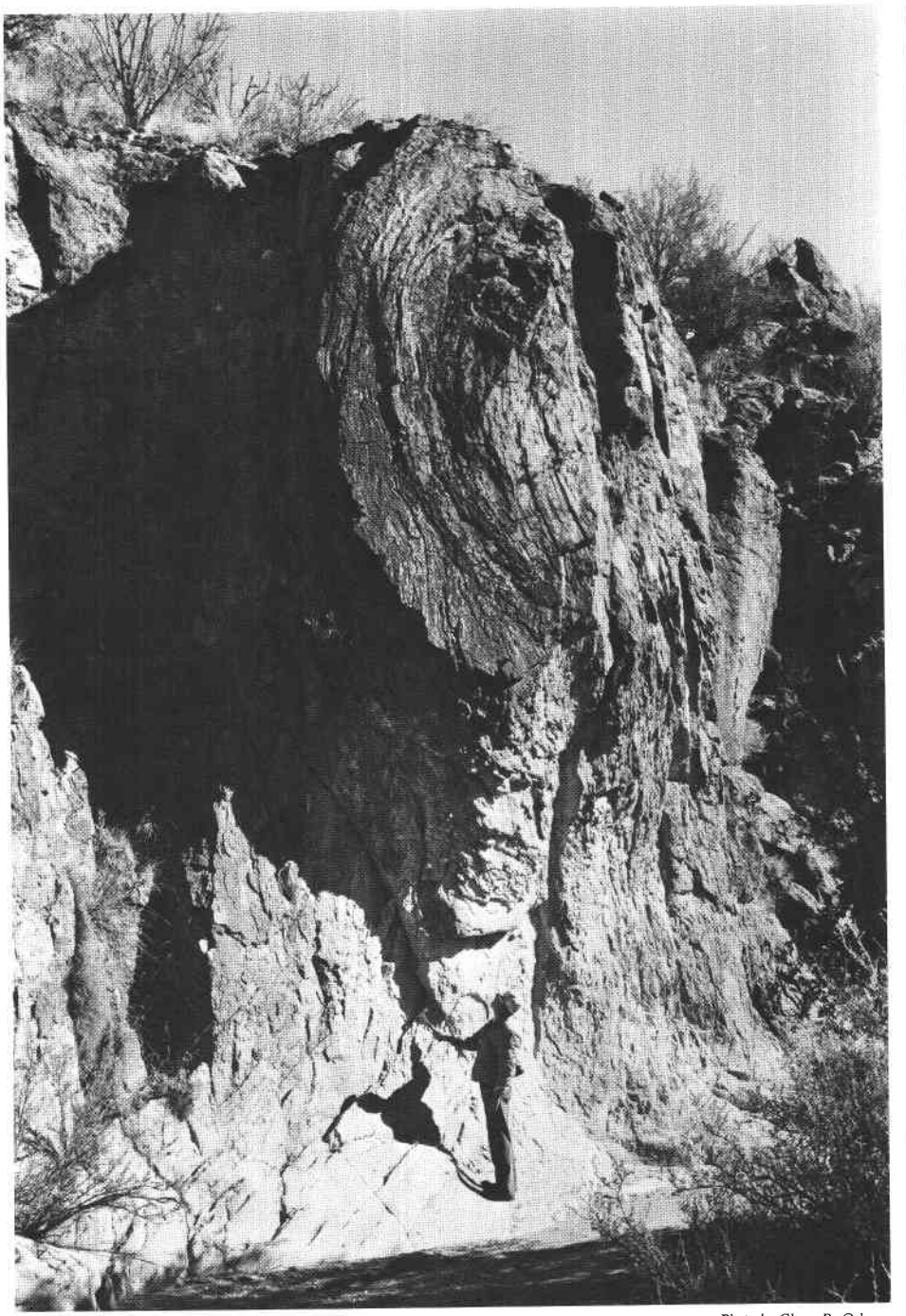

Photo by Glenn R. Osburn

Folding in the Vicks Peak Tuff in East Red Canyon, San Mateo Mountains, New Mexico (NE¼, SW¼, T. 7 S., R. 5 W.). Note the steep foliation along the base of the cliff and the prominent fold nose on the flat joint surface at the top. Chuck Chapin for scale is about 6 ft tall.

Rocks in the eastern San Mateo Mountains are all undeformed Oligocene volcanics that generally have been tilted approximately 10 degrees to the east or southeast. The foliation within the Vicks Peak Tuff is defined by flattened and locally elongated pumice fragments. In most cases, pumice foliation is formed by flattening of pumice fragments during welding of an ash-flow tuff and, consequently, it is flat lying or fairly gently dipping. Steep pumice foliation and folding require another explanation. Abrupt thickness changes in the Vicks Peak Tuff within this area suggest that it was deposited on a surface with considerable pre-existing relief. Therefore, these folds probably formed by slumping of the hot tuff from paleovalley walls during or after welding.

The geology of the area around East Red Canyon has been recently described by Glenn Atwood (1982, M.S. thesis, University of New Mexico) and by E. G. Deal (1974, Ph.D. dissertation, University of New Mexico).

—Glenn R. Osburn