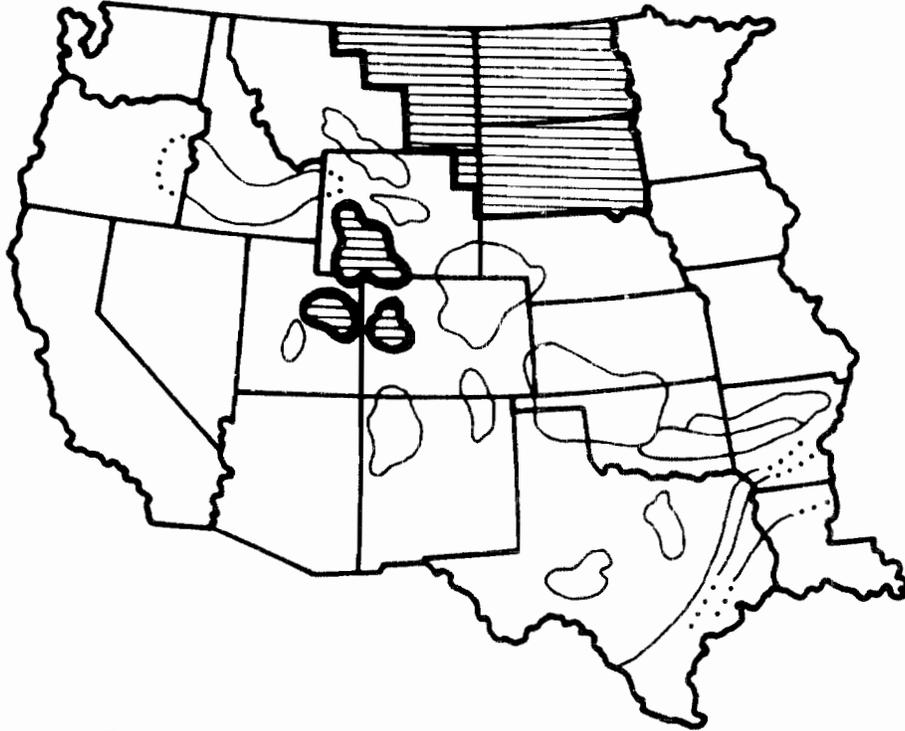

Western Gas Sands Project Quarterly Basin Activities Report



January 1-March 31, 1980

Prepared for
U.S. Department of Energy
Bartlesville Energy Technology Center
Las Vegas Field Office
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Las Vegas, Nevada
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Abbreviations and Acronyms

Completed Wells

WF	unsuccessful new field wildcat
WFD	new field discovery
WD	unsuccessful deeper pool wildcat
WDD	deeper pool discovery
WS	unsuccessful shallower pool wildcat
WSD	shallow pool discovery
WP	unsuccessful new pool wildcat
WPD	new pool discovery
WO	unsuccessful wildcat outpost
WOE	wildcat outpost extension
D	unsuccessful development well
DG	development gas well

Drilling/Staked Wells

WF	new field wildcat
WD	deeper pool wildcat
WS	shallower pool wildcat
WP	new pool wildcat
WO	wildcat outpost
D	development
BHC	Borehole Compensated Log
Cp	Drilling completed
DIL	Dual Induction Laterlog
D&A	Dry and Abandoned
FDC	Formation Density Log
Fr	First Report
GR	Gamma Ray
PB	Plugged back
SDR	Shut down for repairs
SDW	Shut down for weather
SI	Shut in
Spud	Commencement of drilling
Sp	Spud In
SP	Spontaneous Potential
SN	Sidewall Neutron
Swb(d)(g)	Swabbed, swabbing
TD	Total Depth
Tstg	Testing
WOCT	Waiting on completion tools
WOO	Waiting on orders

Introduction

This quarterly basin activities report is a summation of drilling and testing activities in the four primary study areas of the WGSP for the months of January, February and March, 1980. Figure 1-1 shows the location of study areas in the WGSP.

The monitoring of basin activities is a part of resource assessment and promotes cooperation between industry and government. This is especially evident in the core program. Certain areas in each study area have been recommended by the USGS for obtaining core. Operators active in these specific areas are located by monitoring new activity in each area and contacted by CER Corporation to negotiate contracts for joint industry/government coring operations.

The summary of information on each study area is divided into two sections. The core program section identifies industry activity within the preferred core areas and relates the status of WGSP core acquisition developments. The second section details drilling and testing operations of interest and tabulates production figures from horizons of interest. Newly staked and active wells, and completed wells are listed and located on a map with red and blue numbers, respectively.

The drilling information used in this report was compiled primarily from *The Rocky Mountain Region Report*, published daily by Petroleum Information Corporation. Additional sources used were the *Montana Oil and Gas Journal*, *The Oil and Gas Journal* and the *Western Oil Reporter*.

Background and geologic information about the WGSP can be obtained from the Quarterly

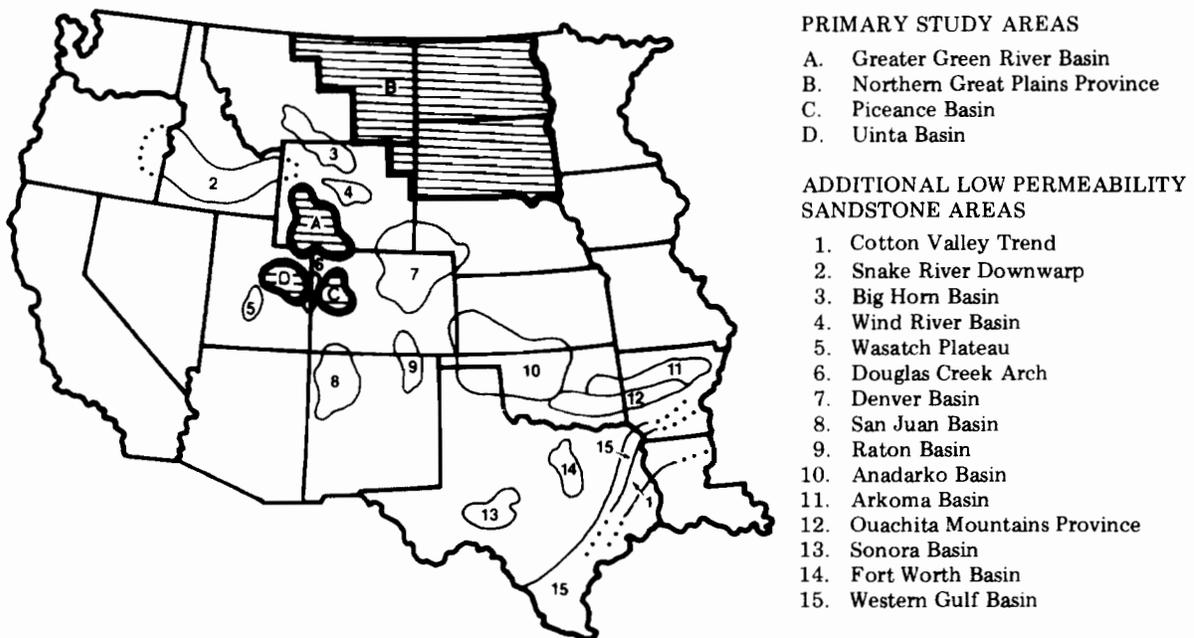


Figure 1-1 Map of Western United States, Showing Areas of Interest

Basin Activities Reports, dated January 1, 1978 (NVO/0655-03), April 1, 1978 (NVO/0655-05), and July 21, 1978 (NVO/0655-06). Included in these reports are stratigraphic correlation charts, cross sections and a brief account of the geology of each area and information relating to the USGS recommended coring locations. For information on the core

program, refer to the *WGSP Core Program, January 12, 1978*. These reports may be obtained from the Technical Information Center (TIC), Post Office Box 62, Oak Ridge, Tennessee, 37830, except the Core Program document, which is available from CER Corporation, 4220 South Maryland Parkway, Suite 801, Las Vegas, Nevada, 89109.

Northern Great Plains Province

CORE PROGRAM

Specific areas within Montana were selected by the USGS for the initiation of the WGSP core program. These areas include:

- Powder River County – T5S, R52E to T53E.
- Custer and Prairie Counties – T10N to T11N, R48E to R49E.
- Valley County – T29N to T30N, R35E to R37E.
- Phillips County – T29N to T30N, R26E to R27E.

The four areas (refer to Figure 2-2 for location) were chosen for the following reason:

- They are removed from productive fields and little data is available in the areas.
- There are two or more potential reservoir intervals and adjacent source beds in the areas.
- The combination of these areas will test several different reservoir types, including sections with fine-grained carbonates, such as chalk, and fractured reservoirs found along lineament zones.

The objectives are Cretaceous horizons ranging from the Judith River Formation

through the older Mowry Formation. Figure 2-1 is a correlation chart of Cretaceous rocks in the Northern Great Plains Province. Drilling depths to reach these objectives are shallower in the Province (2,000 to 4,000 ft) than in the basins of Wyoming, Colorado and Utah. Therefore, costs for recovering core and obtaining complete log data should be less than in basins where the objectives are deeper.

There was little activity in the designated core areas during the quarter. Trio Petroleum had one wildcat well near Core Area D (Phillips County) that was completed D&A. Montana-Dakota Utilities had five development completions near Core Area C in Valley County. Table 2-1 contains the wells near the core areas, and Figure 2-2 shows the locations of these wells.

DRILLING ACTIVITIES

Near the crest of the Cedar Creek Anticline, Sugar Creek Resources completed one of their 3 Eagle tests in Fallon County, Montana, as a shut-in gas well. This well was fractured with 80,000 lbs of sand. Denmark Resources also plans more Eagle tests in this area. Gulf Oil is currently evaluating their Eagle test in Garfield County, Montana. Staman Exploration and Production abandoned their Judith River test in Roosevelt County, Montana.

While the above represents some of the new activity for the shallow Cretaceous gas sands, more activity has been centered around the Shannon sandstone (lower Eagle) in southeast Montana and South Dakota. Canada Northwest Land Ltd. drilled 2 dry Shannon tests in Rosebud County, Montana, and Jerry McCutchin was evaluating Shannon tests in Carter County, Montana. CIG Exploration drilled a Niobrara test in Carter County, but

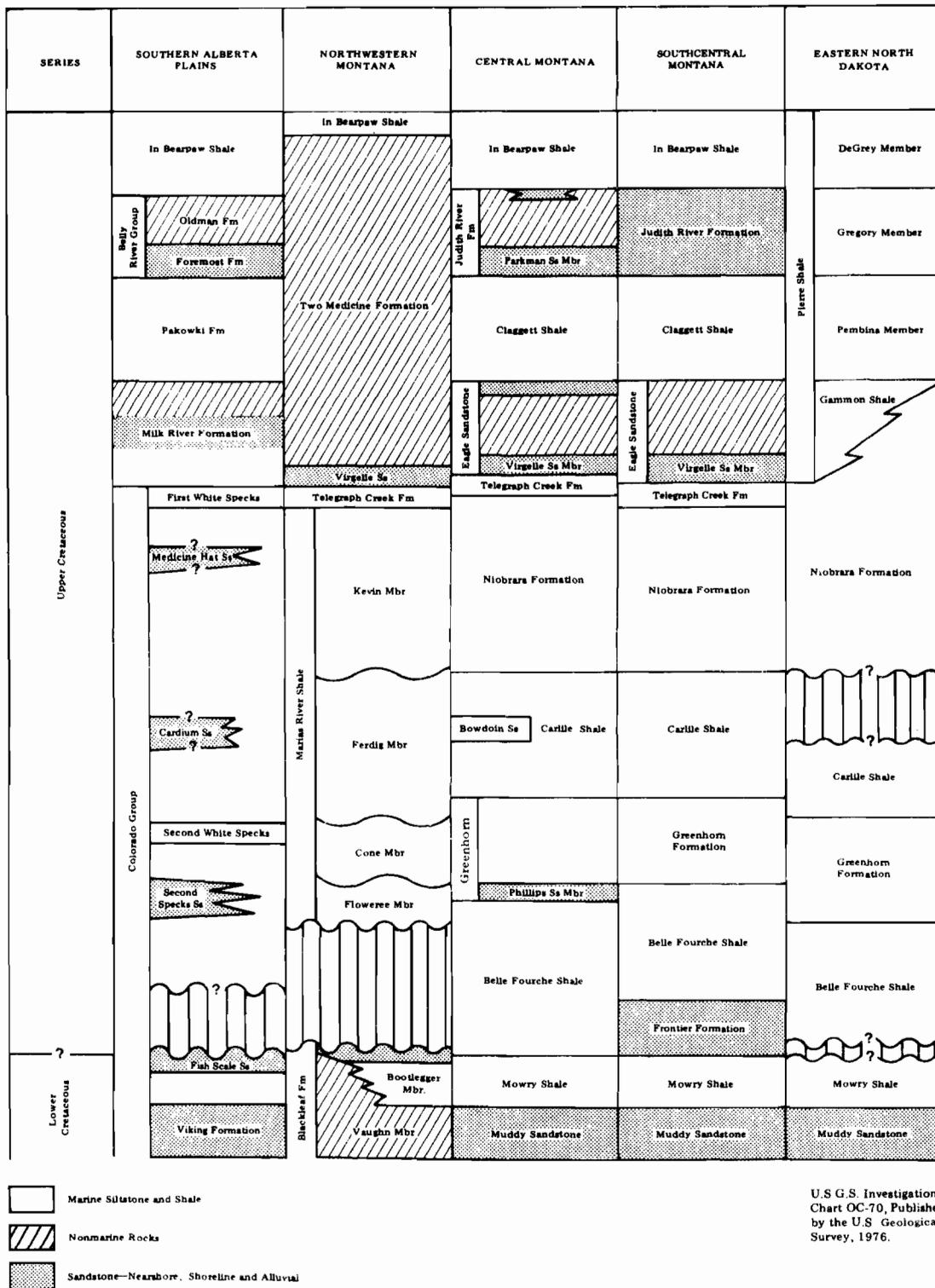


Figure 2-1 Correlation Chart of Cretaceous Rocks of the Northern Great Plains Province

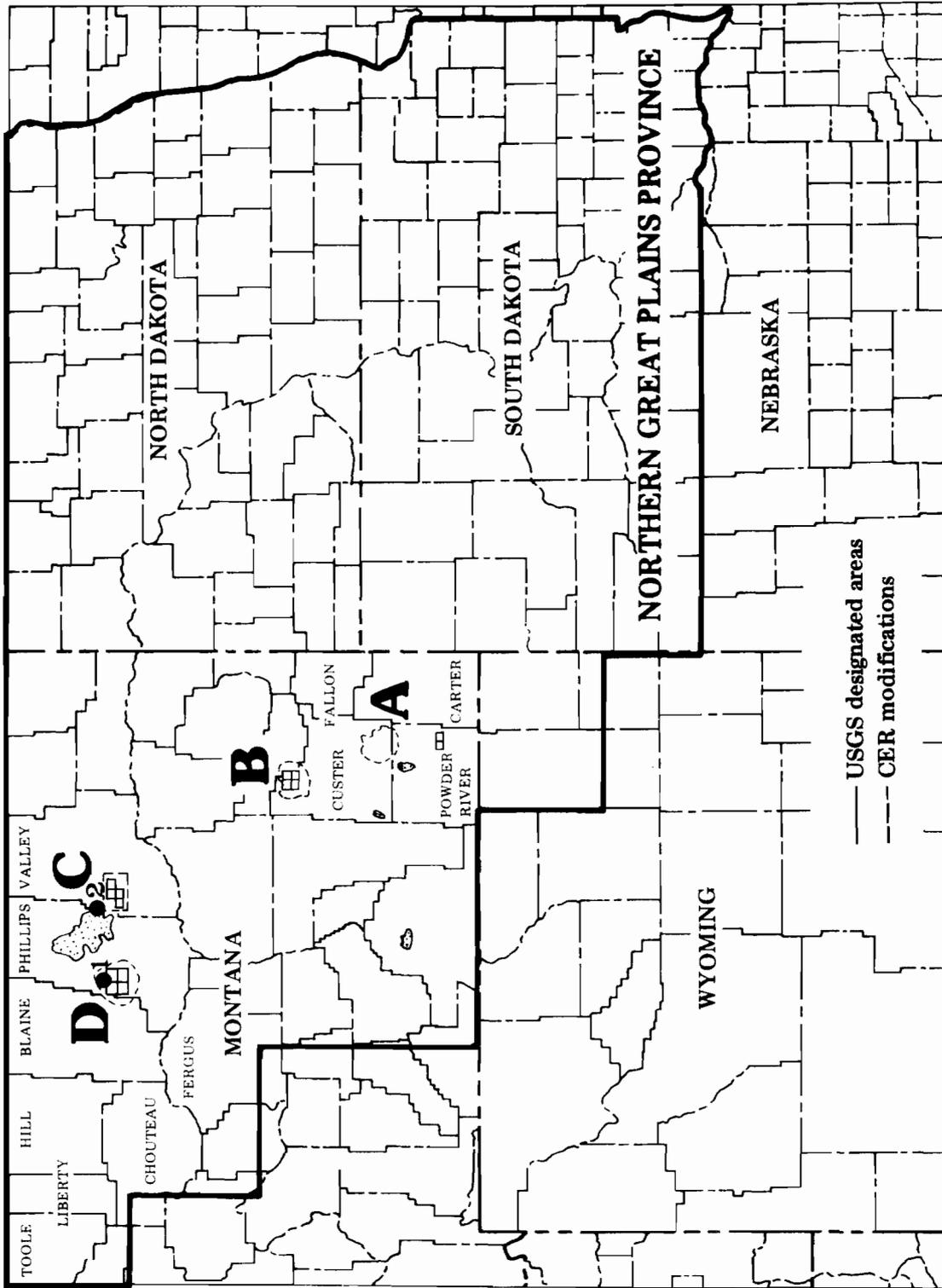


Figure 2-2 USGS Designated Core Areas and Wells of Interest, Northern Great Plains Province (refer to Table 2-1)

Table 2-1 Core Wells -- Northern Great Plains Province

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	PROJECTED HORIZON (Depth in ft)	COMMENTS
SP: 8-20-79 CP: 6-15-79	Trio Petroleum	1 Nylander	1	nwne 1/31N/27E Wildcat Field Phillips Cnty, MT	Phillips 2,300	WF, comp. D&A. Located near Core Area D.
SP: 7-10-79 CP: 11-14-79	Montana- Dakota Utilities	966 Smith	2	nenw 13/31N/34E Bowdoin Field Valley Cnty, MT	Bowdoin 1,400	DG; prod. zone Bowdoin 771-842 (gross); TD 1,200, PB: 900. Located near Core Area C. Operator had 4 additional completions at same time near core area.

no information had been released by quarter's end.

Brownlie, Wallace and Bander were testing a Shannon well in Custer County, Montana, and Trio Petroleum discovered a new Eagle field just west of the Bowdoin Dome in Blaine County, Montana. There still remains significant activity in the Bowdoin Dome area for the Bowdoin and Phillips objectives. Midlands and Falcon-Colorado Exploration are two of the most active operators in that area.

McCutchin and Davis Oil are extending the South Dakota Shannon play by moving further southeast into Butte County. Sodagar drilled several Niobrara wells that were completed D&A in Stanley County, South Dakota.

Table 2-2 is a summary of the WGSP drilling activities in the NGPP. These figures are updated to include information obtained during the quarter.

There were 31 newly-staked locations in the first quarter: 17 development and 14 wildcat wells. A summary of active wells and newly-

staked locations is in Table 2-3 and Figure 2-3 shows the locations of these wells.

Most of the wells in the province have natural production. However, if fractured, treatment is usually 8,000 - 15,000 gal fluid and 20,000 - 40,000 lb sand. The largest fracture treatment reported during the quarter was performed on Capitol Energy Corporation No. 11-6 Federal well, Sec. 11, T36N, R34E, Phillips County, Montana. The well, which was acidized with 250 gal and fractured with 13,500 gal fluid and 30,000 lb sand, was completed D&A.

During the first quarter, 81 wells were reported as completions: 46 development wells were producers and 11 were D&A; 6 wildcat wells were discoveries and 18 were D&A. (Six development and two wildcat locations were abandoned.) Reported initial potential of new gas was 28,455 MCFD with the Bow Island Formation as the largest contributor. Other contributing horizons included the Eagle, Bowdoin, Niobrara, Mowry, Dakota, Greenhorn, Frontier, Phillips, Shannon and Blackleaf. Table 2-4 is a summary of completed wells, and Figure 2-3 shows their locations.

	NO. OF WELLS				PRODUCING HORIZONS IN MCFD													Total	
	D&A	Discovery	D&A	Develop-ment	Total	Eagle			Green horn			Mowry	Bow Island/Muddy	Commingle					
						Shannon	Niobrara/1st White Spacs	Carlisle/Bowdoin	Undifferentiated	Phillips/2nd White Spacs	Frontier				Blackleaf				
*2nd Qtr 1977	15	6	13	38	72	40	0	310 ¹	471	0	4,265	0	0	227	3,013	0	3,804	22,747 ²	34,877
**3rd Qtr 1977	12	6	7	43	68	340	0	10,309	0	0	0	18	614	0	495	0	9,524	9,233 ³	30,533
**4th Qtr 1977	23	5	14	37	79	0	0	10,056 ¹	87	0	1,004	50	960	0	259	0	1,965	23,839 ⁴	37,260
**1st Qtr 1978	9	2	5	6	22	0	0	150	0	0 ¹	0	0	218	0	645	0	1,152	0	2,165
**2nd Qtr 1978	10	1	20	24	55	0	3,912	7,841	640	77	1,406	0	252	0	0	0	2,064	1,644 ⁵	17,836
**3rd Qtr 1978	32	12	30	58	132	0	0	16,713 ⁶	2,087	0	4,372	239	2,140	670	136	0	8,715 ⁶	4,850 ⁷	39,872
**4th Qtr 1978	33	4	30	83	150	189	0	10,772	0	0	4,100	0	8,230	0	0	0	7,008 ⁸	2,264	32,563
1st Qtr 1979	12	9	13	67	101	0	0	4,724 ¹⁰	0	0	3,741	0	0 ⁸	0	0	0	787	3,834 ¹¹	13,086
2nd Qtr 1979	13	6	8	49	76	0	0	3,528 ¹	2,307 ¹¹	296	3,678	0	4,290	0	267	0	5,621	1,446 ¹³	21,163
3rd Qtr 1979	16	4	22	33	75	0	0	8,674 ¹⁰	0	0	260	0	217	0	1,064	0	5,363 ¹	not ¹⁴ available	15,578
4th Qtr 1979	20	9	25	68	122	0	0	11,186 ¹⁰	2,275	34	1,082	0	6,715 ⁶	0	0	0	9,525 ⁶	2,213	33,030
1st Qtr 1980	18	6	11	46	81	0	0	7,292 ¹	0 ¹	3,034	2,890	2,030 ¹	88	520	295	1,000	8,691	1,040 ¹⁵	26,905

¹ IPF not available from one well
² Bowdoin/Greenhorn/Phillips 14,878
 Bowdoin/Greenhorn 6,015
 Colorado/Bow Island 436
 Dakota/Bow Island 113
 Sunburst/Bow Island 680
³ Bowdoin/Greenhorn/Phillips 1,989
 Bowdoin/Greenhorn 6,015
 Bow Island/Dakota 113
 Bow Island/Sunburst 1,116
⁴ Bowdoin/Greenhorn/Phillips 3,051
 Bowdoin/Greenhorn 3,740
 Bowdoin/Phillips 15,523
 Bow Island/Sawtooth 1,500
 Ferdig/Blackleaf/Bow Island 25
⁵ Bowdoin/Greenhorn 900
 Bow Island/Dakota 40
 Bow Island/Sunburst/Ellis 704
⁶ IPF not available from two wells
⁷ Bowdoin/Greenhorn/Phillips 676
 Bowdoin/Phillips 909
 Bow Island/Sunburst/Swift 1,881
 Bow Island/Sunburst/Swift/Kootenai 175
 Bow Island/Sunburst 110
 Bow Island/Swift 400
 Blackleaf/Spike 699
⁸ IPF not available from three wells
⁹ Bowdoin/Phillips 903
 Bowdoin/Greenhorn/Phillips 738
 Blackleaf/Bow Island N/A
 Greenhorn/Bowdoin 623
¹⁰ IPF not available from six wells
¹¹ Bowdoin/Phillips 960
 Bowdoin/Greenhorn 711
 Greenhorn/Phillips 2,078
 Eagle/Bowdoin 85
¹² IPF not available from five wells
¹³ Bowdoin/Greenhorn/Phillips 1,361
 Bowdoin/Eagle 85
¹⁴ Blackleaf/Bow Island
¹⁵ Niobrara/Bow Island 860
 Bow Island/Sunburst 105
 Phillips/Bow Island 75
 * Data compiled from P.I. Rocky Mountain Region Report "Completions"
 ** Revised figures

Table 2-2 Summary of Drilling Activities — Northern Great Plains Province

**Table 2-3 Active Wells and New Locations —
Northern Great Plains Province**

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	PROJECTED HORIZON (Depth in ft)	COMMENTS
FR: 12-5-79 SP: 12-6-79	Brownlie, Wallace, Armstrong & Bander	17-12 Miles	1	swnw 17/1N/54E Wildcat Field Custer Cnty, MT	Shannon 1,900	WF; TD 1,948, tstg. Operator has 1 additional wildcat test in locale.
FR: 5-15-79 SP: 7-4-79	CIG Exploration	1 BN	2	swne 19/3N/56E Wildcat Field Carter Cnty, MT	Niobrara 3,050	WF, TD 4,059, WOCT (tight hole). No cores or tests.
FR: 9-4-79 SP: 10-10-79	Marquis Petroleum	26-1 McCarter	3	nene 26/32N/2E Wildcat Field Toole Cnty, MT	Bow Island 1,200	WF, TD 715, WOCT. Operator has 2 additional wildcat wells in locale.
FR: 8-20-79 SP: 10-1-79	Webb Resources	25-13 State	4	sww 25/37N/4W Fitzpatrick Lake Field Toole Cnty, MT	Bow Island 1,860	D, TD 1,866; acidized, foam/sand fracture, swbg; SI.
FR: 6-4-79 SP: 8-26-79	Joseph J. C. Paine & Associates	2-14 BLM	5	cnw 4/129N/106W Little Missouri Field Bowman Cnty, ND	Eagle 1,500	D, TD 1,410, WOCT. Operator has 23 additional Eagle tests in this locale.
FR: 1-9-80	Kissiger Petroleum	1-28 Cowans	6	nene 28/29N/14E Unnamed Field Chouteau Cnty, MT	Eagle 1,600	WO.
FR: 3-19-80	Staman Exploration & Production	1-8 Werner	7	cnw 8/27N/50E Wildcat Field Roosevelt Cnty, MT	Judith River 1,065	WF.
FR: 2-20-80	Balcon Oil	1-32 Sprague	8	swne 32/30N/2W Wildcat Field Pondera Cnty, MT	Bow Island 1,400	WF. Operator had D&A completion in county this quarter.

Table 2-4 Completed Wells — Northern Great Plains Province

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	HORIZON (Projected Depth or Producing Interval)	FINAL TD	FRACTURE TREATMENT	COMMENTS	IPF in MCFD
SP: 10-28-79 CP: 11-15-79	Orlyn Terry	28-13 Federal (changed from 28-1 Federal)	1	sww 28/7S/59E Wildcat Field Carter Cnty, MT	Muddy 1,700	1,600		WF, comp. D&A; holding for data.	
SP: 8-11-79 CP: 8-13-79	Balcon Oil	1-10 Van Dyke	2	sesw 10/29N/2W Ledger Field Pondera Cnty, MT	Bow Island 785-809 (open hole)	809		WOE, no cores or tests.	800
SP: 10-10-79 CP: 10-27-79	Century Oil & Gas (changed from Stroock et al)	23-30 Dignin (changed from Lisco & Strook)	3	nesw 30/30N/3W Wildcat Field Pondera Cnty, MT	4th Bow Island 1,735-1,810 (open hole)	1,810		WFD, new field. No cores or tests.	630
SP: 11-2-78 CP: 11-1-79	Sam G. Harrison	21-1 Truman	4	nenw 21/15N/3E Cady Creek Field Harding Cnty, SD	Shannon	1,100		WOE, comp. as SIGW, OWWO: OTD 7,337; comp. 12-25-74 D&A.	N/A
SP: 11-15-79 CP: 11-21-79	Gulf Oil	1-13 Federal	5	nene 13/20N/41E Wildcat Field Garfield Cnty, MT	Eagle 2,250	2,050		WF, D&A, no cores or tests.	
SP: 1-24-80 CP: 1-28-80	Petrolero Corporation	1-5 Crow Tribal	6	nwnw 5/5N/35E Wildcat Field Treasure Cnty, MT	Shannon 2,270	2,242		WF, D&A, no cores or tests.	
SP: 1-9-76 CP: 7-28-79	Petroleum Incorporated	2 Miles	7	sese 29/35N/7E Unnamed Field Liberty Cnty, MT	Niobrara 2,022-2,026 Bow Island 2,137-2,176	3,345		DG, drill stem tested, no cores. Commingled production.	860
SP: 12-26-79 CP: 1-2-80	P&M Management	34-19 Fee (Walter B. Bales et al)	8	swse 19/8S/46E Wildcat Field Powder River Cnty, MT	Parkman 4,700	4,461		WF, D&A; drill stem tested; no cores.	

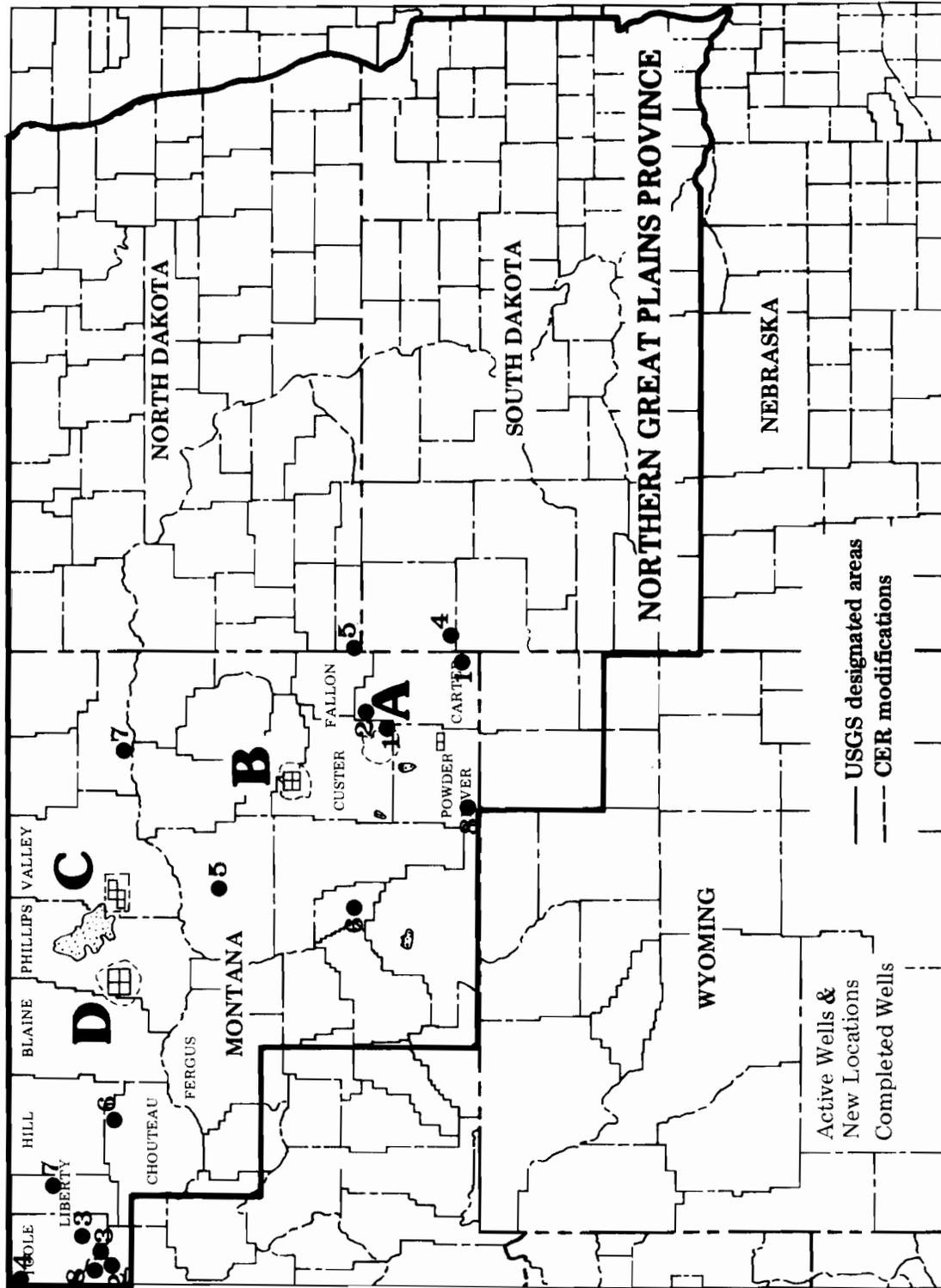


Figure 2-3 Wells Staked and Completed, USGS Designated Core Areas, Northern Great Plains Province (refer to Tables 2-3 and 2-4)

Greater Green River Basin

CORE PROGRAM

To assist in assessing the resource potential within the Greater Green River Basin, the USGS recommended core acquisition in the following areas (see Figure 3-1):

Area A

The crest of the Wamsutter Arch in Sweetwater and Carbon Counties, the Northern edge bordering on the Red Desert Basin and the southern edge occupying part of the Washakie Basin, T17N to T21N, and R91W to R97W. The section below the commercial Almond and Ericson (Mesaverde) is of primary interest in this area;

Area B

The area east of the Big Piney/LaBarge Field in Sweetwater and Sublette Counties, running north and south through the Pinedale area, and to the northern edge of the Green River Basin. These areas skirt the edge of the Wind River Range. Production here is primarily Frontier, with some contribution from the Mesaverde and Fort Union.

Area B has been divided into four subdivisions which are:

B₁ West of R104W to R109W and north from T22N to T28N;

B₂ R106W to R111W and from T27N to T31N;

B₃ R108W to R112W but not including development drilling, and T30N to T35N; and

B₄ North edge of Green River Basin into the Hoback Basin, R112W to R114W and T36N to T39N.

The core sites contain thick sections of tight, but generally untested gas sands, in Upper Cretaceous and Tertiary formations.

During the quarter, one DOE coring job was completed in the Greater Green River Basin. Coring began December 29 on Rainbow Resources, Inc. No. 1-3 Federal well, Sec. 3, T26N, R103W, Sweetwater County, Wyoming. The first two cores were cut from the Ericson Formation, and the rest were cut from the Rock Springs Formation. Approximately 340 ft of core were cut, with 91 percent recovery. H. E. Newman, R. E. Hill, S. R. Anderson and W. J. Brown (CER Corporation) were the assisting personnel on site. Table 3-1 has detailed core information. Samples were sent to Bartlesville Energy Technology Center, Lawrence Livermore Laboratory and Core Laboratories.

Logging operations commenced January 19, with G. C. Kukal and W. J. Brown (CER Corporation) assisting. Logging was completed January 20. Table 3-2 is a list of logs run on the well.

Table 3-3 is a summary of wells located in (or near) the USGS designated core areas and Figure 3-1 shows their locations.

Table 3-1 Core Description of Rainbow Resources No. 1-3 Federal Well, Greater Green River Basin

Core No.	Interval Cored	Ft Recovered	Percent Recovered	Feet	General Lithologic Descriptions
1	12,398-12,455	57	100	56.9	Sandstone: lt. grey; fine-med. grain; dark, silty shale laminations; non-calcareous; low porosity; massive bedding; some coal inclusions
				.1	Shale: silty; dk. grey
2	12,455-12,497	42	100	39.1	Sandstone: lt. grey; salt & pepper; fine-med. grain; occasional silty shale inclusions; some coal inclusions
				2.9	Shale: silty; dk. grey; micaceous
3	12,630-12,688	38.5	66	38.1	Sandstone: lt. grey; salt & pepper, fine-med. grain; scattered carbonaceous shale lamination; some coal inclusions
				.4	Siltstone: shaly; dk. grey; carbonaceous
4	12,688-12,737	49	100	38.4	Sandstone: lt. grey; fine-med. grain, silty shale laminations; some crossbedding; low porosity; some coal inclusions
				8.8	Siltstone: shaly; dk. grey; local coal inclusions; carbonaceous; very fine grain sand
				1.8	Shale: silty; dk. grey; carbonaceous
5	12,737-12,769	29	91	22.1	Shale: dk. grey; some silty; carbonaceous; some coal inclusions
				3.4	Sandstone: lt. grey; fine grain, non-calcareous; some silty shale laminations
				2.5	Siltstone: dk. grey; shaly w/some fine grained sand
6	12,769-12,777.5	8.5	100	6.5	Shale: dk. grey; some very silty; carbonaceous; some w/very fine grained sandstone; some non-laminated.
				1.5	Sandstone: lt. grey; very fine - fine grain; scattered silty shale inclusions; non-calcareous
7	13,410-13,459	46	94	23.4	Sandstone: lt. grey; very fine grain, salt & pepper; calcareous; scattered shaly & siltstone inclusions; alternating lt. & dk. grey bedding
				12.5	Shale: lt. - dk. grey; silty; calcareous; contorted bedding; some lt. grey, fine grain sandstone
				10.1	Siltstone: dk. grey; shaly; calcareous; some fine grain sandstone laminations
8	13,459-13,463	4	50	2	Shale: dk. grey; carbonaceous; silty; coal inclusions
9	13,463-13,503	38	95	25.8	Shale: dk. grey; non-calcareous; carbonaceous; some silty sandstone laminations; some coal inclusions; silty
				11.4	Sandstone: lt. grey; very fine grain; silty; slightly to non-calcareous; low porosity; some carbonaceous shale laminations
				.8	Siltstone: dk. grey; shaly w/thin sandstone laminations

**Table 3-2 Logs Run on Rainbow Resources
No. 1-3 Federal Well, Greater Green River Basin**

Service	Remarks
Dual Laterolog/Simultaneous Micro-SFL/Caliper/Gamma Ray	Logged 13,700 - 11,390 ft. (Logged pad closed 13,662 - 12,440 ft.) Repeated sections 12,720 - 12,380 ft and 12,890 - 12,756 ft. Mud Log 12,400 - 12,170 ft.
Dual Induction Log - SFL/SP/GR	Logged 13,692 - 11,389 ft; repeat section 12,692 - 12,270 ft.
Simultaneous BHC Sonic-Caliper	Logged 13,665 - 11,389 ft; repeat section 12,745 - 12,270 ft.
Variable Density Log	Logged 13,664 - 11,389 ft; repeat section 12,856 - 12,337 ft.
Dipmeter	Logged 13,694 - 11,392 ft; repeat section 13,686 - 13,340 ft.
Formation Density - Caliper/ Simultaneous Compensated Neutron/GR	Logged 13,693 - 11,392 ft; repeat sections 12,800 - 12,340 ft and 13,508 - 13,394 ft.
Natural Gamma Spectroscopy	Logged 13,641 - 11,390 ft; repeat section 13,573 - 12,364 ft.

Table 3-3 Core Wells – Greater Green River Basin

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	PROJECTED HORIZON (Depth in ft)	COMMENTS
FR: 3-5-80	Pacific Transmission Supply	3-2A Federal	1	csw 2/20N/91W Wildcat Field Sweetwater Cnty, WY	Mesaverde 12,000	WF, located in Core Area A.
FR: 3-5-80	Universal Resources	1 Universal State	2	nesw 16/19N/93W Echo Springs Field Carbon Cnty, WY	Mesaverde 10,000	D, located in Core Area A.
FR: 2-4-80	Cotton Petroleum	7 Shallow Creek Unit	3	nwse 32/16N/94W Unnamed Field Sublette Cnty, WY	Mesaverde 12,000	WO, located in Core Area A.
FR: 2-12-80	Northwest Exploration	1 New Fork- Federal	4	nwse 7/30N/110W Wildcat Field Sublette Cnty, WY	Mesaverde 14,250	WF, located in Core Area B2.
FR: 2-1-80	LR Company	1-34 McCaw- Federal	5	swse 34/21N/95W Wamsutter Field Sweetwater Cnty, WY	Mesaverde 9,600	D, located in Core Area A.
FR: 4-18-79 SP: 10-22-79	Rainbow Resources	1-3 Pacific Creek Federal	6	n $\frac{1}{2}$ n $\frac{1}{2}$ 3/26N/103W Wildcat Field Sweetwater Cnty, WY	Frontier 21,000	WF, TD 15,000, WOCT. Cored this quarter for WGSP (see text).

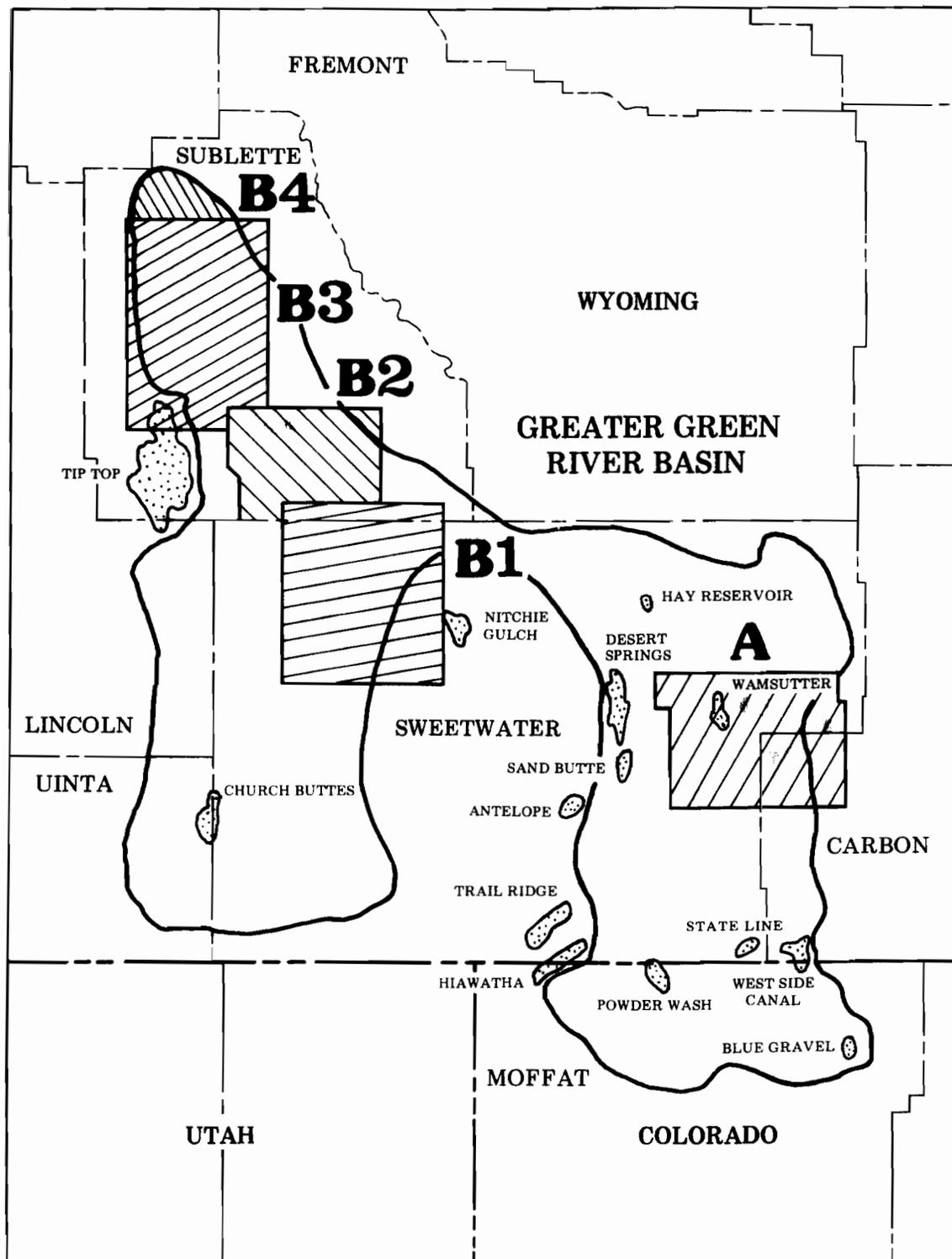


Figure 3-1 USGS Designated Core Areas and Wells of Interest, Greater Green River Basin (refer to Table 3-3)

NO. OF WELLS	PRODUCING HORIZONS IN MCFD													Total					
	D&A	Discovery	D&A	Producing	Total	Wasatch	Fort Union (Army)	Lance	Fox Hills	Lewis	Transition Zone	Undifferentiated	Mesaverde				Bear River	Combinged	
													Almond		Ericson	Blair			Frontier
**2nd Qtr 1977	18	23	6	20	67	0	6,168	0	14,703	0	8,573	9,180	580	0	14,219	0	2,566 ¹	0	55,979
**3rd Qtr 1977	14	8	5	24	51	0	25,231	0	7,361	0	9,413	8,477	0	0	12,180	0	0	0	37,687
**4th Qtr 1977	24	5	8	23	60	0	0	0	7,405	0	20,282	8,372	3,982	1,298	13,861	0	0	0	55,190
**1st Qtr 1978	8	9	5	22	44	0	725	0	11,100	2,191	4,292	2,999	0	0	7,455	0	14,650 ²	0	43,412
**2nd Qtr 1978	9	7	7	31	54	0	532	53	16,061 ³	1,697	8,532	14,044	0	0	18,703	0	12,306 ⁴	0	71,928
**3rd Qtr 1978	15	8	4	31	58	0	628	0	16,110	0	12,122	4,327	1,389 ³	0	16,167	0	1,064 ²	0	51,807
**4th Qtr 1978	12	12	13	23	60	0	1,297	0	3,987	0	7,501	7,825	1,723	0	25,841	0	1,288 ⁵	0	49,462
1st Qtr 1979	10	12	6	30	58	0	994	0	9,378 ⁶	0	6,269 ⁷	2,029	1,320	0	21,234 ⁸	0	849 ⁹	0	42,522
2nd Qtr 1979	5	9	6	28	48	0	0	0	13,445 ³	0	12,012 ⁸	5,630	0	0	14,871	0	0	0	45,958
3rd Qtr 1979	8	4	5	33	50	0	0	0	10,745	0	10,874	10,040	1,643	0	14,182	5,896	0	0	53,380
4th Qtr 1979	13	10	7	48	78	156	2,168	0	7,486	0	16,207	25,227	870	0	22,339	0	1,619 ¹⁰	0	76,072
1st Qtr 1980	14	19	8	37	78	0	0	0	675	5,723	7,686	21,357	0	0	23,275	0	7,250 ¹¹	0	65,966

¹ Almond/Ericson/Table Rock/Rock Springs
Lewis/Almond 2,194
362

² Frontier/Bear River

³ IPF not available from one well

⁴ Frontier/Bear River 11,457
Frontier/Hillard 28
Mesaverde/Ericson 821

⁵ Ft. Union/Lance 499
Lewis/Lance 789

⁶ IPF not available from two wells

⁷ IPF not available from three wells

⁸ IPF not available from four wells

⁹ Mesaverde/Ericson 821
Lewis/Hillard 28

¹⁰ Lewis/Ericson 193
Frontier/Muddy 800
Frontier/Bear River 626

¹¹ Frontier/Muddy 2,350
Almond/Ericson 4,900

* Data compiled from P. I. Rocky Mountain Region Report "Completions"

** Revised figures

Table 3-4 Summary of Drilling Activities — Greater Green River Basin

Table 3-5 Active Wells and New Locations – Greater Green River Basin

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	PROJECTED HORIZON (Depth in ft)	COMMENTS
FR: 5-29-79 SP: 8-11-79	Amoco Production	1 USA-Amoco-U	1	swne 18/17N/95W Wildcat Field Sweetwater Cnty, WY	Mesaverde 12,700	WF, TD 12,352; acidized, prep to frac.
FR: 5-11-79 SP: 7-3-79	Marathon Oil	15 Unit	2	nesw 32/20N/112W Wilson Ranch Field Lincoln Cnty, WY	Frontier 11,350	D, TD 11,490. Operator has 1 additional Frontier test in locale.
FR: 5-18-79 SP: 2-5-80	Amoco Production	1 Champlin-444 Amoco-D	3	csw 5/16N/93W Wildcat Field Carbon Cnty, WY	Mesaverde 9,170	WF, TD 9,733, WOCT.
FR: 5-3-79	Wexpro Company	32-1 Pando-Federal	4	nwnw 12/18N/112W Bruuff Field Uinta Cnty, WY	Frontier 12,250	D. Operator has no additional tests in county within basin.
FR: 8-11-78	Pacific Transmission Supply	23-1 Federal	5	nesw 1/25N/112W Fontenelle Field Lincoln Cnty, WY	Frontier 8,770	D. Operator has 4 additional Frontier tests in field.
FR: 10-27-78 SP: 7-30-79	Energetics Inc.	10-5 Federal	6	cnw 5/27N/111W Wildcat Field Sublette Cnty, WY	Bear River 10,800	WF, TD 11,391, WOCT (tight hole). Operator has 4 additional Bear River tests in locale.
FR: 1-21-80	Davis Oil	2 Sooner Reservoir Unit	7	senw 34/24N/92W Wildcat Field Sweetwater Cnty, WY	Mesaverde 15,000	WF. Operator has 1 additional Mesaverde wildcat test in locale.
FR: 3-24-80	Coquina Oil	1 State	8	nenw 27/12N/92W Wildcat Field Moffat Cnty, CO	Lewis 5,200	WF. Operator has no additional tests in county.

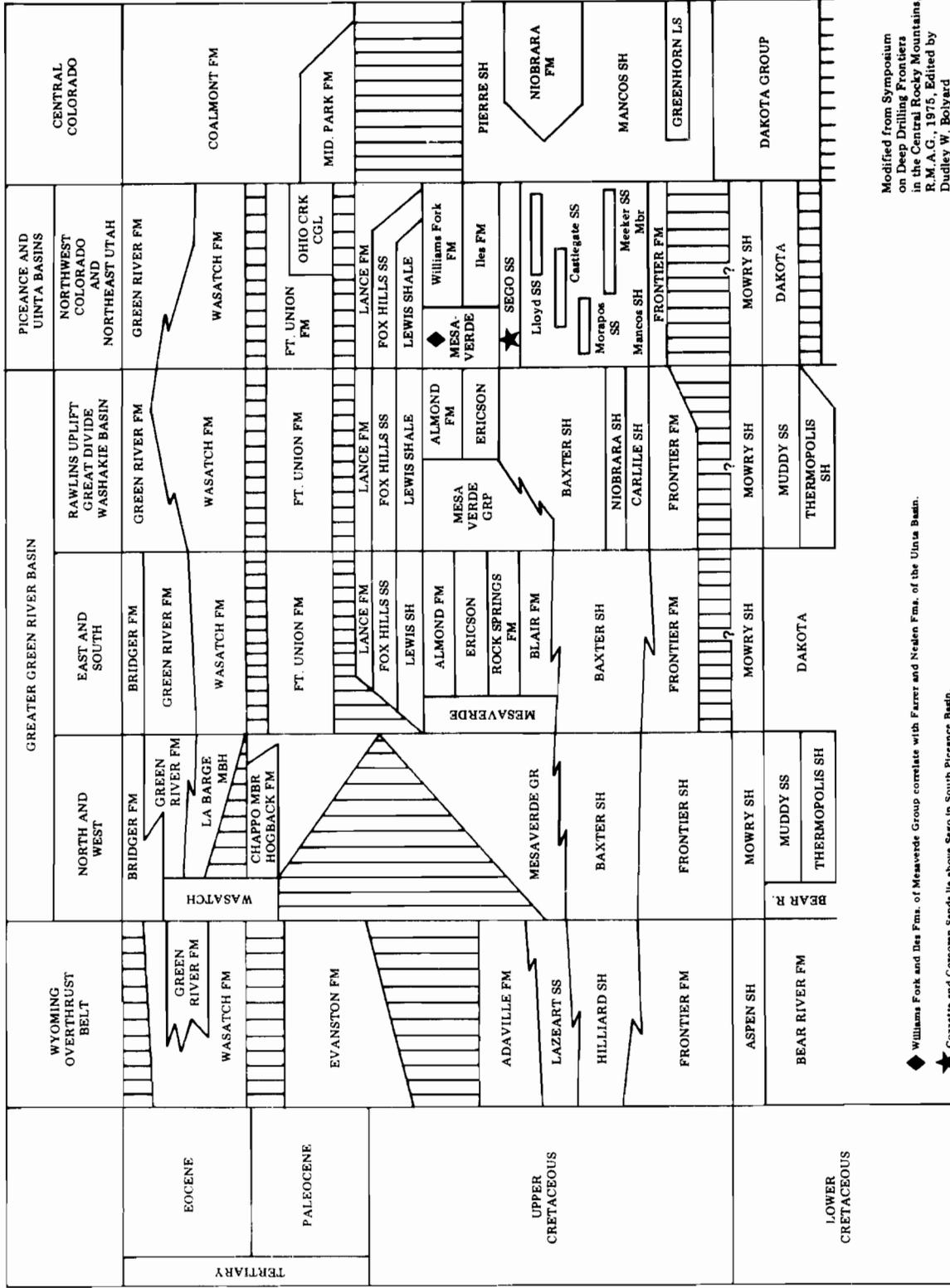
DRILLING ACTIVITIES

The Washakie and Red Desert Sub-Basins continue to be the most active areas in the Greater Green River Basin. Operators tend to have a higher success ratio drilling for the Lewis, Almond, Ericson and Rock Springs horizons where, with the exception of the Ericson, they represent marginal marine and marine deposits. Figure 3-2 is a stratigraphic correlation chart, showing the formations of the Greater Green River, Piceance and Uinta Basins. Recently operators have begun to drill in the deeper part of the Washakie for horizons of comparable ages with established production along the Cherokee and Wamsutter Arches. Davis Oil, Amoco, Pacific Transmission Supply and Getty Oil are active in the Red Desert Sub-Basin. CIG Exploration, Koch, and Davis Oil are active in the

Washakie Basin. The Tertiary is also a major objective in the Washakie Basin.

The Lewis continues to be the major objective in the Sand Wash Basin, Colorado. The Green River Basin proper has a limited amount of exploration activity directed at Tertiary or Upper Cretaceous gas sands. These sections are predominantly fluvial sands in a non-marine depositional environment. Although there is a thick stratigraphic section of potential tight gas sands, drilling depths to penetrate it are generally greater. Superior is currently planning a Frontier test in the northern part of the basin which may provide information on the Mesaverde section.

By the quarter's end, 95 new locations had been staked: 67 development and 28 wildcat. Seventy-eight wells were reported complete



Modified from Symposium on Deep Drilling Frontiers in the Central Rocky Mountains, R.M.A.G., 1975, Edited by Dudley W. Bolyard

Figure 3-2 Stratigraphic Correlation Chart of Greater Green River, Piceance and Uinta Basins

◆ Williams Fork and Des Fms. of Mesaverde Group correlate with Farrer and Nealen Fms. of the Uinta Basin.

★ Cozzette and Concannon Sands lie above Segó in South Piceance Basin.

Table 3-6 Completed Wells – Greater Green River Basin

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	HORIZON (Projected Depth or Producing Interval)	FINAL TD	FRACTURE TREATMENT	COMMENTS	IPF in MCFD
SP: 3-13-79 CP: 12-5-79	Amoco Production	1 Champlin 226 Amoco-G	1	csw 33/18N/93W Unnamed Field Carbon Cnty, WY	Almond 8,918-9,094 (gross) Ericson 9,124-9,204	9,307	202,230 gal gel, 366,300 lb sand	WOE, no cores or tests, commingled production	4,900
SP: 9-3-79 CP: 12-18-79	Pacific Transmission Supply	3-10 Federal	2	sesw 10/19N/93W Echo Springs Field Carbon Cnty, WY	Mesaverde 9,257-9,288	9,730 PB: 9,601		DG, located in Core Area A.	300
SP: 10-17-79 CP: 2-1-80	Universal Resources	1-30 Lawler Federal	3	nwnw 30/19N/112W Bruff Field Lincoln Cnty, WY	Frontier 11,350-11,384	12,000		DG, holding for data.	611
SP: 10-25-79 CP: 11-28-79	Rainbow Resources	1-10 Federal	4	nese 10/23N/114W Wildcat Field Lincoln Cnty, WY	Hilliard 6,500	6,506		WF, D&A.	
SP: 10-22-79 CP: 12-9-79	Woods Petroleum	3 Lost Valley Unit	5	nesw 20/25N/99W Wildcat Field Sweetwater Cnty, WY	Mesaverde 13,000	13,738		WF, D&A.	
SP: 6-12-79 CP: 10-26-79	Belco Petroleum	68-30 Unit	6	nesw 30/27N/112W Green River Bend Field Sublette Cnty, WY	Frontier 6,923-7,097 (gross)	7,245 PB: 7,193	32,500 gal water, 116,000 lb sand	DG, no cores or tests.	1,743
SP: 11-10-79 CP: 1-18-80	Sinclair Oil	12 Blue Gap II Unit	7	nesw 17/15N/93W Wildcat Field Carbon Cnty, WY	Mesaverde 11,500	11,242		WF, temp abnd (holding for data).	
SP: 2-13-79 CP: 6-4-79	Davis Oil	1 Bright Trail Unit	8	swne 21/27N/108W Wildcat Field Sublette Cnty, WY	Mesaverde 12,000	18,000		WF, D&A.	
SP: 6-19-79 CP: 12-12-79	Tenneco Oil	1-10 Pilgrim	9	csw 10/10N/93W Unnamed Field Moffat Cnty, CO	Lewis 7,438-7,456	9,450 PB: 8,895	Acidized 3 times w/total 4,000 gal; fractured 3 times w/total 82,000 gal acid, 77,052 gal water, 24,000 gal gel, 260,500 lb sand.	WFD, drill stem tested; Lewis Discovery - New Field.	425

with a total initial production of 65,966 MCFD. Of these completions, 37 development wells were producers, 19 wildcat wells were discoveries, and 8 development and 14 wildcat wells were D&A. (One wildcat location was temporarily abandoned).

Contributing horizons included the Frontier, Almond, Mesaverde undifferentiated, Lewis, Almond/Ericson commingled, Frontier/Muddy commingled and Fox Hills. The producing horizons and a summary of drilling activities are listed in Table 3-4. (The figures

are updated to include information obtained during the quarter.) Tables 3-5 and 3-6 are summaries of active wells and new locations, and completed wells, respectively. Their locations are shown in Figure 3-3.

The largest fracture treatment this quarter was performed on Amoco Production's No. 1 Champlin 226 Amoco-E, Sec. 5, T19N, R92W, Carbon County, Wyoming. The well was acidized with 3,700 gal and fractured twice with a total 365,358 gal gel and 697,000 lb sand. The Almond completion produced 401 MCFD.

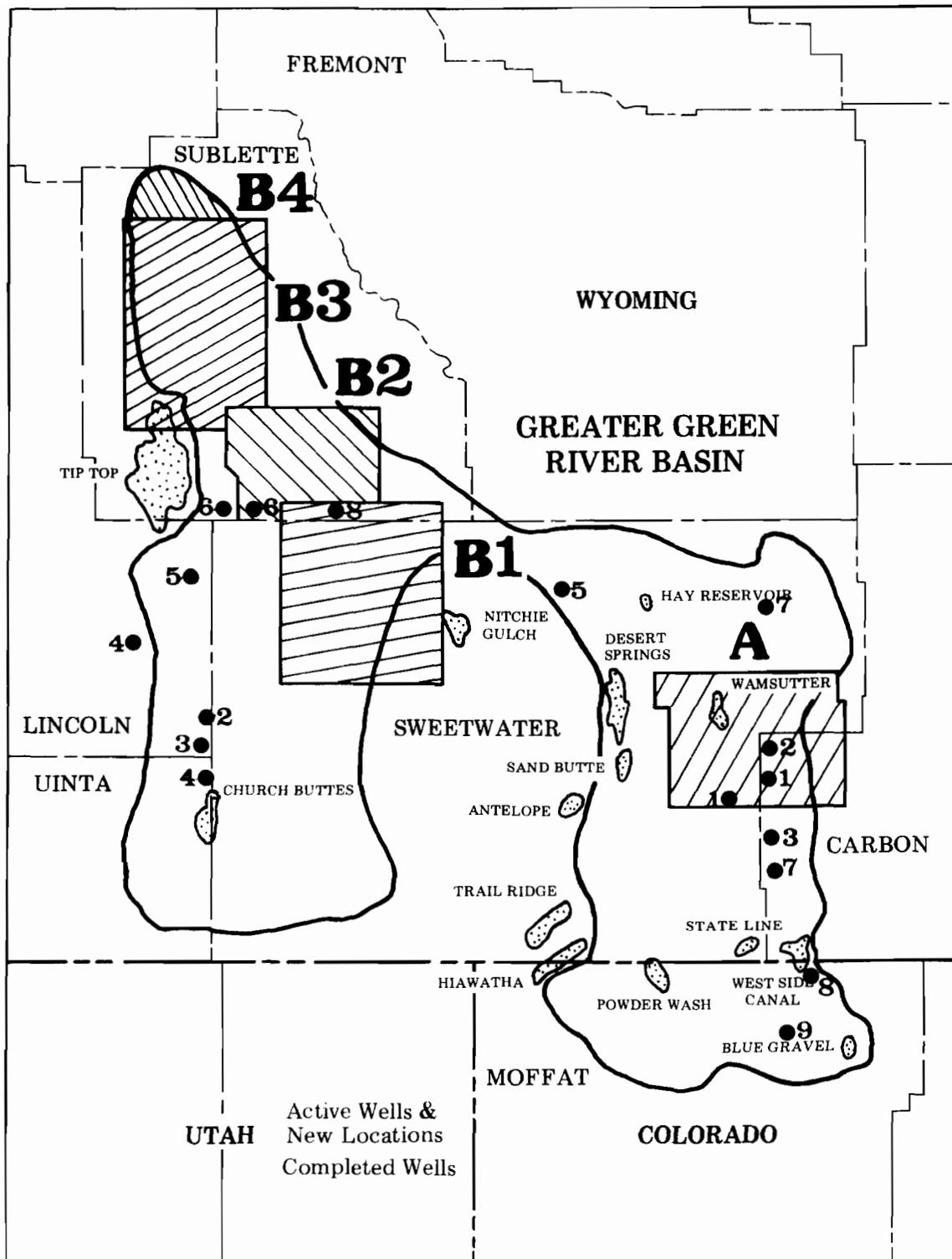


Figure 3-3 Wells Staked and Completed, USGS Designated Core Areas, Greater Green River Basin (refer to Tables 3-5 and 3-6)

Uinta Basin

CORE PROGRAM

The Uinta Basin is located in northeastern Utah and has potential production from "tight gas sands" in a thick section of Upper Cretaceous through Tertiary sediments. Cretaceous tight horizons include the Castle-gate and Segoe sandstones and the Blackhawk, Price River, Neslen and Farrer Formations. Tertiary tight gas sands are found in the Tuscher, North Horn, Wasatch and Green River Formations.

Areas recommended by the USGS for the acquisition of core for the WGSP core program are listed below. (See Figure 4-1).

Area A

Wasatch and Duchesne Counties – T4S to T7S, R5W to R11W; in Wasatch County, T9S to T11S, R7E to R9E; in Carbon County, T11S and T12S, R7E to R13E.

Area B

Duchesne and Uintah Counties – T3S to T4S, R2E to R2W and parts of T8S, R16N to R18W.

Area C

Uintah County – T8S to T9S and R23E to R25E.

Area D

Uintah and Grand Counties – T10S, R18E, T11S to T16S, R18E to R25E; and T17S to T19S, R21E and R22E.

These areas were selected due to the lack of core and well data, and location being outside the main productive fields of the Uinta Basin. Within the core areas, newly staked locations are monitored so that operators can be contacted concerning participation in the WGSP core program.

There was only minor activity in the core areas during the first quarter, 1980, most of which was centered in Core Area D – the southern part of Uintah County and the northern section of Garfield County. Table 4-1 is a sampling of tests located in the core area, and Figure 4-1 shows the locations of these tests. Several tests will penetrate horizons of interest to the WGSP.

DRILLING ACTIVITIES

The focal point of the Uinta Basin activity is the Natural Buttes area, T8S to T11S, R19E to R24E. Belco Development Corporation, Mapco Incorporated, Gas Producing Enterprises and Conoco were active during the quarter staking new locations, drilling and completing wells. Other operators active in the Natural Buttes and surrounding areas were Enserch, Pacific Transmission Supply, Gulf Oil and Cotton Petroleum.

The Wasatch Formation is the principal pay horizon in the Natural Buttes area but there are indications that interest is increasing in

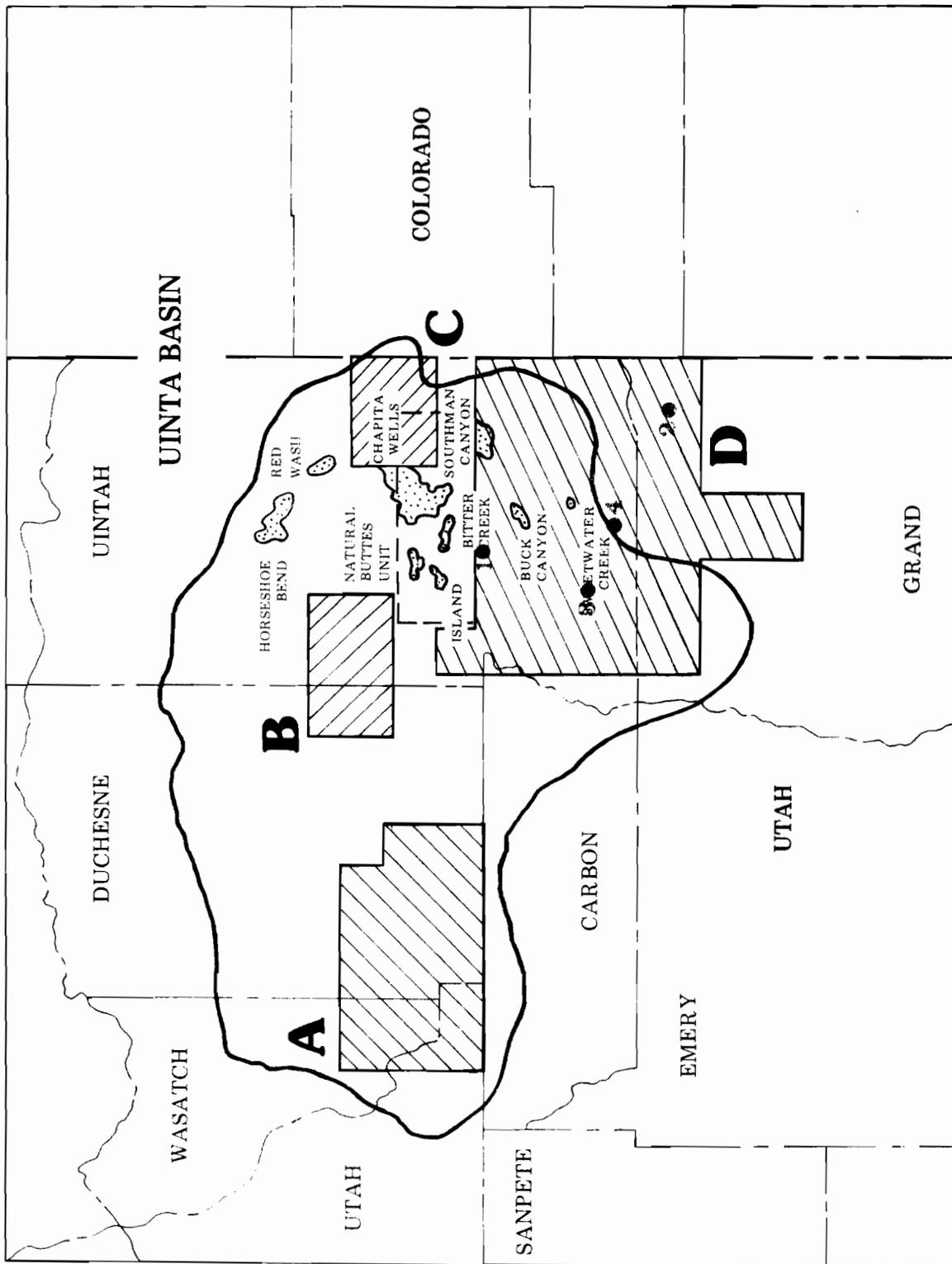


Figure 4-1 USGS Designated Core Areas and Wells of Interest, Uinta Basin (refer to Table 4-1)

Table 4-1 Core Wells – Uinta Basin

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	PROJECTED HORIZON (Depth in ft)	COMMENTS
FR: 3-6-80	Cotton Petroleum	1-2-11-21 Love Unit	1	w½sw 2/11S/21E Natural Buttes Field Uintah Cnty, UT	Mesaverde 8,000	D, located in Core Area D.
FR: 2-8-80	Tenneco Oil	36-16 State	2	sese 36/16S/24E Bryson Canyon Field Grand Cnty, UT	Morrison 6,500	D, located in Core Area D. Operator has 4 additional tests in core area.
FR: 10-29-79	Uton Energy	1 Uton	2	nwse 5/16S/24E Wildcat Field Grand Cnty, UT	Morrison 8,100	WF, located in Core Area D.
FR: 12-28-79	Del Rio Drilling	30-1A Federal	3	swne 30/14S/20E Flat Rock Field Uintah Cnty, UT	Wasatch 4,400	WO, located in Core Area D.
FR: 9-24-79	Coseka Resources	3-11-15-21 Wolf Unit - Federal	4	sesw 11/15S/21E Wildcat Field Uintah Cnty, UT	Morrison 10,425	WF, located in Core Area D.

the Mesaverde horizon. Gas production from the two horizons was commingled in several wells during the quarter, especially Mapco wells. Fracture treatments are standard completion procedures, with the size of the treatments during the quarter varying from 50,000 to 500,000 lbs of sand.

The largest fracture treatment reported during the quarter was performed on Cotton Petroleum No. 1 Love Unit, Sec. 11, T11S, R21E, Uintah County. The discovery well yielded 1,122 MCFD from the Mesaverde Group (undifferentiated) after being fractured twice with a total 267,000 gal fluid and 609,725 lb sand.

In other areas of the Uinta Basin, operators continued to be active in the oil-productive regions around Red Wash and Altamont fields where the Tertiary, Green River and Wasatch Formations are the primary pays. Pacific Transmission Supply completed a discovery well in Duchesne County, with the North Horn as the producing zone.

In the southern portion of the basin, there has been an increase in drilling for gas in the Cisco Dome area. However, objectives lie below horizons of interest to the WGSP, with drilling depths to these objectives shallow (1,000 to 5,000 ft), because the Upper Cretaceous-Tertiary section has been partially or totally removed.

Elsewhere in the Uinta Basin, there was little activity of note. The high level of activity in and around the Natural Buttes Unit is expected to continue.

Table 4-2 is a summary of drilling activities in the basin, updated to include information obtained during the quarter. Revision will continue in future quarters.

By quarter's end, 24 new locations had been staked: 17 development and 7 wildcat tests. Twenty wells were reported complete during the quarter: 16 development wells were producers, 2 wildcat were discoveries, and 1 of each was D&A. (One wildcat well was temporarily abandoned.)

	NO. OF WELLS				PRODUCING HORIZONS IN MCFD							Total		
	Wildcats		Develop-ment		Green River	Wasatch	North Horn	Mesaverde	Undifferentiated	Manco			Total	
	D&A	Discovery	D&A	Producing						Manco B/Emery	Commingled			
**2nd Qtr 1977	3	0	0	6	9	435	4,794	0	0	0	0	0	0	5,229
**3rd Qtr 1977	3	2	2	14	21	0	23,138	0	1,079	0	0	0	0	24,217
**4th Qtr 1977	1	1	0	8	10	0	13,264	0	0	314	0	0	0	13,578
**1st Qtr 1978	0	0	0	12	12	0	13,985 ¹	0	697	0	0	750 ²	0	15,432
**2nd Qtr 1978	1	2	0	16	19	963 ¹	14,837	0	1,612	0	288	7,750 ²	0	25,450
**3rd Qtr 1978	1	1	0	16	18	1,786	10,663 ¹	0	3,367	0	0	0	0	15,816
**4th Qtr 1978	1	3	2	24 ⁶	30	1,660	9,973	0	840	0	205	3,210	0	15,888
1st Qtr 1979	3	4	1	40	48	3,431 ¹	35,011 ⁴	0	662 ¹	0	204	3,550	0	42,858
2nd Qtr 1979	0	8	2	17	27	0	31,033 ¹	0	500 ¹	0	0	0 ¹	0	31,533
3rd Qtr 1979	3	1	0	12	16	0	22,571 ¹	0	0	0	0	0	0	22,571
4th Qtr 1979	9	0	0	15	24	50	2,692 ¹	0	6,250	0	0	3,209 ²	0	12,201
1st Qtr 1980	1	2	1	16	20	1,839	3,703	435	3,688	0	0	4,408 ²	0	14,073

1 IPF not available from one well
2 Wasatch/Mesaverde
3 Mesaverde/Castlegate 410
Wasatch/Mesaverde 2,800
4 IPF not available for four wells
5 Mesaverde/Wasatch 3,500
6 No IPF and no formation available for nine wells
* Data compiled from P.I. Rocky Mountain Region Report "Completions"
** Revised figures

Table 4-2 Summary of Drilling Activities — Uinta Basin

Potential new gas totalled 14,073 MCFD, with the Wasatch horizon contributing the most new gas (see Table 4-2). Other contributing horizons were the Mesaverde undifferentiated, Green River, North Horn

and Wasatch/Mesaverde commingled. Tables 4-3 and 4-4 are summaries of active wells and new locations, and completed wells, respectively. Figure 4-2 shows the locations of these wells.

Table 4-3 Active Wells and New Locations – Uinta Basin

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	PROJECTED HORIZON (Depth in ft)	COMMENTS
FR: 11-1-78	Enserch Exploration	1-6 PTS - Federal	1	senw 6/10S/24E Natural Buttes Field Uintah Cnty, UT	Mesaverde D. 9,000	
FR: 9-4-79 SP: 10-9-79	Pacific Transmission Supply	24-22 Federal	2	sesw 22/8S/22E Chapita Wells Field Uintah Cnty, UT	Mesaverde 8,400	WO, TD 8,400, PB: 855; perf, tstg. Operator has 1 additional Mesaverde test in immediate locale.
FR: 7-24-78 SP: 11-28-79	Amoco Production	1 Cottonwood Canyon USA	3	swnw 7/9S/6E Wildcat Field Utah Cnty, UT	13,000 ft Cretaceous test	WF, drilling 8,671 (tight hole).
FR: 9-24-79 SP: 11-20-79	Mapco Production	7-25A Federal	4	swne 25/9S/18E Wildcat Field Uintah Cnty, UT	Wasatch 9,300	WF, TD 9,570, WOCT
FR: 4-26-78 SP: 7-22-79	Mapco Production	7-25B Federal (name changed from RBU)	4	swne 25/9S/18E Natural Buttes Field Uintah Cnty, UT	Mesaverde 8,730	D, TD 9,232; gel/sand fracture, tstg.
FR: 4-26-78 SP: 9-17-79	Mapco Incorporated	5-11D RBU	5	swnw 11/10S/18E Uteland Butte Field Uintah Cnty, UT	Mesaverde 8,455	D, TD 9,100; fractured; F 783 MCFD; SI.
FR: 11-1-78 SP: 12-15-79	Enserch Exploration	1-3 Bitter Creek-Federal	6	swne 3/11S/22E Natural Buttes Field Uintah Cnty, UT	Mesaverde 7,500	D, TD 8,310, tstg.
FR: 1-9-80	Parute Oil & Mining	15-24 Pomco	7	nenw 24/9S/17E Wildcat Field Uintah Cnty, UT	Green River 6,000	WF. Operator has 4 additional Green River tests in locale.

Table 4-4 Completed Wells – Uinta Basin

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	HORIZON (Projected Depth or Producing Interval)	FINAL TD	FRACTURE TREATMENT	COMMENTS	IPF in MCFD
FR: 11-21-79 CP: 1-28-80	Pacific Transmission Supply	21-19 Devils Playground Federal	1	nenw 19/9S/24E Natural Buttes Field Uintah Cnty, UT	Mesaverde 7,125	6,700		D, D&A; holding for data.	
SP: 8-24-79 CP: 11-8-79	Belco Petroleum	14-34 Stage Coach	2	nenw 34/8S/21E Stage Coach Field Uintah Cnty, UT	Wasatch 6,897-7,328	7,408 PB: 7,360	66,192 gal gel, 128,000 lb sand	DG, no cores or tests.	183
SP: 3-31-79 CP: 11-24-79	Pacific Transmission Supply	33-36 State	3	nwse 36/11S/14E Unnamed Field Duchesne Cnty, UT	North Horn 3,865-4,455 (gross)	6,383 PB: 6,280	Acidized 5 times w/total 10,350 gal; fractured w/95,000 gal water, 77,800 lb sand	WFD, new field. Drill stem tested, no cores.	
SP: 10-31-79 CP: 1-19-80	Cotton Petroleum	1 Love Unit	4	csw 11/11S/21E Unnamed Field Uintah Cnty, UT	Mesaverde 6,659-7,734 (gross)	8,069 PB: 7,592	Fractured twice w/total 267,700 gal water, 609,725 lb sand	WFD, new field; 1,122 no cores or tests. Largest fracture job reported during quarter.	
SP: 5-16-79 CP: 11-14-79	Mapco Incorporated	11 16F RBU	5	nesw 16/10S/20E Island Field Uintah Cnty, UT	Wasatch 5,363-6,024 Mesaverde 7,915-8,084 (gross)	8,350	Acidized twice w/total 5,100 gal; fractured twice w/total 149,590 gal emul, 282,200 lb sand	DG, no cores or tests. Commingled production.	367
SP: 6-8-79 CP: 8-16-79	Gulf Oil	3-29-2C Skitzzy Canyon Ute	6	sene 29/4S/6W Wildcat Field Duchesne Cnty, UT	Wasatch 8,000	6,300 PB: 6,254	Acidized 4 times w/total 12,200 gal	WF, temp. abnd; cored.	
SP: 7-10-79 CP: 1-14-80	Sun Gas	Utah-Federal D	7	nwnw 25/7S/24E Powder Springs Field Uintah Cnty, UT	Green River 5,112-5,126	5,399 PB: 5,361		DG, no cores or tests.	1,200

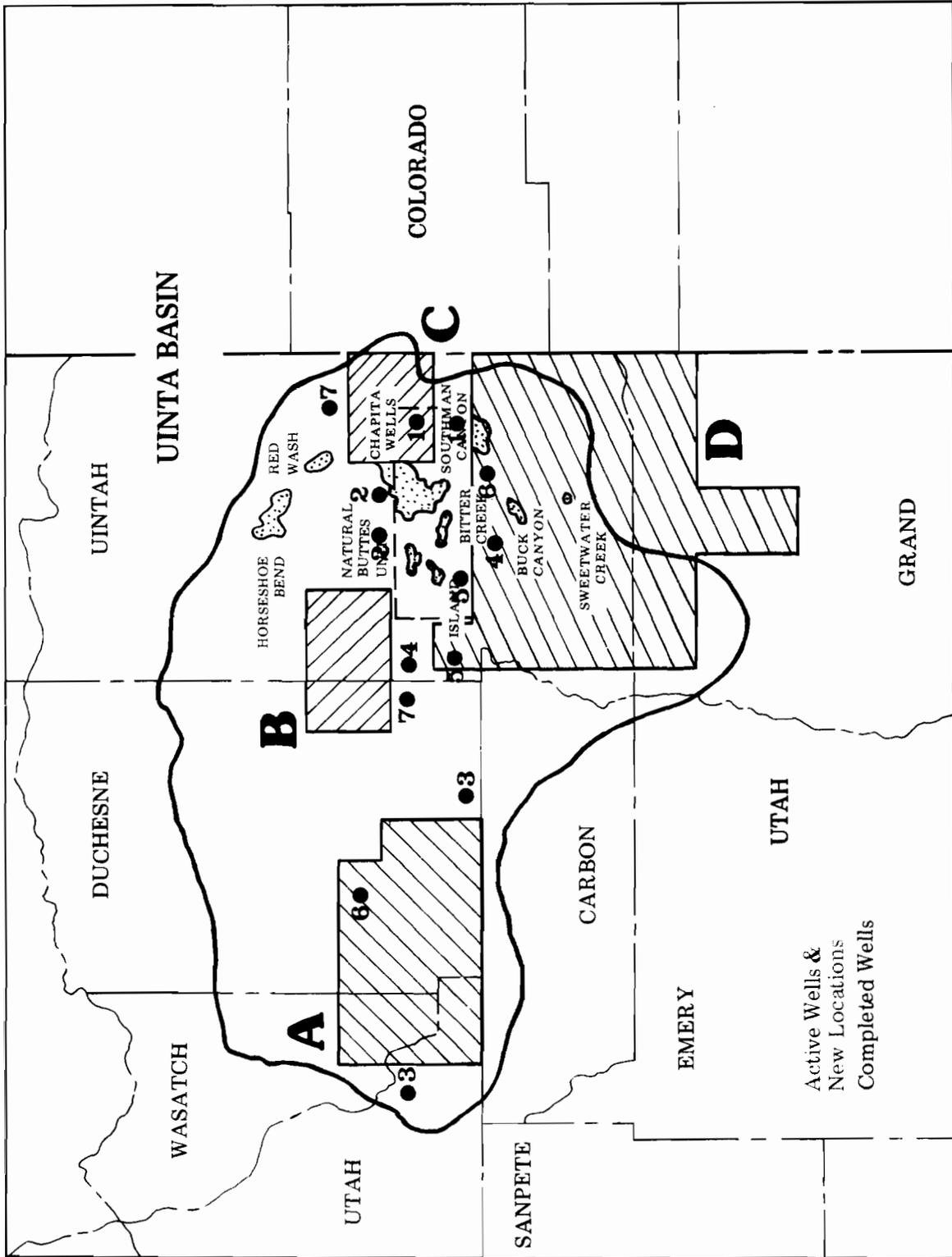


Figure 4-2 Wells Staked and Completed, USGS Designated Core Areas, Uinta Basin (refer to Tables 4-3 and 4-4)

Piceance Basin

CORE PROGRAM

The Piceance Basin has numerous tight Upper Cretaceous and Tertiary gas sands. Within the Mancos Formation, the Castlegate (Rollins) and the Mancos B sands are the principal objectives. The Iles Formation of the Mesaverde Group contains the Corcoran, Cozzette, Sego and Trout Creek sand units which have gas potential. Within the continental portion of the Mesaverde Group (Williams Fork Formation) and the continental Fort Union and Wasatch Formations, potential is present in both lenticular and blanket sand deposits. Most of these units are productive somewhere within the Piceance Basin. Actively producing gas fields include the Cathedral, Piceance Creek, Trail Canyon, Thunder, Dragon Trail, and Texas Mountain. However, in areas removed from productive fields, or in horizons below known producing zones, very little information is available. For example, in the Piceance Creek Field, very few wells have penetrated below the commercial Wasatch and therefore data is limited.

In an effort to better understand areas or horizons with minimal control, the USGS has recommended several key areas from which cores should be obtained. Within the Piceance Basin these areas are (see Figure 5-1):

Area A

East of Rangely Field in Rio Blanco County, T1S to T2N, R98W to R99W;

Area B

Piceance Creek Field area, Rio Blanco County, T2S, R96W and R97W (below the Wasatch);

Area C

Garfield and Mesa Counties, T5S to T8S, R95W in the north tapering down to R98W to R99W on the southern part of the area; and

Area D

Garfield and Mesa Counties, T8S to T10S, R92W to R94W (this area is flanked on the northwest and southeast by the Grand Mesa National Forest).

As new locations are staked in areas of interest to the WGSP Core Program, operators are contacted to discuss possible joint coring operations. None were discussed during the fourth quarter due to limitation of funds for coring.

The activity in the core areas was scattered, with most of it confined to the southern portion of the basin. In Mesa County, Teton Energy was drilling for Cozzette and Corcoran objectives. Table 5-1 summarizes wells within the core areas, and Figure 5-1 shows their locations.

DRILLING ACTIVITIES

During the quarter, 36 new locations were staked in the Piceance Basin: 30 development and 6 wildcat tests. Two areas continued to attract most of the drilling activity. Along

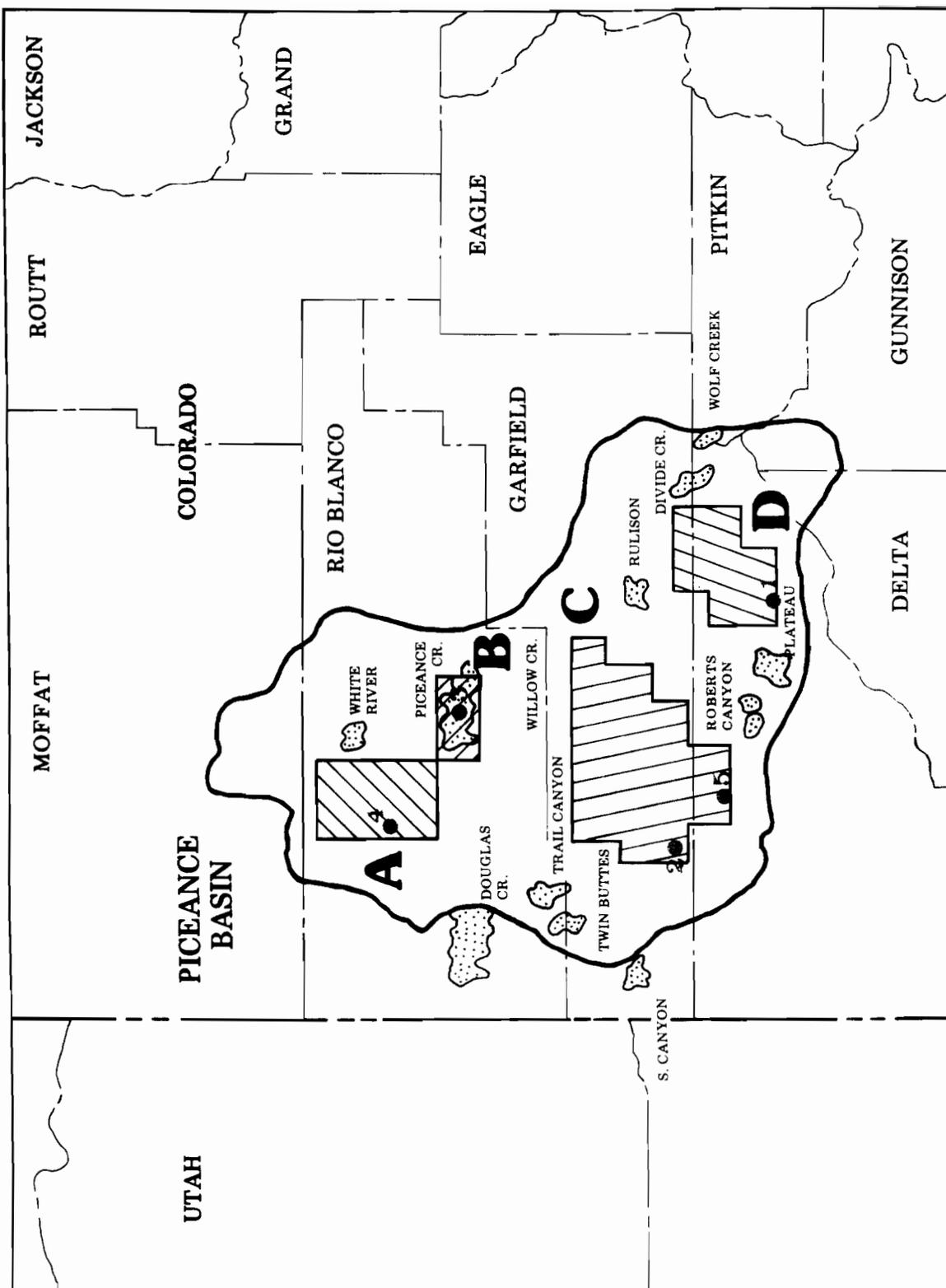


Figure 5-1 USGS Designated Core Areas and Wells of Interest, Piceance Basin (refer to Table 5-1)

Table 5-1 Core Wells – Piceance Basin

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	PROJECTED HORIZON (Depth in ft)	COMMENTS
FR: 3-18-80	Teton Energy	23-2 Walck	1	nwnw 23/10S/93W Plateau Field Mesa Cnty, CO	Cozette 5,476	D. Located in Core Area D.
FR: 9-25-79 SP: 10-29-79	Aldoph Coors	1-29 DF	2	swne 29/7S/99W Wildcat Field Garfield Cnty, CO	Morrison 7,675	WF, TD 9,290, tstg. Located in Core Area C.
FR: 5-4-79 SP: 5-24-79	Mobil Oil	F-23-18G USA	3	nesw 18/2S/96W Piceance Creek Field Rio Blanco Cnty, CO	10,900 ft test	WF, TD 10,875, SI. Located in Core Area B.
FR: 6-1-79 SP: 7-10-79	Pacific Transmission Supply	22-12 Federal	4	senw 12/1N/99W Wildcat Field Rio Blanco Cnty, CO	Dakota 14,500	WF. Cored during 4th Quarter, 1979, for WGSP; located in Core Area A.
FR: 2-8-80	Teton Energy	1 Federal	5	sesw 36/8S/98W Coon Hollow Field Mesa Cnty, CO	Cozette- Corcoran 5,500	D, located in Core Area C.

the western margin in the Douglas Creek Arch area, the Mancos B (Emery equivalent) sand has been the primary objective, found at shallow depths ranging from 2,000 to 6,000 ft. In the southern portion of the basin, east of Grand Junction and principally south of the Colorado River, operators are drilling wells to tap the Mesaverde-Mancos transition sands. Such sands include the Rollins (Castlegate equivalent), Corcoran and Cozette, and are found at depths ranging from 3,000 to 8,000 ft.

Wells in both areas are usually fractured and sometimes the Mancos B is acidized to improve production. Fracture treatments during the quarter were moderate in size, ranging from 90,000 to 350,000 lbs of sand. The largest treatment reported during the quarter was performed on Chandler & Associates No. 12-29-1-1 Fort Unit well, Sec. 29, T1S, R101W, Rio Blanco County. The well produced 409 MCFD of new gas from the

Morapos/Mancos B horizons after being acidized 3 times with a total 2,500 gal, and fractured twice with a total 142,800 gal water and 363,000 lb sand.

The Mancos B accounted for almost three-quarters of the new gas production reported during the first quarter. The majority of this production was from the Douglas Creek Arch area, but operators are in the process of extending the Mancos play eastward into the Piceance Basin proper. Other contributing horizons included the Mancos A, Mesaverde undifferentiated, Castlegate, Corcoran, and Wasatch. Commingled production included Rollins/Corcoran, Corcoran/Cozette, and Morapos/Mancos B. These horizons are shown in Table 5-2, which gives the Piceance WGSP drilling activity.

By quarter's end, 36 wells were reported complete: 29 development wells were pro-

	NO. OF WELLS				PRODUCING HORIZONS IN MCFD											Total	
	Wildcats		Development		Green River (Douglas Creek)	Wasatch	Undifferentiated	Cozzetta	Corcoran	Mesaverde			Mancos		Comtingled		
	D&A	Discovery	D&A	Producing						Castlegate/Rollins/Mancos A	Mancos B/Emery	Mancos					
**2nd Qtr 1977	0	2	2	17	21	0	3,815	0	0	0	0	0	0	4,490 ¹	634 ²	8,939	
**3rd Qtr 1977	8	1	3	21	33	2,000	3	0	0	1,159	120	2,839	4,605 ¹	10,726			
**4th Qtr 1977	2	0	3	42	47	0	2,108 ³	3,132	0	2,267 ³	0	7,947	850 ²	16,304			
**1st Qtr 1978	5	2	1	12	20	0	0	0	140	0	0	3,509	2,336 ⁴	5,985			
**2nd Qtr 1978	6	3	2	15	26	0	250	0	1,167	489 ³	0	4,558	1,809 ²	5,982			
**3rd Qtr 1978	2	3	2	27	34	775	7,062	610	0	1,002 ¹	0	4,418 ³	1,787 ⁵	15,654			
**4th Qtr 1978	1	0	0	43 ^{1,2}	44	0	6,730	5,338	370	650	3,122	0	13,150 ¹	1,178 ^{1,3}	30,538		
1st Qtr 1979	0	2	5	42	49	0	0	0	0	5,161 ⁶	0	8,307 ³	4,004 ⁷	17,482			
2nd Qtr 1979	1	6	0	15	22	0	0	440 ⁸	0	439	0	5,683 ⁸	0	6,562			
3rd Qtr 1979	3	1	2	25	31	0	0	8,947	0	1,050	0	6,803 ³	6,066 ⁹	22,866			
4th Qtr 1979	3	7	2	33	45	0	1,278 ⁸	490	3,822	552 ³	0	8,751	2,541 ^{1,6}	17,434			
1st Qtr 1980	0	2	3	31	36	0	0 ³	0	175	0	335	8,323 ¹	2,382 ^{1,3}	11,215			

1 IPF not available from two wells
2 Rollins/Cozzette/Corcoran
3 IPF not available from one well
4 Morapos/Alamos 481
Cameo/Cozzette/Corcoran 460
Rollins/Cozzette/Corcoran 1,395
5 Rollins/Cozzette/Corcoran 1,734
Castlegate/Mancos B 53
6 IPF not available from five wells
7 Rollins/Cozzette/Corcoran 1,284
Cozzette/Corcoran 2,720
8 IPF not available from three wells
9 Cozzette/Corcoran 2,537
Rollins/Cozzette/Corcoran 1,087
Mancos B/Dakota 2,428
Mancos/Mesaverde 14
10 Rollins/Corcoran 325¹
Cozzette/Corcoran 1,033
Rollins/Cozzette/Corcoran 1,183
11 Morepos/Mancos B 409
Cozzette/Corcoran 598
Rollins/Corcoran 1,145
Frontier/Dakota 230
12 No IPF and no formation available for 2 wells
13 Cozzette/Corcoran 845
Rollins/Cozzette/Corcoran 333
* Data compiled from P.I. Rocky Mountain Region Report "Completions"
** Revised figures

Table 5-2 Summary of Drilling Activities — Piceance Basin

ducers, 2 wildcat wells were discoveries, 2 development wells were completed as SIGW, and 3 development wells were D&A. Total initial potential flow of new gas was 11,215 MCFD.

Tables 5-3 and 5-4 give a sample of active wells and new locations, and completed wells, respectively. The locations of these wells are shown in Figure 5-2.

Table 5-3 Active Wells and New Locations – Piceance Basin

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	PROJECTED HORIZON (Depth in ft)	COMMENTS
FR: 9-28-79 SP: 9-29-79	Adolph Coors	1-20 USA-Philadelphia Creek	1	swnw 20/1S/100W Wildcat Field Rio Blanco Cnty, CO	Mancos 5,500	WF, TD 5,649, WOCT.
FR: 1-8-79 SP: 2-4-79	CSG Exploration	298-29-2 Government	2	senw 29/2S/98W Sulphur Creek Field Rio Blanco Cnty, CO	Mancos 17,800	WD, TD 11,750; acidized/fract; swbg.
FR: 3-3-80	Northwest Exploration	11 Clough	3	senw 7/6S/94W Rulison Field Garfield Cnty, CO	Wasatch 2,550	WO. Operator has 24 additional tests in county.
FR: 12-7-79	Amoco Production	1 Bowie Unit	4	swne 15/12S/91W Wildcat Field Delta Cnty, CO	Mesaverde test	WF, first drilling within township, closets drilling 8 mi. west.
FR: 11-6-79	Northwest Exploration	37 Federal	5	nsw 36/1S/101W Philadelphia Creek Field Rio Blanco Cnty, CO	Mancos 3,875	D. Operator has 2 additional Mancos tests in immediate locale.
FR: 2-8-80	Coseka Resources	16 2-5S-104 Federal	6	nene 2/5S/104W Wildcat Field Garfield Cnty, CO	Mancos 4,200	WF. Operator is drilling 1 additional Mancos well in immediate locale.
FR: 11-13-79	Northwest Exploration	7 Texas Creek	7	swne 15/3S/103W Wildcat Field Rio Blanco Cnty, CO	3,500 test	WF. Operator has 4 additional tests in immediate locale.
FR: 2-29-80	Norris Oil	4-1 Federal	8	nwse 4/10S/97W Roberts Canyon Field Mesa Cnty, CO	Mesaverde 2,675	WSX, OWWO: OTD 2,675; comp. 10-18-79 D&A.

Table 5-4 Completed Wells – Piceance Basin

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	HORIZON (Projected Depth or Producing Interval)	FINAL TD	FRACTURE TREATMENT	COMMENTS	IPF in MCFD
SP: 12-7-79 CP: 12-13-79	Wexpro Company	10-2 Federal	1	sese 10/2S/103W Lower Horse Draw Field Rio Blanco Cnty, CO	Mancos B 2,809-3,100 (open hole)	3,100		DG, no cores or tests.	1,640
SP: 11-2-79 CP: 12-4-79	Norris Oil	36-3 Federal	2	nene 36/9S/97W Shire Gulch Field Mesa Cnty, CO	Corcoran 3,238-3,248	3,422	90,000 gal emul, 727,750 lb sand	DG, no cores or tests.	175
SP: 5-5-79 CP: 7-9-79	Northwest Exploration	1 HD Lake	3	nese 22/1N/95W Powell Park Field Rio Blanco Cnty, CO	Mancos B 12,320-12,450 (gross)	12,704 PB: 12,508	50,000 gal emul, 60,000 lb sand	WDD, no cores or tests, OWWO: previous prod. zone Mesaverde; oil well.	
SP: 9-27-79 CP: 12-20-79	Chandler & Associates	11-32 North Plateau Creek	4	nesw 32/9S/96W Shire Gulch Field Mesa Cnty, CO	Cozette 3,918-4,064 Corcoran 4,065-4,125	4,323 PB: 4,089	Acidized w/4,200 gal; fractured w/ 66,956 gal water, 261,000 lb sand	DG, cored, no tests. Commingled production.	440
SP: 10-27-79 CP: 11-3-79	Coseka Resources	2-T-2 Federal	5	senw 2/5S/103W Evacuation Creek Field Garfield Cnty, CO	Mancos B 4,916-5,018 (gross)	7,597 PB: 5,211	83,496 gal emul, 196,000 lb sand	WOE, no cores or tests.	155
SP: 10-5-79 CP: 12-10-79	Chandler & Associates	12-29-1-1 Fork Unit	6	nsw 29/1S/101W Dragon Trail Field Rio Blanco Cnty, CO	Marapos 1,083-1,101 Mancos B 2,430-2,495	2,835	Acidized 3 times w/total 2,500 gal; fractured twice w/total 142,800 gal water, 363,000 lb sand	DG, no cores or tests. Commingled production.	409

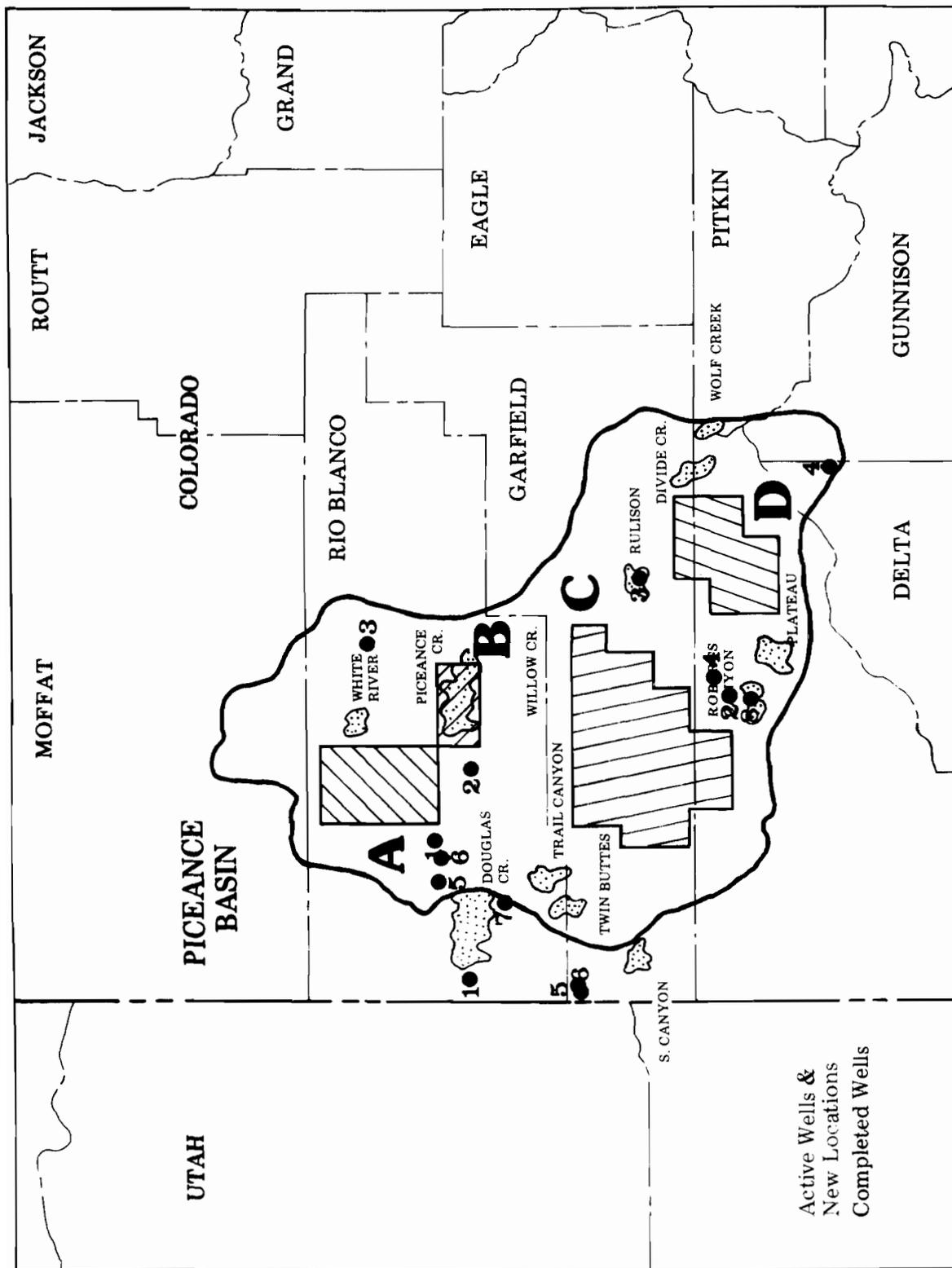


Figure 5-2 Wells Staked and Completed, USGS Designated Core Areas, Piceance Basin (refer to Tables 5-3 and 5-4)