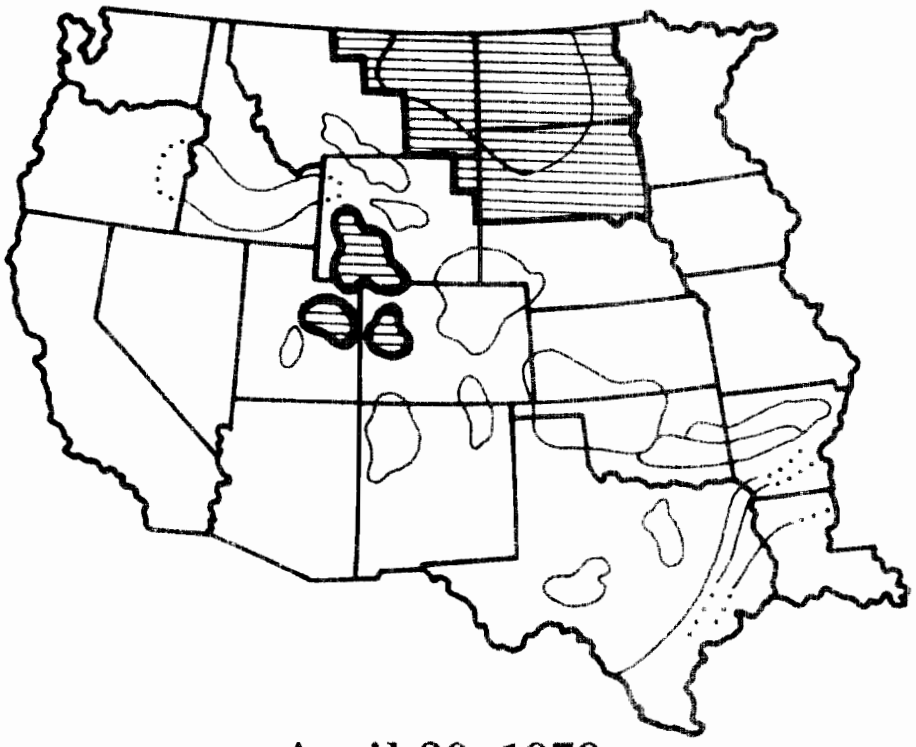
DOE/BG/01569-9

Western Gas Sands Project
Quarterly Basin Activities Report



April 30, 1979

Prepared for
U.S. Department of Energy

Bartlesville Energy Technology Center
Charles H. Atkinson
Project Manager

Compiled by CER Corporation
Las Vegas, Nevada

Contract DE-AC08-79BG01569

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States DOE, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

Available from the National Technical Information Service,
U. S. Department of Commerce, Springfield, Virginia 22161.

NATIONAL TECHNICAL INFORMATION SERVICE
PAPER COPY PRICES EFFECTIVE JANUARY 1, 1979

Page Range	Domestic Price
001-025	$4.00
026-050	$4.50
051-075	$5.25
076-100	$6.00

Contents

		Page
1.	INTRODUCTION	1
2.	NORTHERN GREAT PLAINS PROVINCE	3
	2.1 Core Program	3
	2.2 Drilling Activity	3
3.	GREATER GREEN RIVER BASIN	15
	3.1 Core Program	15
	3.2 Drilling Activity	17
4.	UINTA BASIN	25
	4.1 Core Program	25
	4.2 Drilling Activity	27
5.	PICEANCE BASIN	33
	5.1 Core Program	33
	5.2 Drilling Activity	36

Figures

		Page
Figure 1-1	Map of Western United States, Showing Areas of Interest	1
Figure 2-1	Northern Great Plains Province	4
Figure 2-2	Detail of USGS Designated Core Areas and Wells of Interest, Northern Great Plains Province	5
Figure 2-3	Correlation Chart of Cretaceous Rocks of the Northern Great Plains Province	6
Figure 2-4	Northern Great Plains Province Showing Wells of Interest	11
Figure 2-5	Detail of USGS Designated Core Areas and Wells of Interest, Northern Great Plains Province	12
Figure 3-1	USGS Designated Core Areas and Wells of Interest, Greater Green River Basin	16
Figure 3-2	Stratigraphic Correlation Chart of Greater Green River, Piceance and Uinta Basins	19
Figure 3-3	Wells Completed and Staked, USGS Designated Cores Areas, Greater Green River Basin	22
Figure 4-1	USGS Designated Core Areas and Wells of Interest, Uinta Basin	26
Figure 4-2	Wells Completed and Staked, USGS Designated Core Areas, Uinta Basin	30
Figure 5-1	USGS Designated Core Areas and Wells of Interest, Piceance Basin	34
Figure 5-2	Wells Completed and Staked, USGS Designated Core Areas, Piceance Basin	39

Tables

		Page
Table 2-1	Summary of Wells Located in USGS Designated Core Areas—Northern Great Plains Province	3
Table 2-2	Summary of Drilling Activities, Northern Great Plains Province	7
Table 2-3	Summary of Wells Completed—Northern Great Plains Province	9
Table 2-4	Summary of Active Wells and New Locations—Northern Great Plains Province	13
Table 3-1	Summary of Wells Located in USGS Designated Core Areas—Greater Green River Basin	17
Table 3-2	Summary of Drilling Activities, Greater Green River Basin	18
Table 3-3	Summary of Wells Completed—Greater Green River Basin	20
Table 3-4	Summary of Active Wells and New Locations—Greater Green River Basin	23
Table 4-1	Summary of Wells Located in USGS Designated Core Areas—Uinta Basin	27
Table 4-2	Summary of Drilling Activities, Uinta Basin	28
Table 4-3	Summary of Wells Completed--Uinta Basin	29
Table 4-4	Summary of Active Wells and New Locations—Uinta Basin	31
Table 5-1	Summary of Wells Located in USGS Designated Core Areas—Piceance Basin	35
Table 5-2	Summary of Drilling Activities, Piceance Basin	37
Table 5-3	Summary of Wells Completed—Piceance Basin	38
Table 5-4	Summary of Active Wells and New Locations—Piceance Basin	40

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

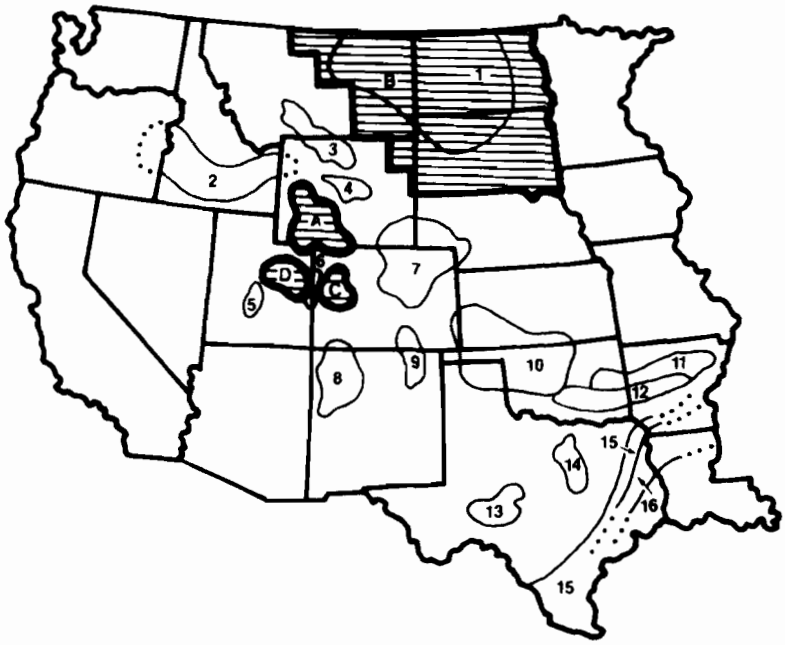
Drilling/Staked Wells

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
Comp	Drilling completed
DIL	Dual Induction Laterlog
D&A	Dry and Abandoned
FDC	Formation Density Log
FR	First Report
GR	Gamma Ray
PB	Plugged back
SDW	Shut down for weather
SI	Shut in
Spud	Commencement of drilling
SP	Spontaneous Potential
SDR	Shut down for repairs
SDW	Shut down for weather
SN	Sidewall Neutron
Swb(d)(g)	Swabbed, swabbing
TD	Total Depth
WOCT	Waiting on completion tools
WOO	Waiting on orders

1. Introduction

This quarterly basin activities report is a summation of three months drilling and testing activities in the four primary study areas of the WGSP. This report details information in each study area for the month of January, February, and March, 1979. Refer to Figure 1-1 for the location of study areas in the WGSP.



PRIMARY STUDY AREAS

A. Greater Green River Basin
B. Northern Great Plains Province
C. Piceance Basin
D. Uinta Basin

ADDITIONAL LOW PERMEABILITY SANDSTONE AREAS

1. Williston Basin
2. Snake River Downwarp
3. Big Horn Basin
4. Wind River Basin
5. Wasatch Plateau
6. Douglas Creek Arch
7. Denver Basin
8. San Juan Basin
9. Raton Basin
10. Anadarko Basin
11. Arkoma Basin
12. Ouachita Mountains Province
13. Sonora Basin
14. Fort Worth Basin
15. Western Gulf Basin
16. Cotton Valley Trend

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

Monitoring basin activities is an integral part of resource assessment and is useful in the core program. The USGS has recommended obtaining core from specific locations within each study area. Operators active in these specific areas are located by monitoring new activity in each area and contacted by DOE 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 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. Active wells and new locations, and completed wells are listed and located on maps 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, the Western Oil Reporter, and the State of Utah, Division of Oil, Gas, and Mining, News Letter.*

Background and geologic information can be obtained from the Quarterly Basin Activities Reports, January 1, 1978, (NVO/0655-03), April 1, 1978, (NVO/0655-05) and July 31, 1978, (NVO/0655-06). Stratigraphic correlation charts, cross-sections and a brief account of the geology of each area and information relating to the USGS recommended coring locations are included in these reports. 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 for the core program document, which is available from CER Corporation, 4220 South Maryland Parkway, Suite 801, Las Vegas, Nevada, 89109.

2. Northern Great Plains Province

2.1 CORE PROGRAM

Specific areas within Montana were selected by the USGS for the initiation of the WGSP Core Program (Figures 2-1 and 2-2 and Table 2-1). Four sites were chosen for the following reasons:

- The sites are removed from productive fields and little data is available.
- There are two or more potential reservoir intervals and adjacent source beds at selected sites.
- The combination of these sites 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 older Mowry Formation, up through the Judith River Formation. Figure 2-3 is a correlation chart of Cretaceous rocks in the Northern Great Plains Province. Drilling depths to these objectives are shallower in this Province (2,000 - 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.

Companies contacted during the quarter for possible participation in the WGSP Core Program include Universal Gas, Trio Petro, Odessa Natural Corporation, and Kansas-Nebraska Natural Gas Company.

Table 2-1 Summary of Wells Located in USGS Designated Core Areas—Northern Great Plains Province[1]

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: 11-2-78 CP: 11-29-78	Joseph J. C. Paine & Assoc.	1-1306 Strohmer	1	nwse 13/30N/36E Unnamed Field Valley Cty, MT	Bowdoin (1,182-1,222)	1,595 PB: 1,272		DG, located in core area C, no tests.	720
SP: 10-11-78 CP: 11-2-78	Joseph J. C. Paine & Assoc.	1-3406 Porteen	1	nesw 34/30N/36E Unnamed Field Valley Cty, MT	Bowdoin (1,391-1,418)	1,675 PB: 1,481	14,910 gal water 40,000 lb sand	DG, located in core area C.	250
SP: 9-30-78 CP: 11-1-78	Joseph J. C. Paine & Assoc.	1-1907 Federal	2	nwnw 19/30N/37E Unnamed Field Valley Cty, MT	Bowdoin (1,936-1,981)	1,725 PB: 1,539	11,298 gal water 40,000 lb sand	DG, located in core area C, no tests	82
SP: 12-12-78 CP: 12-17-78	Joseph J. C. Paine & Assoc.	1-0707 Federal	2	sese 7/30N/37E Unnamed Field Valley Cty, MT	Bowdoin (1,339-1,384)	1,625 PB: 1,434		DG, located in core area C.	228

[1] From Petroleum Information

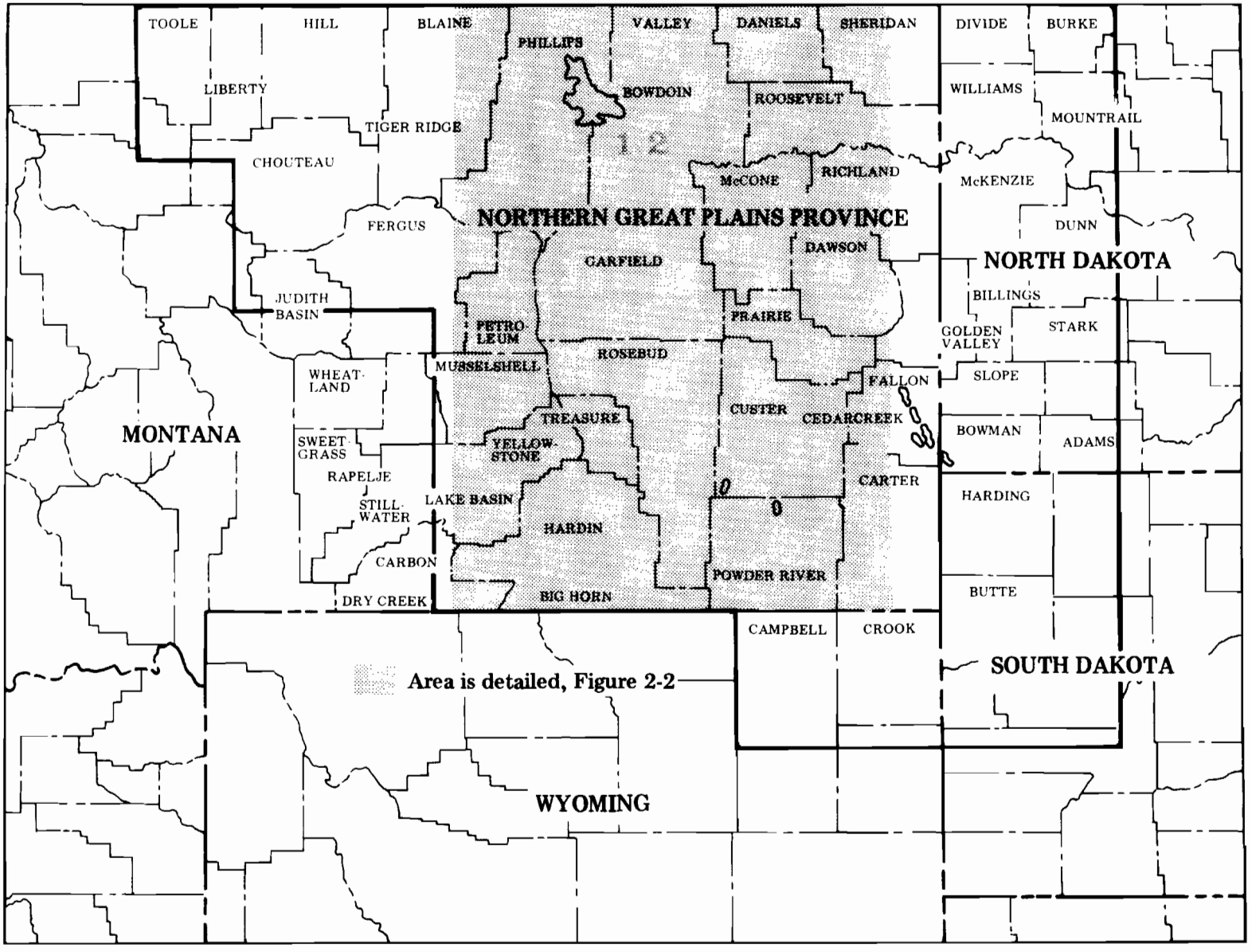


Figure 2-1 Northern Great Plains Province

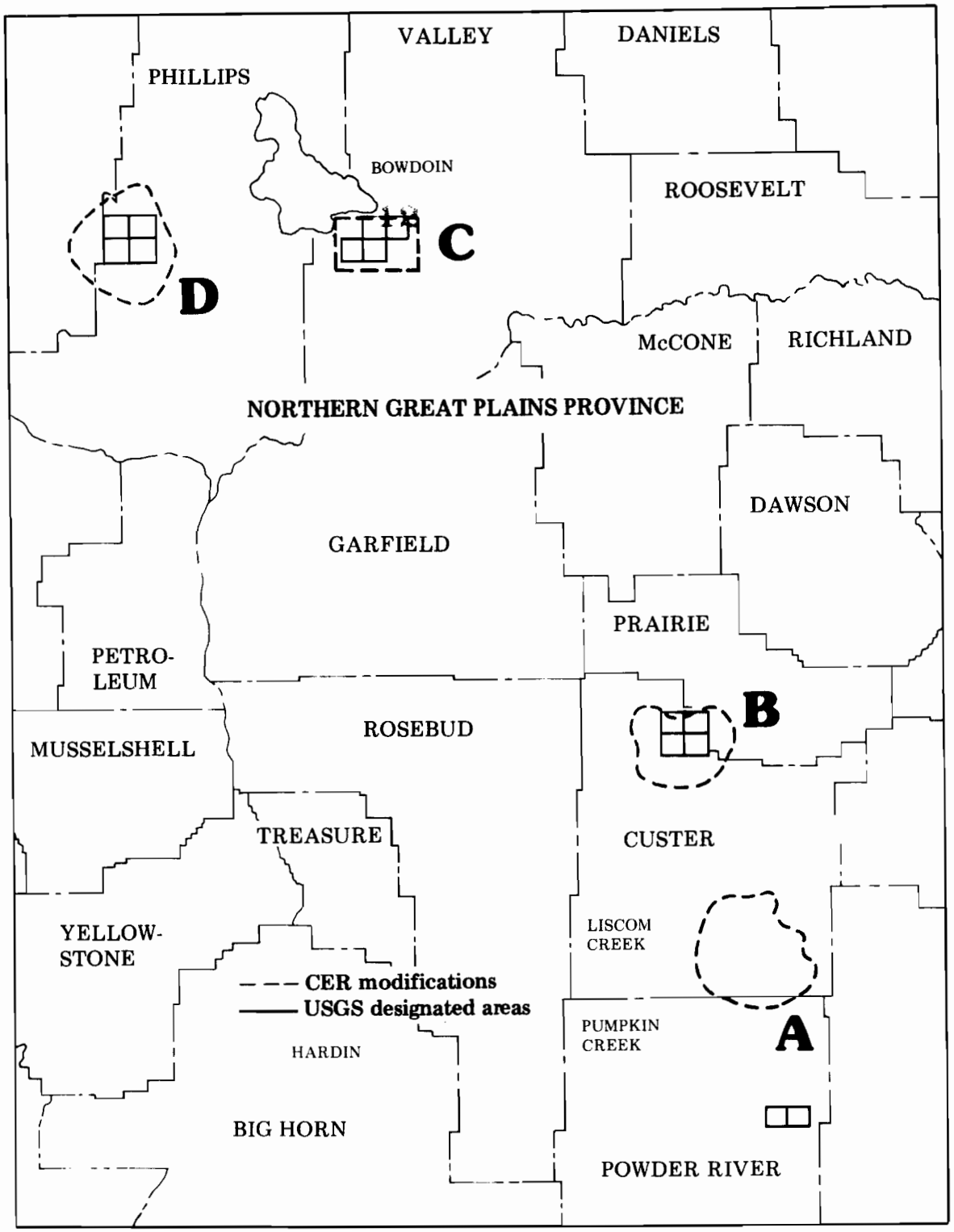


Figure 2-2 Detail of USGS Designated Core Areas and Wells of Interest, Northern Great Plains Province (refer to Table 2-1)

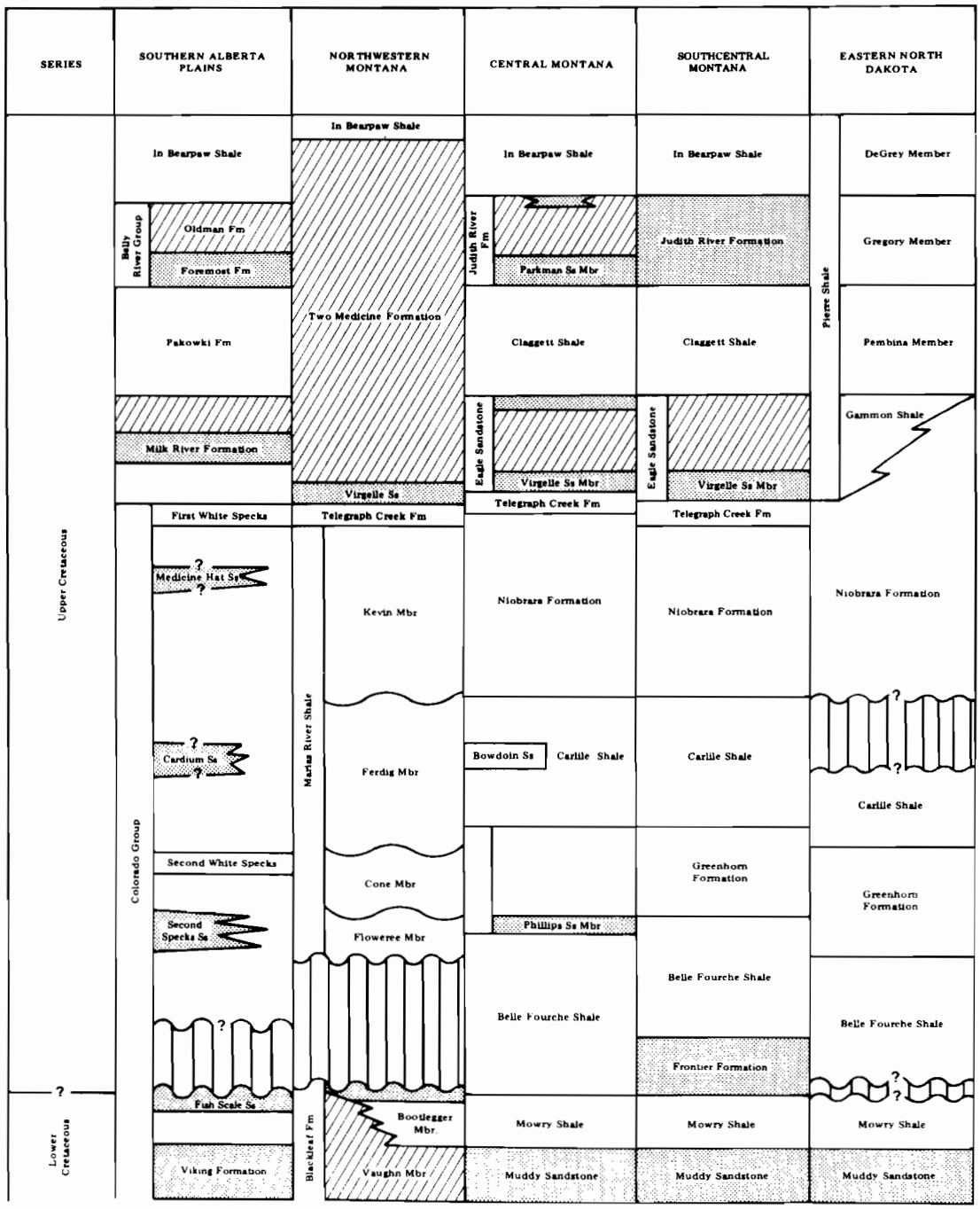


Figure 2-3 Correlation Chart of Cretaceous Rocks of the Northern Great Plains Province

2.2 DRILLING ACTIVITY

During the first quarter of 1979, 101 wells were completed in horizons of interest to the WGSP in the Northern Great Plains Province: 80 development wells and 21 wildcats. Sixty-seven of 80 development wells and 9 of 21 wildcats were successful. This is a increase of 12 and 4 wells, respectively, over the previous quarter. Producing horizons were the Bow Island, Blackleaf, Greenhorn, Bowdoin, and Eagle. In several instances production from two horizons was commingled. New production yielded a minimum of 13,635 MCFD this quarter (See Table 2-2).

*Table 2-2 Summary of Drilling Activities, Northern Great Plains Province**

	NO. OF WELLS					Producing Horizons in MCFD											
	Wildcats		Development		Total			Eagle			Carlile		Green-horn				
	D&A	Disc.	D&A	Prod.		Judith River	Undifferentiated	Virgelle	Shannon	Undifferentiated	Bowdoin	Phillips	Frontier	Blackleaf	Bow Island - Muddy	Commingled	Total
2nd Quarter 1977	24	7	10	34	75	0	5,345[12]	0	700	0	460	2,699	4,123	5	5,529	2,768[13]	21,629[14]
3rd Quarter 1977	13	6	13	40	72	0	1,249[8]	0	0	0	4,924	354	622	630[9]	6,280[10]	23,719[11]	37,778
4th Quarter 1977	13	6	17	50	86	340	7,068[1]	0	1,348	0	1,126	1,911	227	1,417	5,373	12,359[2]	31,169
1st Quarter 1978	13	3	13	26	55	40	6,985	0	0	not available	0	50	0	259	2,489	17,943[3]	27,766
2nd Quarter 1978	9	1	4	10	24	0	5,174[1]	0	0	0	0	0	0	645	0	253[4]	6,072
3rd Quarter 1978	17	7	38	25	87	0	18,975[5]	0	0	0	1,406	410[7]	0	0	1,406	1,798[6]	23,995
4th Quarter 1978	31	5	36	55	127	189	7,406[14]	0	0	0	5,197	4,301[1]	610	157	7,560[18]	2,386[15]	28,183
1st Quarter 1979	12	9	13	67	101	0	4,724[17]	0	0	0	3,741	0[18]	0	0	787	3,834[19]	13,086

1. IPF not available from one well.
2. Bowdoin/Greenhorn
3. Judith River/Eagle - 60
   Bowdoin/Phillips - 15,894
   Bowdoin/Greenhorn/Phillips - 844
   Greenhorn/Phillips - 1,145
4. Fish Scales/Bow Island
5. Natural production: 13,931
6. Bowdoin/Phillips - 284
   Bowdoin/Greenhorn - 368
   Blackleaf/Spike (natural) - 699
   Bowdoin/Greenhorn/Phillips - 447
7. 158 natural "White Specks"
8. Natural production
9. Natural production
10. 4,245 - natural
11. Bowdoin/Greenhorn/Phillips - 14,878
    Bowdoin/Greenhorn - 1,180
    Bowdoin/Phillips - 3,446
    Prairie/Greenhorn/Phillips - 3,690
    Colorado/Blackleaf/Bow Island - 89
    Colorado/2nd Bow Island - 436
12. Natural production - 4,560
13. Bowdoin/Phillips - 205
    Blackleaf/Bow Island - 2,500
    Judith River/Eagle - 63
14. Natural production - 2,490
15. Bowdoin/Phillips - 1,710
    Bowdoin/Greenhorn/Phillips - 676
    Blackleaf/Bow Island - not available
16. IPF not available from two wells
17. IPF not available from six wells
18. IPF not available from eleven wells
19. Bowdoin/Phillips - 960
    Bowdoin/Greenhorn - 711
    Greenhorn/Phillips - 2,078
    Eagle/Bowdoin - 85

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

Exploration for natural gas in Cretaceous rocks continued to be concentrated in the northern counties of Montana (See Table 2-1 and Figure 2-2). Aggressive programs are well underway or completed in the Bowdoin Dome area of north-central Montana. Joseph J. C. Paine has completed wells in the Upper Greenhorn unit, and the Phillips and Bowdoin Members in the northern part of the Bowdoin Field. Some of these wells have higher production figures than previous wells drilled in these areas, (2,000 - 3,000 MCFD). Some MHFs have used 100,000 lbs of sand. Unfortunately, the Canadian border limits extending this play further north. Joseph J. C. Paine has also completed a Bowdoin Member play in the southeastern part of the Bowdoin Field in Valley County, Montana, where production figures have varied widely. Some of these wells have produced nearly 1,000 MCFD although others are not commercial. Odessa Natural Corporation and Midlands Gas were active in Phillips County, and Xeno Inc. was active in Blaine County. The largest frac job attempted during the quarter was in the Midlands Gas, 1-0570 Federal well in Phillips County. The well produced 158 MCFGD from the Bowdoin and Phillips after being stimulated with 29,526 gal of water and 80,000 lb of sand.

Trio-Petro has not, however, been as successful with their initial 12 well, Eagle Sandstone, program just southwest of the Bowdoin Field. After drilling 3 wells, the program was re-evaluated and apparently no more wells will be drilled.

In southeast Montana, several operators have drilled to the Judith River Formation in the Liscom Creek, Pumpkin Creek Field area with no success. Joseph J. C. Paine has planned another major drilling program to the Eagle on the southeast end of the Cedar Creek Anticline, North Dakota. A successful program here would generate new enthusiasm in North Dakota as the Shannon discovery to the south in Harding County, South Dakota did last year.

CER Corporation is continuing to contact operators for potential core sites. Kansas-Nebraska Natural Gas Company has sent CER a proposal for coring a well in the northern part of the Bowdoin Field.

Refer to Tables 2-3 and 2-4 for summaries of completed wells, and active wells and new locations, respectively, and Figures 2-4 and 2-5 for the locations of the wells.

Table 2-3 Summary of Wells Completed—Northern Great Plains Province[1]

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: 12-16-78 CP: 1-1-79	W. N. McMurry	1 Lane	1	swne 29/2N/23E Wildcat Field Yellowstone Cty, MT	Morrison	2,835		WF, no cores or tests	D&A
FR: 11-13-78	Nevel E. Murphy	1 Schwend	2	nwsw 14/7S/23E Wildcat Field Carbon Cty, MT	Dakota			WF, Abnd. loc.	
SP: 11-4-78 CP: 11-12-78	Grace Pet	26-2 Federal	3	nwne 26/8S/51E Leary Field Powder River Cty, MT	Muddy (5,750)	5,840		D	D&A
FR: 10-5-78	Gary Operating	1 SOR	4	sese 1/8S/54E Bell Creek Field Powder River Cty, MT	Muddy	4,631		D, crg.	
FR: 10-10-78 CP: 11-8-78	J. E. Shackelford	1-16 State	5	nene 16/16N/55E Dawson Cty, MT	Shallow test	1,083		WSX, OWWO. Old well data: Apache Corp, 1-16 State, Spud 10-13-78, OTD 10,400. Comp. 11-20-76, D&A	D&A
FR: 11-6-78	Southland Royalty	1-6-24 NE Whitaker	6	nwne 6/24N/34E Bowdoin Field Phillips Cty, MT	Phillips			D, Abnd. loc.	
SP: 10-10-78	Montana Power	3-16	7	nenw 16/28N/14E Unnamed Field Couteau Cty, MT	Eagle	2,200		D, WOCT	
SP: 10-15-78 CP: 12-13-78	Joseph J. C. Paine & Assoc.	1-2306 Kuki	8	sese 23/30N/36E Unnamed Field Valley Cty, MT	Bowdoin (1,460-1,496)	1,770 PB: 1,550	13,818 gal water, 40,000 lb sand	DG, no cores or tests, located in core area C	808
SP: 9-30-78 CP: 11-1-78	Joseph J. C. Paine & Assoc.	1-1907 Federal	9	nwnw 19/30N/37E Unnamed Field Valley Cty, MT	Bowdoin (1,936-1,981)	1,725 PB: 1,539	11,298 gal water, 40,000 lb sand	DG, located in core area C, no cores or tests	82
SP: 12-12-78 CP: 12-17-78	Joseph J. C. Paine & Assoc.	1-0707 Federal	9	sese 7/30N/37E Unnamed Field Valley Cty, MT	Bowdoin (1,339-1,384)	1,625 PB: 1,434		DG, located in core area C	228
SP: 12-5-78 CP: 3-22-79	Marquis Petroleum	23-11 Dumas	10	nesw 23/32N/3W Marias River Gas Field, Toole Cty, MT	Bow Island	1,285		WO	D&A
SP: 10-1-78 CP: 10-3-78	Tricentrol United States	19-16 Fox	11	sese 19/32N/18E Tiger Ridge Field Blaine Cty, MT	Eagle	1,500		D	D&A
FR: 11-6-78	Southland Royalty	1-1-23 NE Whitaker	12	nene 1/32N/33E Bowdoin Field Phillips Cty, MT	Phillips			D, Abnd. loc.	

[1] From Petroleum Information

Table 2-3 Continued

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: 12-16-78 CP: 12-18-78	Wilbur V. Watkins	Big Ten 2-26 Somero	13	sene 26/33N/13E Fresno Field Blaine Cty, MT	Eagle	1,295		D	D&A
SP: 12-13-78 CP: 12-16-78	Western Natural Gas	1-24 Wilson	13	swse 24/33N/13E Fresno Field Hill Cty, MT	Eagle	1,263		D	D&A
SP: 9-3-78 CP: 10-4-78	Benson Mineral Group	1-23 Hoehn	14	nenw 23/34N/17E Wildcat Field Blaine Cty, MT	Greenhorn	2,410		WF, no cores or tests	D&A
SP: 11-30-78 CP: 12-3-78	Fulton Producing	22-14 Christian	15	senw 14/36N/2E Miners Coulee Field Toole Cty, MT	Bow Island	1,777		D	D&A
SP: 2-21-78 CP: 2-1-79	Universal Gas	11-36-23 Rasmussen	16	nwse 11/36N/23E Wildcat Field Blaine Cty, MT	Greenhorn	3,369		WF	D&A
FR: 12-13-78	Universal Gas	26-36-26 Bill Mayer	17	nwse 26/36N/26E Wildcat Field Blaine Cty, MT	Greenhorn			WF, abnd loc.	
SP: 9-14-78 CP: 12-15-78	Odessa Natural	1 Mavencamp	18	nesw 7/36N/33E Unnamed Field Phillips Cty, MT	Phillips	2,170		WF, no cores or tests, WOCT	
SP: 8-12-78 CP: 8-17-78	Xeno, Inc.	1-22 E. Signal	19	nene 23/37N/16E Wildcat Field Hill Cty, MT	Eagle	2,087		WF	D&A
SP: 12-3-78 CP: 12-16-78	Xeno, Inc.	5-24 E. Signal	19	swnw 24/37N/16E Wildcat Field Hill Cty, MT	Eagle	1,670		WF, no cores or tests	D&A
SP: 12-18-78 CP: 1-18-78	Xeno, Inc.	5-10 Border	20	swnw 10/37N/18E Wildcat Field Blaine Cty, MT	Eagle	1,670		WF, no cores or tests	D&A

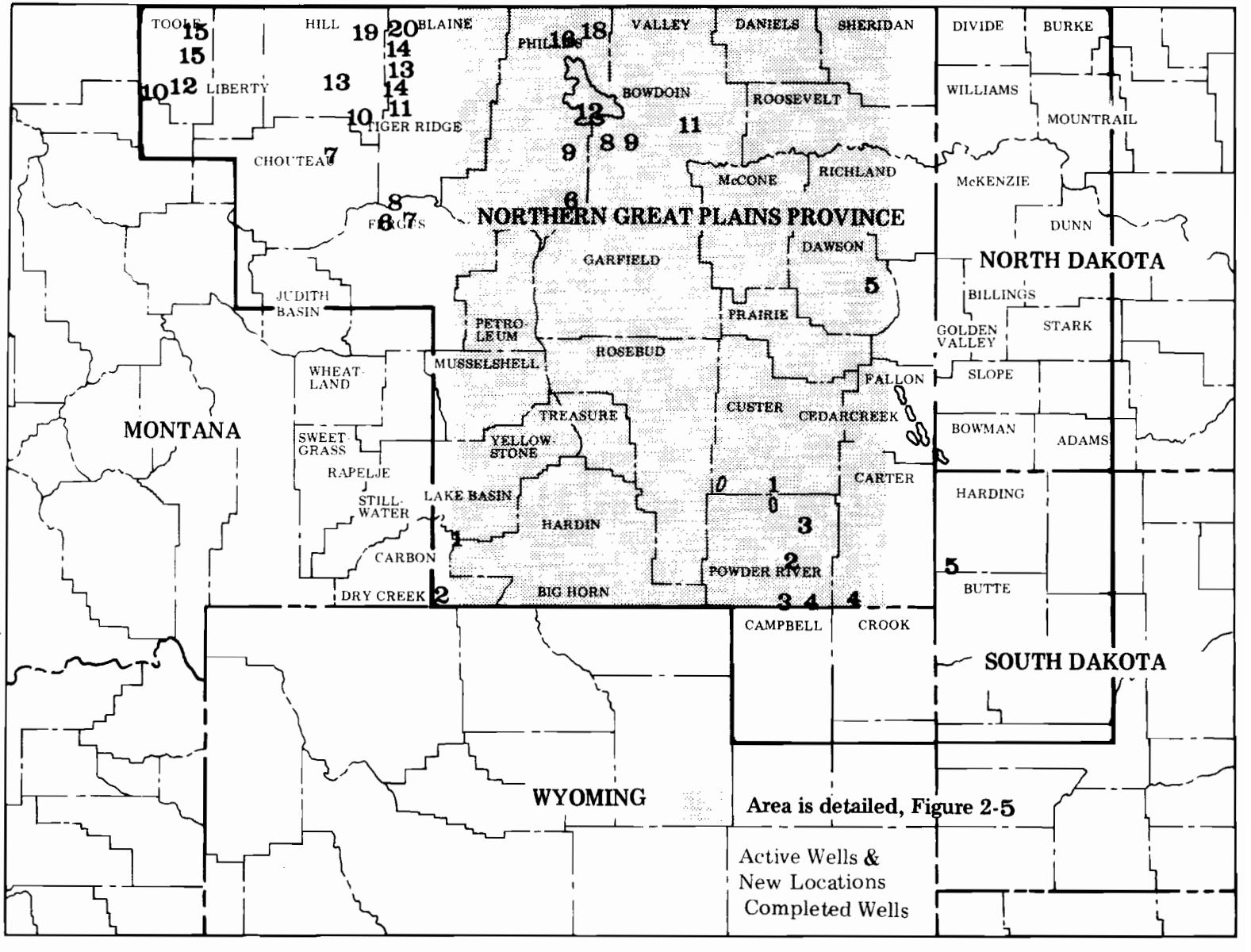


Figure 2-4 Northern Great Plains Province Showing Wells of Interest (refer to Tables 2-3 and 2-4)

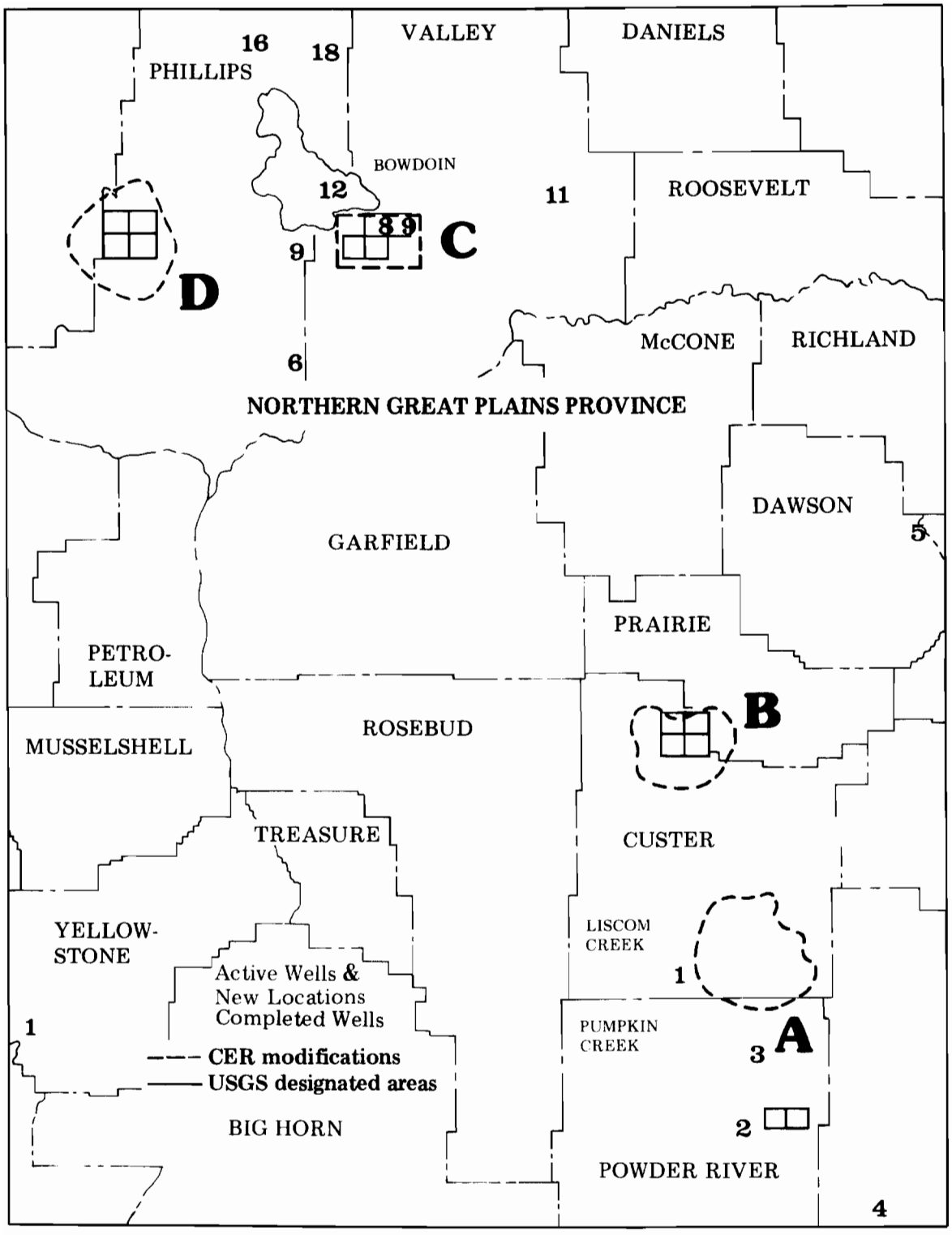


Figure 2-5 Detail of USGS Designated Core Areas and Wells of Interest, Northern Great Plains Province (refer to Table 2-3 and 2-4)

Table 2-4 Summary of Active Wells and New Locations—Northern Great Plains Province[1]

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	PROJECTED HORIZON (Depth in ft)	COMMENTS
FR: 3-14-79	Pete Lien & Sons	1 Tonn Bros.	1	sesw 11/2N/49E Wildcat Field Custer Cty, MT	Judith River (2,200)	WF
FR: 2-13-79 SP: 2-19-79	Marmik Oil	16-2 Federal	2	sese 2/5S/51E Wildcat Field Powder River Cty, MT	Shannon (2,800)	WF, drilling at 2,373
FR: 11-13-78	Charles G. Knight	1 IRA	3	sesw 26/7S/52E Wildcat Field Powder River Cty, MT	Muddy (5,000)	WF
FR: 2-13-79	Orlyn Terry	36-16-2 Montana State	4	sese 26/7S/58E Wildcat Field Carter Cty, MT	Muddy (1,450)	WF
FR: 10-2-78	Jerry McCutchin	1 State-Placid	5	nwnw 16/15N/3E Wildcat Field Harding Cty, SD	Shannon (1,300)	WFX, old info: Sam G. Harrison, 1-6 State Placid, Spud 6-23-78, no cores or tests, OTD 3,500 ft, D&A.
FR: 10-17-78	Devon Corp.	1 Gladys Mees	6	nwse 1/22N/19E Wildcat Field Fergus Cty, MT	Eagle (2,000)	WF
FR: 10-17-78	Devon Corp.	2 Anderson, et al	7	nene 21/23N/20E Wildcat Field Fergus Cty, MT	Eagle (2,000)	WF
FR: 10-19-78	Devon Corp.	2 Olson	8	sene 26/23N/19E Leroy Field Fergus Cty, MT	Eagle (2,000)	D
FR: 2-21-79	Phoenix Resources	44-5 Federal	9	sese 5/29N/33E Wildcat Field Phillips Cty, MT	Bowdoin (2,800)	WF
FR: 11-6-78	Elenburg	15-32 Olson	10	swse 32/31N/17E Tiger Ridge Field Hill Cty, MT	Eagle (2,000)	D
FR: 2-19-79	Montana Dakota Utilities	966 Smith	11	nenw 13/31N/43E Bowdoin Field Valley Cty, MT	Bowdoin-Phillips (1,400)	D
FR: 6-9-78	J. Burns Brown	3-32-15 State	12	swne 3/32N/1W Unnamed Field Toole Cty, MT	Eagle (1,600)	D
FR: 11-6-78	Xeno, Inc.	7-3 Chouteau	13	swne 3/35N/19E Unnamed Field Blaine Cty, MT	Eagle (1,750)	D
FR: 10-3-78	Xeno, Inc.	13-2 E. Chouteau	14	swsw 2/35N/20E Wildcat Field Blaine Cty, MT	Eagle (1,900)	WF
FR: 11-21-78	Fulton Petroleum, et al	44-5 US	15	sese 5/36N/2E West Butte Shallow Field Toole Cty, MT	Bow Island (1,800)	D
FR: 11-20-78	Southland Royalty	1-8-60 NE Fee	16	swne 8/36N/30E Unnamed Field Phillips Cty, MT	Phillips (1,800)	D

[1] From Petroleum Information

3. Greater Green River Basin

3.1 CORE PROGRAM

To assess the resource potential within the Greater Green River Basin the USGS recommended core acquisition in the following areas:

Area A

The crest of the Wamsutter Arch in Sweetwater and Carbon Counties, the northern edge of which borders on the Red Desert Basin and the southern edge which occupies 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 is primarily Frontier, with some Mesaverde and Fort Union tests.

Area B has been divided into four subdivisions which are:

B_1 West of R104W to R109W and from T22N, north to T28N
B_2 R106W to R111W and from T27N to T31N
B_3 R108W to R112W but not including development drilling, and T30N to T35N
B_4 North edge of Green River Basin; north into the Hoback Basin, T36N to 39N and R11W to 114W.

The core sites contain thick sections of tight, but generally untested gas sands with "tight gas sand" potential in Upper Cretaceous and Tertiary formations (See Figure 3-1). During the first quarter of 1979, Wood Petroleum, Michigan-Wisconsin Pipeline Company, Dome Petroleum, Kemmerer Coal Company, and Forest Oil Company were contacted concerning participation in the core program (See Table 3-1 and Figure 3-1). No agreements were reached.

Smokey Oil participated with DOE in the core program in drilling a deep test in Sec. 18-15N-99W of Sweetwater County, Wyoming. No core was recovered from this test due to loss of the core bit at the start of the coring operation.

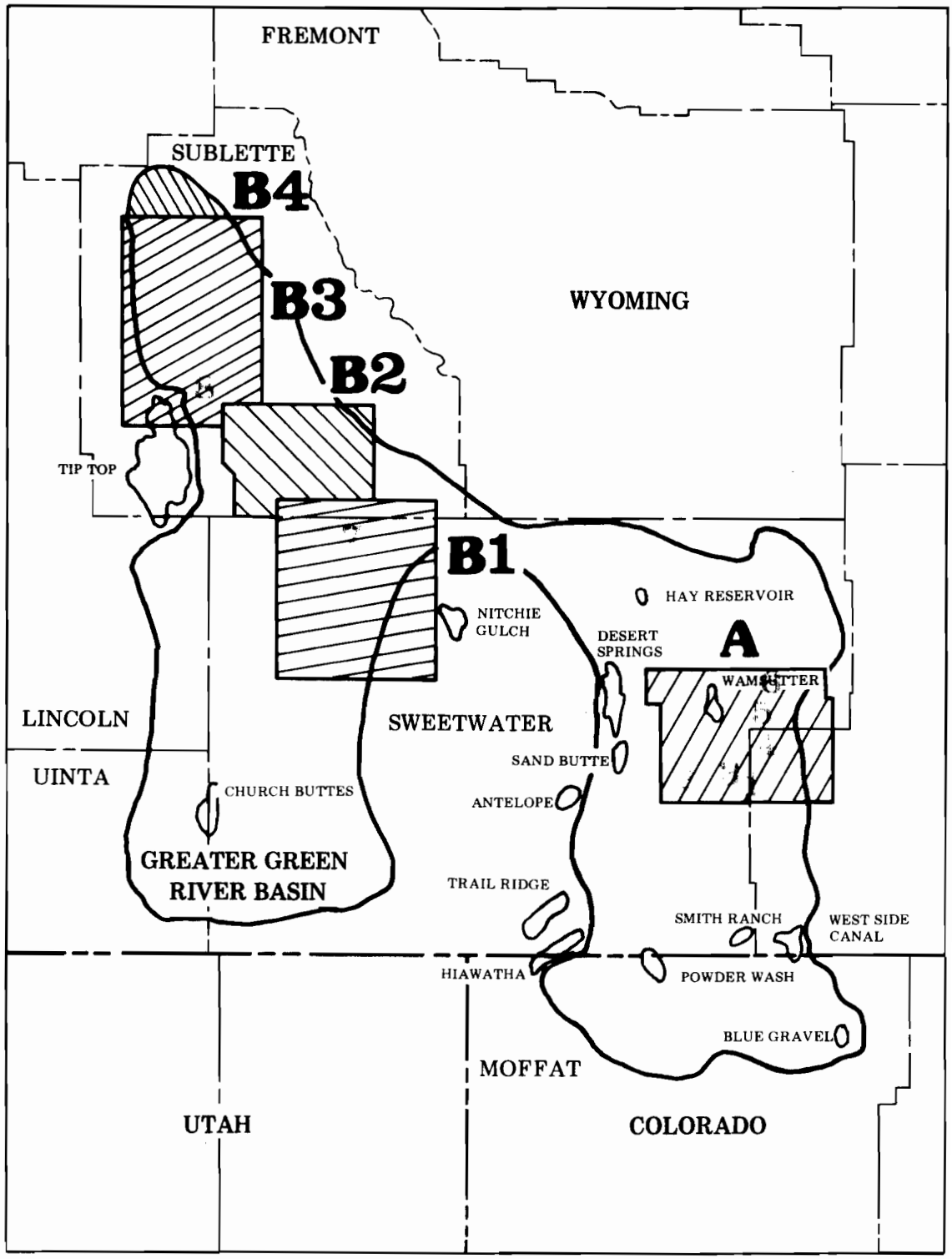


Figure 3-1 USGS Designated Core Areas and Wells of Interest, Greater Green River Basin (refer to Table 3-1)

Table 3-1 Summary of Wells Located in USGS Designated Core Areas—Greater Green River Basin[1]

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: 8-10-78 CP: 1-16-79	Amoco Production	1 Champlin 336 Amoco B	1	csw 7/17N/93W Wild Rose Field Carbon Cty, WY	Mesaverde (9,331-9,670)	9,933	3,360 gal acid 52,920 gal water 100,000 lb sand	DG located in core area A	200
SP: 8-3-78 CP: 12-8-78	Smokey Oil	2-18 Bluewater Federal	2	nwsw 18/17N/96W Unnamed Field Sweetwater Cty, WY	Mesaverde (12,099-963 gross)	13,007 PB: 12,827	131,400 gal gel el 177,150 lb sand	WFD, Mesaverde Discovery-New Field, located in core area A	250
SP: 9-10-78 CP: 11-20-78	Davis Oil	2 Nickel Unit	3	nesw 28/18N/94W Wild Rose Field Sweetwater Cty, WY	Ericson (9,861-10,138)	10,315 PB: 10,275	Acdz. 3,000 gal 131,124 gal oil 250,000 lb sand	DG, no cores 10 BCPD, located in core area A	1,320
SP: 8-2-78 CP: 1-6-79	CIG Exploration	1-26-19-93 Federal	4	e½sw 26/19N/93W Standard Draw Field Carbon Cty, WY	Mesaverde (8,897-9,616 gross)	9,720	46,000 gal acid 125,000 gal gel 205,000 lb sand	WOE, Mesa-verde Extension-Standard Draw Field, located in core area A	1,500
FR: 2-6-79	Amoco Production	1 Champlin 242 Amoco-K	5	w½sw 33/20N/93W Echo Springs Field Sweetwater Cty, WY	Mesaverde (10,015)			D, located in core area A	
SP: 2-15-78 CP: 2-21-79	Amoco Production	3 Unit	6	csw 35/21N/93W Five Mile Gulch Field Sweetwater Cty, WY	Almond (10,408-10,418)	11,066 PB: 10,600	Acidized w/ 650 gal	WSD, in core area A, Almond Shallower Pool Discovery	572 3BC
SP: 7-30-75 CP: 7-14-77	Davis Oil	1 Simpson Gulch Unit	7	swne 31/25N/107W Unnamed Field Sweetwater Cty, WY	Mesaverde (10,537-10,541)	17,180 PB: 17,130		WFD in core area B, Mesaverde Discovery-New Field	97
FR: 3-21-79	Woods Petroleum	23-1 GUIO	8	swne 23/30N/112W Wildcat Field Sublette Cty, WY	Frontier (14,000)			WF, located in core area B_3	

[1] From Petroleum Information

Davis Oil has been prominent in drilling deep tests in the center of the Washakie Basin, some of which are projected to the Dakota Formation. The Green River Basin proper and Red Desert Basin have similar coring objectives. These objectives include lower Tertiary, Lance, Lewis, and Mesaverde horizons. Another test in process is being completed by Rainbow Resources in Sublette County, Wyoming. The Pacific Creek Unit No. 1-34 Federal, Sec. 34-T27N-R103W is projected to the Madison Formation at 26,000 ft. This well will be the deepest test in the Rocky Mountain Region.

3.2 DRILLING ACTIVITY

Fifty-eight wells were completed in horizons of interest in the Greater Green River Basin: 36 development wells and 22 wildcats. There was a decrease of 3 development wells and 8 wildcats from the previous quarter. Yet, there was nearly a 50 percent increase in drilling activity for the 1st quarter, 1979 as compared to the 1st quarter, 1978.

During January, February, and March new gas production from the Frontier, Ericson, Almond, Lewis, and Fort Union totaled 43,371 MCFD (See Table 3-2). Figure 3-2 is a stratigraphic correlation chart of the Greater Green River, Uinta, and Piceance Basins.

*Table 3-2 Summary of Drilling Activities, Greater Green River Basin**

	NO. OF WELLS					Producing Horizons in MCFD											
	Wildcats		Development		Total					Mesaverde							
	D&A	Disc.	D&A	Prod.		Fort Union	Lance	Lewis	Undifferentiated	Almond	Ericson	Blair	Frontier	Aspen-Mowry	Bear River	Commingled	Total
2nd Quarter 1977	13	21	6	10	50	4,640	0	11,633	3,651	5,444	500	0	32,924	0	0	0	58,792
3rd Quarter 1977	18	13	6	19	56	4,813	0	19,695	16,929+ 25 BC	2,871	0	0	9,016	0	0	0	53,324+ 25 BC
4th Quarter 1977	20	13	10	31	74	450	1,026	9,218	19,156	17,001	3,982	1,298	21,189	0	760	362[1]	74,442
1st Quarter 1978	7	5	6	12	30	0	0	1,852	5,385[7]	450	0	0	8,603	400	0	1,500[1]	18,190
2nd Quarter 1978	7	6	3	27	43	0	0	11,020	14,304	6,994	0	0	5,179	0	0	4,239[2]	45,595
3rd Quarter 1978	18	15	3	27	63	449	53	5,504+ 37 BC	16,999+ 69 BC	11,432	536	0	21,268+ 26 BC	0	0	10,048[2]	66,289+ 132 BC
4th Quarter 1978	18	12	13	26	69	1,925	0	20,388	5,070	8,690	1,199	0	20,969	0	0	789[4]	57,831
1st Quarter 1979	10	12	6	30	58	994	0	9,378[6]	6,269[7]	2,029	1,320	0	21,234[8]	0	0	2,137[5]	43,371

1. Lewis/Almond
2. Frontier/Bear River
3. IPF not available for one well
4. Lance/Lewis
5. Lewis/Lance - 789
   Mesaverde/Ericson - 821
   Lance/Fort Union - 499
   Lewis/Hilliard - 28
6. IPF not available for two wells
7. IPF not available for three wells
8. IPF not available for four wells

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

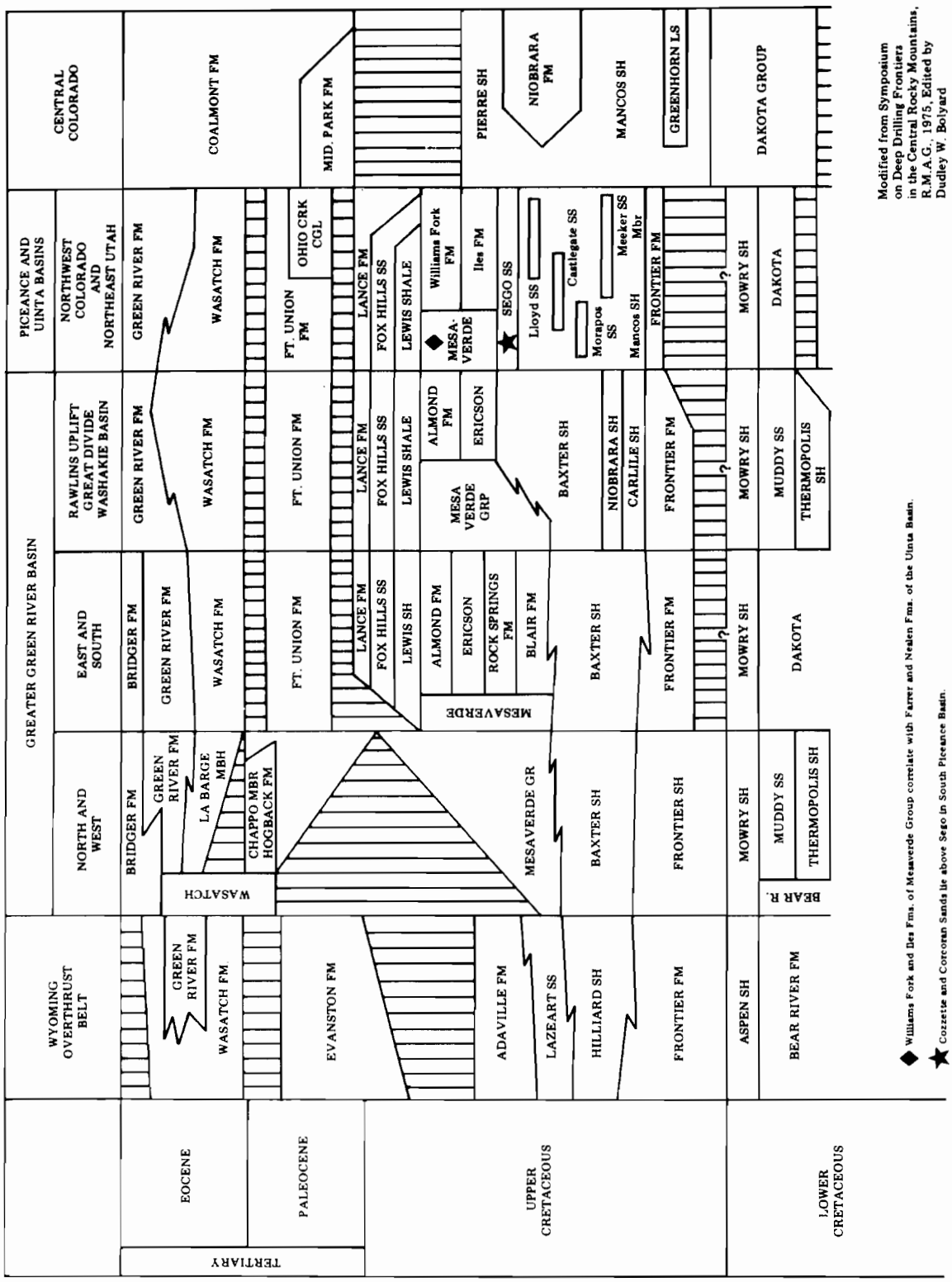


Figure 3-2 Stratigraphic Correlation Chart of Greater Green River, Piceance and Uinta Basins

The most active drilling in the basin continued in the Wamsutter area of Sweetwater and Carbon Counties, Wyoming. The major objective is the Upper Mesaverde Group. The commercial section is not of prime interest to the WGSP Core Program in the Wamsutter area. However, south of the Wamsutter area the complete Mesaverde section in the Washakie Basin, is of interest. The Lewis, Lance, and Fort Union Formations are also considered to have low-permeability gas potential in this area. Very few wells have been drilled through the Mesaverde section in this area, none in the deepest part of the basin. Koch Exploration and Smokey Oil have participated in recent tests in deeper parts of the Washakie Basin. These tests are still being evaluated. Hopefully, more well control will be obtained from the tests.

North of Wamsutter in the Red Desert (Great Divide) Basin, primary drilling objectives are the Lewis, Almond, and Ericson Formations. Almond and Ericson production is primarily in the southern part of the basin while Lewis production is more prevalent in the northern part. Few wells have penetrated the entire Mesaverde section in the northern end of the basin. Lower Tertiary, Lance, Lewis, and the Mesaverde horizons are of foremost interest for core selection in the basin. Davis Oil, Champlin Petroleum, Getty Oil, Pacific Transmission Supply, Belco Petroleum, Amoco Production and Marathon Oil have been the major operators in the Red Desert Basin during the first quarter, 1979 (see Tables 3-3 and 3-4, and Figure 3-3). There probably will be more deep tests in the northern (deeper) part of the basin based on the track record of some operators, notably Davis Oil (drilling deep wildcats in the Green River Basin proper, which lies west of the Rock Springs Uplift).

Chevron's USA 95 Unit well produced 1,064 MCFGD from the Frontier Formation in Sublette County, Wyoming after a large frac treatment of 240,754 gal of water and 396,687 lb of sand.

Table 3-3 Summary of Wells Completed—Greater Green River Basin[1]

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: 1-6-79 CP: 2-28-79	Champlin Petroleum	Sunmark Expl. 22-24 Moffat Cty (9-94)	1	senw 24/9N/94W Wildcat Field Moffat Cty, CO	Mesaverde	9,000		WF, no cores or tests	D&A
FR: 10-27-78 SP: 12-23-78	Getty Oil	2-23 McPherson Springs	2	nwne 23/13N/94W Wildcat Field Sweetwater Cty, WY	Mesaverde	5,648		WF, WOO	
FR: 12-27-78 SP: 1-22-79	Davis Oil	1 Triton Unit	3	nesw 33/14N/95W Wildcat Field Sweetwater Cty, WY	Mesaverde	12,459		WF, nippling up	
SP: 7-21-78 CP: 10-10-78	Oil Development of Texas	13-35 Unit	4	swse 35/13N/ 101W Canyon Creek Field Sweetwater Cty, WY	Lance 4007-13 Lewis 4181-86	4,226 PB: 4,194	Acdz. 500 gal, Fract. w/56,000 gal gel, 55,500 lb sand	DG, ran 20 SDWL cores, no tests, Commingled	789
FR: 6-12-78 SP: 8-14-78	Koch Exploration	1 Adobe Town Unit	5	swse 20/15N/97W Wildcat Field Sweetwater Cty, WY	Mesaverde	17,662		WF, close to core area A, WOCT	
FR: 9-21-78 SP: 1-8-79	Smokey Oil	3-18 Bluewater Federal	6	cne 18/15N/99W Wildcat Field Sweetwater Cty, WY	Mesaverde	11,350		WF, SDR	

[1] From Petroleum Information

Table 3-3 Continued

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: 8-16-77 CP: 4-7-78	Woods Petroleum	1 Leo II	7	senw 20/15N/ 111W Leo Field Sweetwater Cty, WY	Hilliard (13,682-13,836) Frontier (13,837-12,892)	16,325 PB: 14,130	20,000 gal water er 32,000 lb sand	WDD, Comming-led Hilliard-Frontier deeper pool discov-Leo Field	28
SP: 1-4-79 CP: 3-17-79	Diamond Shamrock	1 Hank Unit	8	swne 20/15N/118W Wildcat Field Uinta Cty, WY	Dakota	13,551		WF	D&A
FR: 12-4-78	Davis Oil	1 Coronet Federal	9	cse 8/18N/92W Creston Field Carbon Cty, WY	Mesaverde			WO, located in core area A, Aban location.	
SP: 9-28-78 CP: 12-11-78	St. Michael Exploration	1-36 State	10	sene 36/18N/ 100W Unnamed Field Sweetwater Cty, WY	Almond (3,614-3,623)	4,053	Acdz. 1,800 gal	WFD, no cores Almond Dis-covery-New Field	700
FR: 9-14-78 2-25-79	Amoco Production	1 Champlin 149 Amoco H	11	nwnw 3/18N/112W Bruff Field Uinta Cty, WY	Frontier	7,879		D, Rng. logs	
FR: 11-21-78 2-2-79	Davis Oil	1 Bayard-Federal	12	csw 18/20N/92W Wildcat Field Sweetwater Cty, WY	Mesaverde	10,756		WF, located in core area A, MICT	
FR: 10-6-78 SP: 10-9-78	Pacific Transmission Supply	3-36X State	13	sesw 36/20N/93W Echo Springs Field Sweetwater Cty, WY	Mesaverde	10,019		D, located in core area A, Ran prod. csg. WOCT	
FR: 8-29-78 10-3-78	Mobil Oil	T66-16-S A Gilbert	14	nese 16/20N/98W Desert Springs Field Sweetwater Cty, WY	Mesaverde	6,100		D, Perfed 5,687-5,719, SI	
FR: 9-26-78 SP: 11-11-78	Pacific Transmission Supply	3-26 Federal	15	e½sw 26/22N/94W Siberia Ridge Field Sweetwater Cty, WY	Mesaverde	11,427		D, WOCT	
SP: 12-30-78 CP: 2-12-79	Kenneth Luff	4-34 C Federal	16	swnw 34/22N/ 102W Wildcat Field Sweetwater Cty, WY	Dakota	8,847		WF, D&A	
FR: 9-15-78	Texas Oil & Gas	1 Federal 477	17	csw 21/25N/96W Unnamed Field Sweetwater Cty, WY	Rock Springs	14,000		WO, rgn logs, tight hole	
SP: 1-9-79 CP: 3-13-79	Davis Oil	2 Bastard Butte Unit	18	nwse 36/25N/97W Unnamed Field Sweetwater Cty, WY	Mesaverde	11,870		WFX, RURT, old info: OTD 11,847 ft, Comp 10-10-78, 101 MCFD. Prod. zone-Lewis (10,925-10,934 ft) Temp. Abnd.	
SP: 11-25-78 CP: 12-14-78	J. B. Roden	5-4 Tartan's Island Unit	19	nenw 4/27N/112W Tartan's Island Sublette Cty, WY	Mesaverde	3,501		D, no cores	D&A

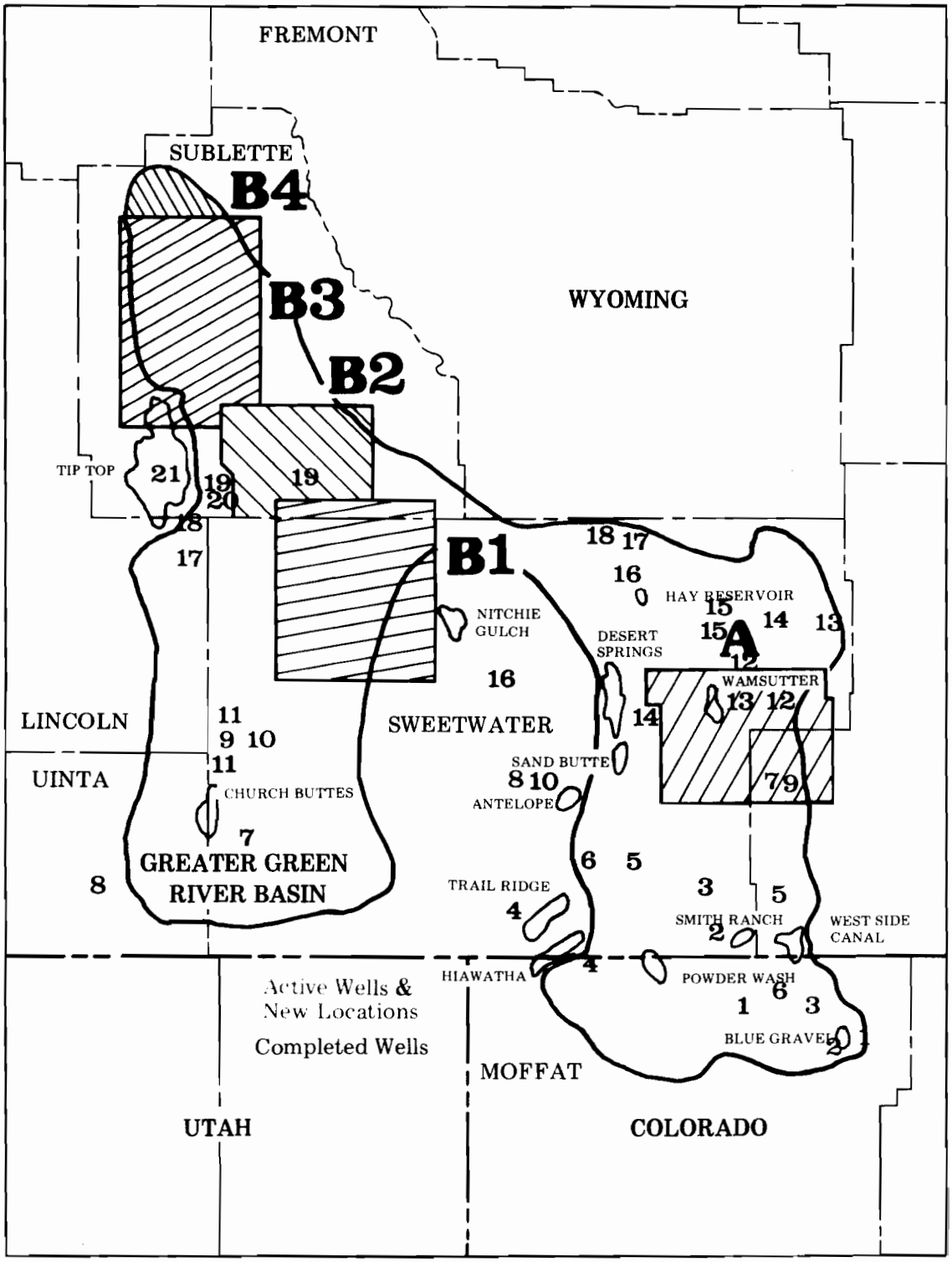


Figure 3-3 Wells Completed and Staked, USGS Designated Core Areas, Greater Green River Basin (refer to Tables 3-3 and 3-4)

Table 3-4 Summary of Active Wells and New Locations—Greater Green River Basin[1]

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	PROJECTED HORIZON (Depth in ft)	COMMENTS
FR: 3-20-79	Sun Gas	29-1 Federal Fox	1	nwnw 29/8N/90W Craig North Field Moffat Cty, CO	Lewis (3,800)	D
FR: 7-5-78	CIG Exploration	1-2-8-91 Visintainer Sheep	2	nesw 2/8N/91W Blue Gravel Field Moffat Cty, CO	(5,200)	WO, at 4,775 ft, running logs
FR: 9-12-78	Sun Gas	1-16 State	3	cne 16/9N/93W Great Divide Field Moffat Cty, CO	Lewis (8,000)	WO
FR: 10-18-78	Wexpro Co.	1 Unit	4	nenw 22/12N/100W Hiawatha Field Moffat Cty, CO	Chinle (15,100)	WD, no depth reported
FR: 8-8-78	Sinclair Oil	34-1 Hamilton Federal	5	nese 34/15N/92W Blue Gap Field Carbon Cty, WY	Mesaverde (8,900)	D
FR: 11-1-78	Northwest Exploration	1 Moffat Cty	6	s½sw 29/10N/93W Great Divide Field Moffat Cty, CO	Lewis (8,000)	D
FR: 11-14-78	Amoco Production	1 Champlin 226 Amoco G	7	csw 33/18N/93W Unnamed Field Carbon Cty, WY	Mesaverde (9,265)	WO, Spud 10-30-78, located in core area A.
FR: 10-19-78	Amoco Production	1 Champlin 358 Amoco C	8	nenw 19/18N/111W Wildcat Field Sweetwater Cty, WY	Frontier (12,000)	WF
FR: 10-12-78	Amoco Production	1 Champlin 149 Amoco J	9	swnw 11/19N/112W Bruff Unit Sweetwater Cty, WY	Frontier (11,628)	D
FR: 10-20-78	Amoco Production	1 Champlin 206 Amoco F	10	swnw 31/19N/111W Bruff Field Sweetwater Cty, WY	Frontier (12,000)	WO
FR: 11-10-78	Amoco Production	7 Seven Mile Gulch	11	nesw 31/20N/112W Wildcat Field Sweetwater Cty, WY	Frontier (12,000)	WF
FR: 7-11-78	Cotten Petroleum	18-1 Hammond Federal	12	e½sw 18/21N/94W Siberia Ridge Field Sweetwater Cty, WY	Mesaverde (10,600)	D, located in core area A
FR: 9-14-78	Amoco Production	1 Champlin 536 Amoco C	13	csw 31/22N/91W Unnamed Field Sweetwater Cty, WY	Mesaverde (13,100)	WO
FR: 11-21-78 12-29-78	Pacific Transmission Supply	1-8 Federal	14	swnw 8/22N/92W Wildcat Field Sweetwater Cty, WY	Mesaverde (13,400)	WF, Drlg. at 11,014
FR: 12-18-78	Pacific Transmission Supply	3-2 Federal	15	csw 2/22N/94W Wildcat Field Sweetwater Cty, WY	Ft. Union (3,400)	WF
FR: 10-9-78	Davis Oil	23 Hay Reservoir Unit	16	senw 8/24N/96W Hay Reservoir Field Sweetwater Cty, WY	Lewis (11,000)	D
FR: 8-11-78	Pacific Transmission Supply	23-1 Federal	17	nesw 1/25N/112W Fontenelle Field Lincoln Cty, WY	Frontier (8,770)	D

[1] From Petroleum Information

Table 3-4 Continued

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	PROJECTED HORIZON (Depth in ft)	COMMENTS
FR: 9-27-78	John J. Christmann	3-20 Red Gap	18	nenw 28/26N/113W South Hog's Back Field Lincoln Cty, WY	Frontier (8,600)	D, well number changed from 3-28, Drlg. 6,042.
FR: 12-12-78	Davis Oil	1 Bright Trail Unit	19	swne 21/27N/108W Wildcat Field Sublette Cty, WY	Mesaverde (12,000)	WF
FR: 10-27-78	Energetics Inc.	10-5 Federal	20	cnw 5/27N/111W Wildcat Field Sublette Cty, WY	Bear River (10,800)	WF
FR: 9-11-78	Western Oil Refining	14-9 Federal	21	swsw 9/27N/113W North LaBarge Field Sublette Cty, WY	Mesaverde (2,300)	D

4. Uinta Basin

4.1 CORE PROGRAM

The Uinta Basin is located in northeastern Utah (see Figure 4-1) and has potential production from "tight gas sands" in a thick section of Upper Cretaceous through Tertiary sediments. Cretaceous tight horizons include the Castlegate and Sego sandstones and the Blackhawk, Price River, Neslen and Farrer Formations. In the 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, R7, 8, and 9E; in Carbon County, T11S to T12S, R7E to R13E.

Area B

Duchesne and Uintah Counties — T3S to T4S, R2E to R2W and parts of T8S, R16E to R18E.

Area C

Uintah County — T8S and T9S and R23, 24, and 25E.

Area D

Uintah and Grand Counties — T10S, R18E, T11S to T16S, R18E to R25E; and in T17S, T18S, and T19S, R21E and R22E.

These areas were selected due to their lack of core and well data, and location outside the main productive fields of the Uinta Basin. Activity is concentrated in and around the Natural Buttes and Red Wash Fields, where production is primarily from the Green River and Wasatch Formations, and Mesaverde Group.

Within the core areas, newly staked locations are monitored so that operators can be contacted concerning participation in the WGSP Core Program (see Table 4-1).

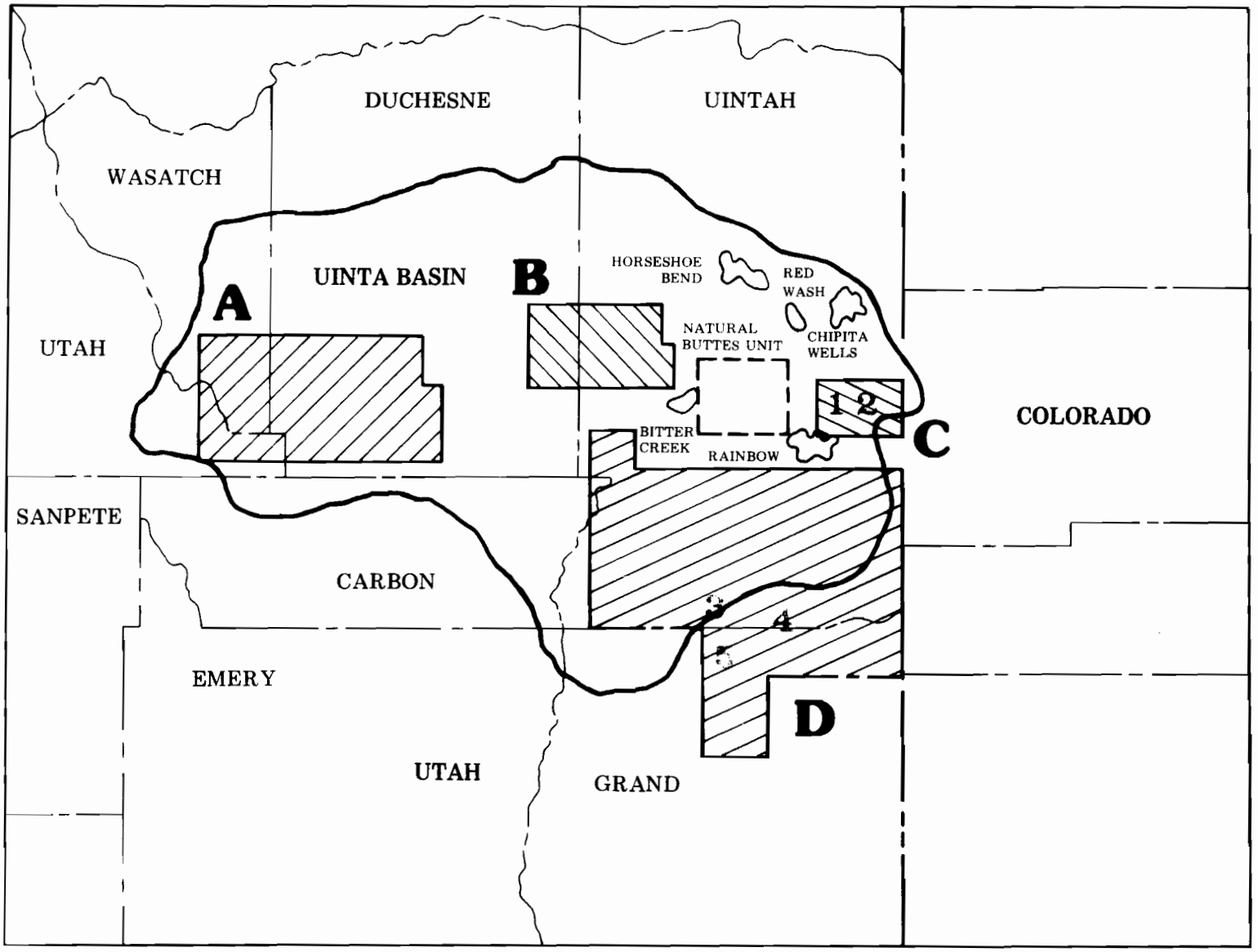


Figure 4-1 USGS Designated Core Areas and Wells of Interest, Uinta Basin (refer to Table 4-1)

Table 4-1 Summary of Wells Located in USGS Designated Core Areas—Uinta Basin[1]

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: 4-16-78 CP: 12-2-78	Continental Oil	15-2 Chapita-Federal	1	sese 15/9S/23E Natural Buttes Uintah Cty, UT	Mesaverde 7,834-8,747 gross Castlegate 8,875-9,036 gross	9,170		DG, completion No cores or tests located in core area C.	410
FR: 1-23-79	Pacific Transmission Supply	23-17 Devil's Playground Federal	2	nesw 17/9S/24E Natural Buttes Uintah Cty, UT	Mesaverde (7,100)			Development well, located in core area C.	
CP: 7-22-78	Exxon Corp.	Wolf Point Unit-1	3	sese 2/15S/21E Uintah Cty, UT		10,300		DG, completion, located in core area D, P&A	
SP: 5-15-78 CP: 9-23-78	Coseka Resources	14-16 Main Canyon Unit	4	nenw 16/15S/23E Unnamed Field Uintah Cty, UT	Dakota (8,420-8,515) open hole	8,515		WFD, Dakota Discovery-New Field in core area D.	2,558
CP: 11-7-78	Anschutz Corp.	State 921-1	5	nenw 34/16S/21E Grand Cty, UT	(Morrison)	10,350		D, completion located in core area D, P&A	

[1] From Petroleum Information

There was little core program activity in the Uinta Basin during the first quarter of 1979. Ensearch Exploration and Pacific Transmission Supply staked several locations in the Natural Buttes area and were contacted during the quarter for possible participation in the WGSP Core Program. No agreements were reached.

Operations were delayed or suspended in the central and southern portions of the Uinta Basin due to adverse winter weather and, in some cases, government requirements related to RARE II studies.

4.2 DRILLING ACTIVITY

Forty-one development wells and 7 wildcats were completed in the Uinta Basin from January to March, 1979. There was an increase in completions of 18 development wells and 2 wildcats over the fourth quarter, 1979.

New gas production from the Castlegate, Mesaverde, Wasatch, and Green River added a minimum of 43,268 MCFD (see Table 4-2). This is 35,813 MCFD and 35,086 MCFD more than the previous quarter and first quarter, 1979 respectively.

The Wasatch Formation is the major objective of most operators within the tight gas sand interval, accounting for at least 80 percent of the total new gas production tabulated during the first quarter. Although IP's from single completions in the Mesaverde have not shown any pattern over the past two years, there are indications that commingled Wasatch/Mesaverde production is increasing. The third quarter, 1978 showed a significant high point (15,742 MCFD) reported from commingled production, a trend not continued into the fourth quarter, 1978. Commingled Wasatch/Mesaverde production reached 3,550 MCFD in the first quarter, 1979, a total exceeded only by the third quarter, 1978.

*Table 4-2 Summary of Drilling Activities, Uinta Basin**

	NO. OF WELLS					Producing Horizons in MCFD						
	Wildcats		Development		Total							
	D&A	Disc	D&A	Prod.		Green River	Wasatch	Mesaverde	Mancos	Mancos B	Commingled	Total
2nd Quarter 1977	7	2	0	6	15	93	3,553	1,743	0	0	0	5,389
3rd Quarter 1977	5	2	1	8	16	not available	12,611	0	0	0	0	12,611
4th Quarter 1977	4	0	2	14	20	0	21,901	1,850	0	0	1,400[1]	25,151
1st Quarter 1978	5	1	0	6	12	0	8,182	0	0	0	0	8,182
2nd Quarter 1978	1	1	1	15	18	0	19,411	329	314	0	750	20,804
3rd Quarter 1978	3	1	0	8	12	1,800	4,214[2]	2,918	0	288	15,742	24,962
4th Quarter 1978	1	4	1	22	28	1,692	2,084[3]	3,679	0	0	0	7,455
1st Quarter 1979	3	4	1	40	48	3,431[2]	35,011[5]	662[2]	0	204	3,960[4]	43,268

1. Wasatch/Mesaverde
2. IPF not available for one well
3. IPF not available for eight wells
4. Mesaverde/Castlegate - 410
   Mesaverde/Wasatch - 3,500
5. IPF not available for four wells

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

The most active area has been around the Natural Buttes - Chapita wells - Bitter Creek Units where CIG Exploration, Continental Oil Company, Ensearch Exploration, Pacific Transmission Supply, and Belco Petroleum have been drilling and routinely massively fracturing Wasatch and Mesaverde wells. Initial production from some of the fractured wells is very small but still commercial due to the proximity of gathering lines within these increasingly important fields.

Belco Petroleum treated their 31-12 Natural Buttes Unit well in Uintah County, Utah with 218,000 gal of emulsion and 414,000 lb of sand. It was one of the largest fracture treatments performed in the basin during the first quarter, 1979 and produced 2,530 MCFD from the Wasatch Formation.

Summaries of completed wells, and active wells and new locations appear in Tables 4-3 and 4-4 respectively. Figure 4-2 shows the locations of these wells.

Table 4-3 Summary of Wells Completed —Uinta Basin[1]

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: 8-21-78 SP: 9-4-78	Koch Exploration	10-1 Reiman	1	nesw 10/4S/6W Wildcat Field Duchesne Cty, UT	Wasatch	7,136		WF, located in core area A, ran prod. csg.	
SP: 7-25-78 CP: 6-30-78	Pacific Transmission Supply	44-36 State	2	sese 36/8S/15E Unnamed Field Duchesne Cty, UT	Parachute Creek (2,942-68)	7,165 PB: 5,000	14,000 gal acid	WFD completion, no cores. Parachute Creek Discovery-New Field	60
SP: 3-1-78 CP: 10-2-78	Pacific Transmission Supply	32-29 PTS-Federal	3	swne 29/8S/17E Unnamed Field Duchesne Cty, UT	Douglas Creek (6,322-70 gross)	14,245 PB: 6,402	Acidized 4,000 gal, Fract. w/ 33,424 gal gel 52,000 lb sand	WFD, Douglas Discovery-New Field	Not Available
FR: 6-13-78	Continental Oil	35-8 Conoco-Ute Tribal	4	nese 35/8S/20E (SLM) Natural Buttes Field Uintah Cty, UT	Mesaverde			D, Abnd. loc.	
SP: 6-13-78 CP: 1-11-79	Continental Oil	34-2 Conoco-MTN LION	5	nese 34/8S/21E Ouray Field Uintah Cty, UT	Wasatch (5,953-6,878)	10,227 PB: 8,015	Perf. 5,954-6,878 Acidized, Fract. w/185,850 gal water, 312,500 lb sand, Perf 8,188-9,923, Fract.	DG, no cores or tests	3,234
SP: 1-28-78 CP: 11-1-78	Gas Producing Enterprises	27-A Natural Buttes Unit	6	swne 33/9S/21E Natural Buttes Field Uintah Cty, UT	Wasatch (5,829-7,317) gross	7,430 PB: 7,395	Acidized 4,000 gals, 119,700 gal water, 262,000 lb sand	DG, no cores or tests	1,090
SP: 10-16-78 CP: 2-6-79	CIG Exploration	55-1-10-21 Natural Buttes Unit	7	senw 1/10S/21E Natural Buttes Field Uintah Cty, UT	Wasatch (5,249-6,088)	6,200 PB: 6,170	1,600 gal acid, 91,000 gal gel, 110,000 lb sand	DG, no cores or tests	2,000
SP: 5-20-78 CP: 1-4-79	Belco Petroleum	31-12B Natural Buttes Unit	8	nwnw 12/10S/22E Natural Buttes Field Uintah Cty, UT	Wasatch (5,189-6,958)	7,126 PB: 7,079	218,000 gal emul, 414,000 lb sand	DG, no cores or tests	2,530
SP: 1-3-77 CP: 10-13-78	Coseka Resources	1 Dry Burn Unit	9	nwse 29/13S/25E Unnamed Field Uintah Cty, UT	Mancos B (5,536-5,686)	5,792 PB: 5,699	Acidized 500 gal, 39,800 gal water, 82,800 lb sand	WFD, no cores or tests, Mancos B Discovery-New Field	204
SP: 10-25-78 CP: 12-7-78	Pacific Transmission Supply	44-3 Federal	10	sese 3/14S/20E Wildcat Field Uintah Cty, UT	Mancos	7,906		WF, located in core area D, D&A	

[1] From Petroleum Information

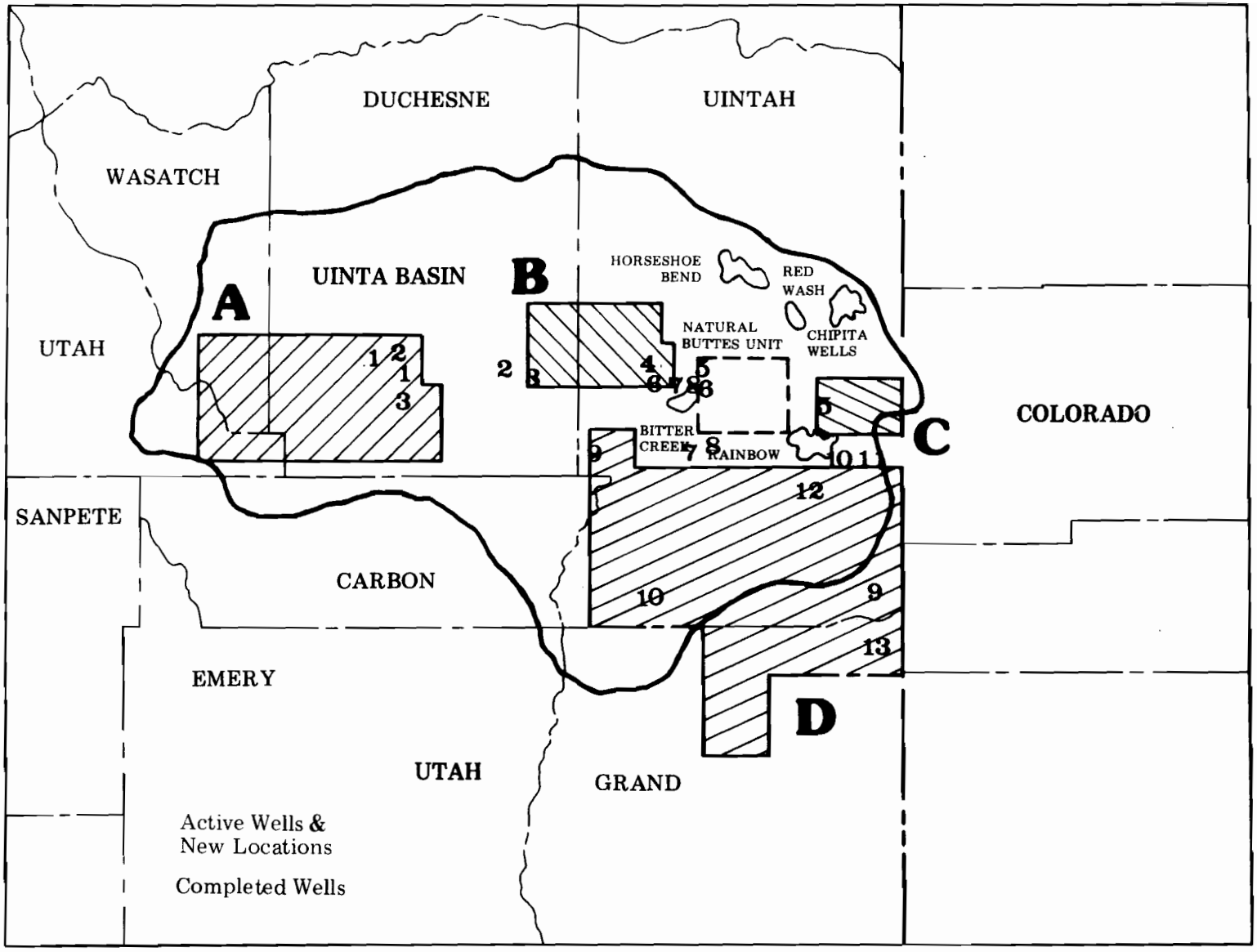


Figure 4-2 Wells Completed and Staked, USGS Designated Core Areas, Uinta Basin (refer to Tables 4-3 and 4-4)

Table 4-4 Summary of Active Wells and New Locations—Uinta Basin[1]

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	PROJECTED HORIZON (Depth in ft)	COMMENTS
FR: 10-17-78 Spud: 9-4-78	Oil Development of Utah	10-1 Ute-Tribal	1	senw 10/4S/5W Starvation Field Duchesne Cty, Utah	Wasatch (8,163)	D, located in core area A, at 7,136 ft, rgn lnr, tight hole. Old info: formerly Brinkerhoff Drilling 10-1 Ute-Tribal, Spud 11-30-71, Comp 2-20-72, D&A.
FR: 8-11-78	Gulf Oil	1-19-Ute Tribal	2	nwsw 19/4S/6W (USM) Wildcat Field Duchesne Cty, UT	Wasatch (8,000)	WF, located in core area A.
FR: 9-8-78	Odessa Natural	18-1 Sowers Canyon Unit	3	senw 16/6S/5W (USM) Wildcat Field Duchesne Cty, UT	Mesaverde (15,400)	WF, located in core area A.
FR: 7-17-78	Energy Reserves Group	1 State of Utah	4	nwsw 29/7S/21E (SLM) Brennan Bottom Field Uintah Cty, UT	Wasatch (7,000)	D
FR: 7-24-78	Amoco Production	1 Cottonwood Canyon USA	5	swnw 7/9S/6E (SLM) Wildcat Field Uintah Cty, UT	13,000	WF, located in core area C.
FR: 4-26-78	Mapco Inc.	7-25 B RBU	6	swne 25/9S/19E (SLM) Natural Buttes Field Uintah Cty, UT	Mesaverde (8,730)	D
FR: 9-27-78 Spud: 2-23-79	CIG Exploration	22-15-9-20 CIGE	7	senw 15/9S/20E (SLM) Natural Buttes Field Uintah Cty, UT	Wasatch (7,200)	D, Drg 6,881.
FR: 11-21-78	Pacific Transmission Supply	21-19 Devil's Playground Federal	8	nenw 19/9S/24E Natural Buttes Field Uintah Cty, UT	Mesaverde (7,125)	D, located in core area C, Operator has 3 additional Mesaverde tests in this locale.
FR: 4-26-78	Mapco, Inc.	5-1 D RBU	9	swnw 11/10S/18E Uteland Butte Field Uintah Cty, UT	Mesaverde (8,455)	D, located in core area D.
FR: 3-27-78	Ensearch Exploration	1-6 Sage HEN Federal	10	nese 6/10S/23E Natural Buttes Field Uintah Cty, UT	Mesaverde (7,000)	D, Operator has 8 other Mesaverde tests in this locale.
FR: 11-1-78	Ensearch Exploration	1-6 PTS Federal	11	senw 6/10S/24E Natural Buttes Field Uintah Cty, UT	Mesaverde (9,000)	D
FR: 11-1-78	Ensearch Exploration	1-3 Bitter Creek Federal	12	swne 3/11S/22E Natural Buttes Field Uintah Cty, UT	Mesaverde (7,500)	D, located in core area D.
FR: 10-9-78	Palmer Oil & Gas	13-9 Federal	13	nese 13/16S/25E San Arroyo Field Grand Cty, UT	Morrison (5,600)	D, located in core area D.

[1] From Petroleum Information

5. Piceance Basin

5.1 CORE PROGRAM

The Piceance Basin of northwestern Colorado (Figure 5-1) 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 all 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 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 are 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:

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 (below the Wasatch Formation).

Area C

Garfield and Mesa Counties, T5S to T8S, R95W in the north tapering down to T98W to R99W on the southern part of the area.

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, see Table 5-1, Figure 5-1).

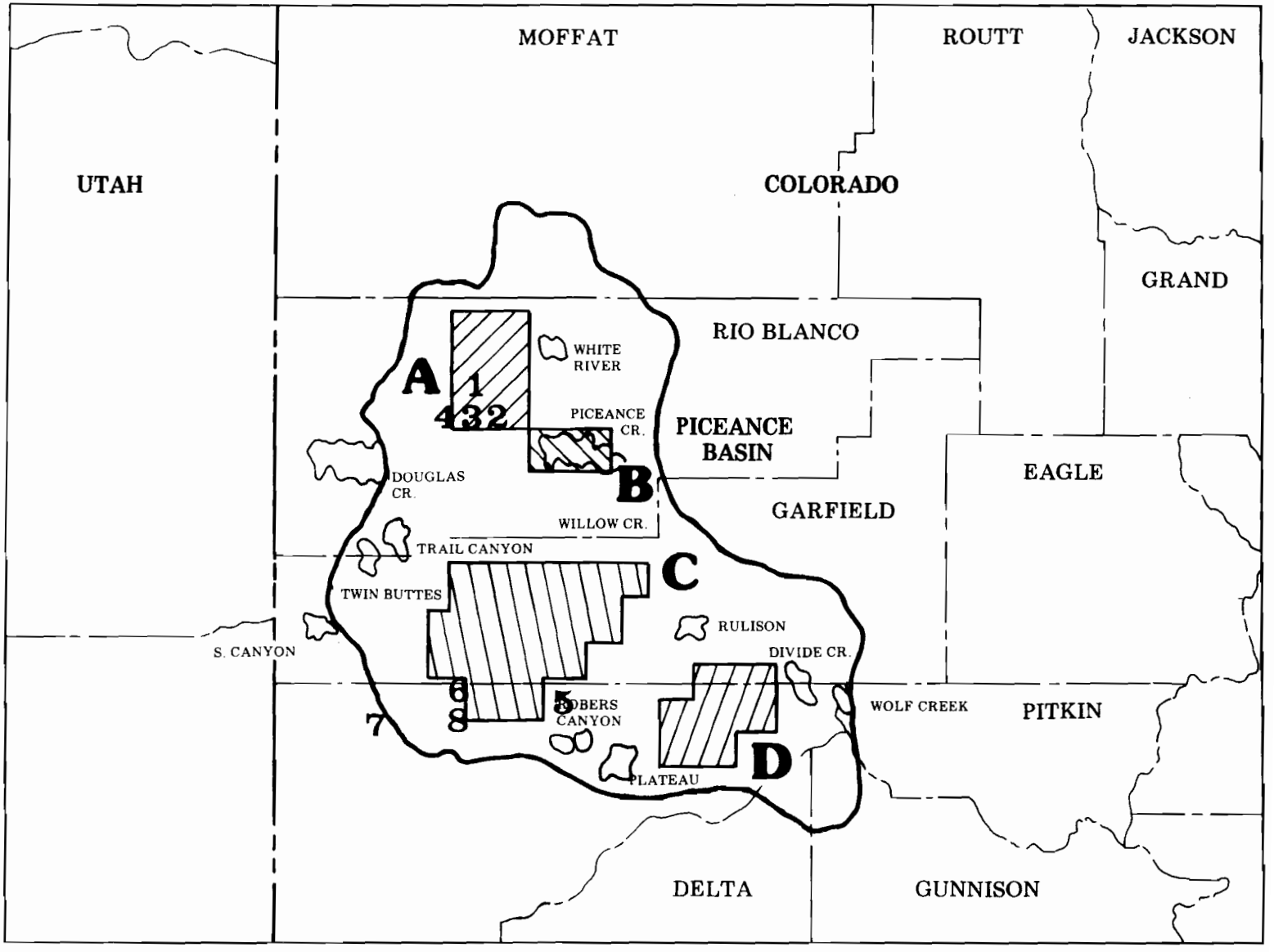


Figure 5-1 USGS Designated Core Areas and Wells of Interest, Piceance Basin (refer to Table 5-1)

Table 5-1 Summary of Wells Located in USGS Designated Core Areas—Piceance Basin[1]

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: 1-30-79	Teton Energy	14-1 Yellow Creek Federal	1	nene 14/1S/99W Wildcat Field Rio Blanco Cty, CO	Mancos (11,500)			WF, located in core area A.	
SP: 8-10-78 CP: 12-5-78	Mobil Oil	T18-13G USA	2	swsw 13/2S/97W Piceance Creek Rio Blanco Cty, CO	Wasatch (2,338-2,684)	3,113		DG, Perf. 2,338-2,684 located in core area A.	6,730
FR: 1-8-79	CSG Exploratory	298-29-2 Government	3	senw 29/2S/98W Sulphur Creek Rio Blanco Cty, CO	Mancos (17,800)			WD, located in core area A.	
SP: 9-25-78 CP: 2-1-79	David B. Munson	5-2-99 Federal	4	swnw 5/2S/99W Unnamed Field Rio Blanco Cty, CO	Mancos (6,812-8,342)	8,952 PB: 8,426	105,000 gal. emul. 246,000 lb. sand	DG, no cores or tests, located in core area A.	663
SP: 9-6-78 CP: 1-31-79	David B. Munson	2-8D Munson	4	nenw 8/2S/99W Unnamed Field Rio Blanco Cty, CO	Mancos (8,785-9,442)	9,600 PB: 9,525	70 Ton CO_2 468,000 lb. sand	DG, no cores or tests, located in core area A.	530
FR: 3-23-79	Teton Energy	29-2 Federal	5	swnw 29/8S/97W Debeque Field Mesa Cty, CO	Corcoran (4,400)			WD, located in core area C.	
FR: 10-19-78 SP: 11-27-78	Koch Exploration	1 Federal	6	nwnw 13/8S/99W Wildcat Field Mesa Cty, CO	Dakota	8,320		WF, located in core area C, SDW.	
FR: 10-19-78	Koch Exploration	2 Federal	7	nwsw 12/9S/101W Wildcat Field Mesa Cty, CO	Dakota (6,000)			WF, located near core area C, SUS.	
FR: 10-19-78 SP: 11-8-78	Koch Exploration	1 Federal	8	swne 15/9S/99W Wildcat Field Mesa Cty, CO	Dakota	7,450		WF, located near core area C, SDW.	

[1] From Petroleum Information

Operators are contacted to discuss WGSP Core Program participation whenever a new well is staked in a designated core area and the well is scheduled to penetrate program objectives. During the first quarter of 1979, the following Piceance Basin operators were contacted:

Chandler and Associates
Cities Service Gas Exploration
Fuel Resources Development Company
Northwest Exploration
Teton Energy

No coring contracts had been finalized at the end of the quarter, but Fuel Resources Development Company's location on the White River Dome and Chandler and Associates' locations near the Plateau Field were being seriously discussed.

Results of analyses were received on the Twin Arrow C&K 4-14 core obtained in December, 1978 from Core Lab in Casper, Wyoming. These results were published in the 1 March 1979 - 31 March 1979 WGSP Report. Originally, only limited analyses had been authorized for this core, as the hole had been lost before logs were run, thus limiting the usefulness of the core data. An offset hole, C&K 4-14x, was drilled 75 feet from the original hole early in January and a complete suite of logs was obtained at that time. A good correlation was possible between the core and logs, providing a basis for increasing the number of analyses carried out by Core Lab.

5.2 DRILLING ACTIVITY

Forty-nine wells were completed in horizons of interest to the WGSP: 47 development wells and 2 wildcats. Of 47 development wells, 5 were completed D&A. Wildcat activity was particularly low during the first quarter. Only two wildcats were completed; however, both proved to be Mancos B discoveries.

Development drilling was divided between Mancos wells in the Douglas Creek Arch area, Rio Blanco County, and Cozzette/Corcoran wells in Mesa and Garfield Counties. Most wells were completed in the Mancos sands and the new production from this formation accounted for more than half the basin's total for the quarter.

New gas for the first quarter, 1979 totaled 24,212 MCFD. Producing horizons were the Mancos, Rollins, Corcoran, Cozzette, and Wasatch. Mancos production increased by 9,724 MCFD over the previous quarter, while Wasatch production decreased by 5,161 MCFD (see Table 5-2).

The majority of this quarter's exploratory and development activity was by Chandler and Associates, and Twin Arrow.

The principal productive sands within the Mancos are the Castlegate (Mancos A) and the Emery (Mancos B). The "B" zone in particular is apparently gas saturated in most areas of the Douglas Creek Arch. However, due to the sand's tight characteristics, productivity is dependent upon natural fracturing within the reservoir rock, supplemented by frac treatments of moderate size. Initial gas production after fracing generally falls in the range of 50 to 500 MCFD.

One of the largest frac treatments in the basin was performed by Chandler and Associates on their 6-18-1-1 Fork Unit well in the Douglas Creek Arch area. Treatment consisted of 2,000 gal of acid, 85,050 gal of water, and 348,000 lb of sand to produce 311 MCFD from the Mancos B horizon.

In the southern part of the Piceance basin, productive zones are the inter-tongued sands of the Mesaverde-Mancos transition zone. The Cozzette and Corcoran sands of the Mesaverde and the Rollins sand (Castlegate equivalent) of the Mancos are also commonly fraced to increase productivity. Production from these zones is normally commingled.

Few rank wildcats have been drilled recently in the northern portion of the basin. Most Mancos and Wasatch tests are located near known productive areas. In the southern area, transition zone tests tend to be more widely spaced. The announcement in February that Northwest Exploration would be drilling four wildcats in the Grand Mesa area during the summer of 1979 was of particular interest. Two wells in Delta County, 1 Federal, sesw 32-11S-93W, and 1 Federal, nwse 7-12S-94W are Mesaverde tests located about five miles from a 1958 Mesaverde gas discovery in swsw 15-11S-94W. To the west in Mesa County, Northwest staked 1 Sommerville, sesw 16-11S-97W, and 1 Federal senw 17-12S-96W, which are located about 10 miles south of the nearest wells in Plateau Field.

The drilling season is short due to surface elevations in this area of 9,000 to 10,000 ft. Previous wells in the Grand Mesa area have been plagued with lost circulation and associated problems in the Mesaverde.

Summaries of completed wells and active wells and new locations appear in Tables 5-2 and 5-3 respectively. Figure 5-3 shows the locations of these wells.

*Table 5-2 Summary of Drilling Activities, Piceance Basin**

	NO. OF WELLS					Producing Horizons in MCFD									
	Wildcats		Development		Total					Mesaverde		Mancos			
	D&A	Disc.	D&A	Prod.		Douglas Creek	Wasatch	Fort Union	Undifferentiated	Corcoran	Undifferentiated	Castlegate/Rollins	Mancos B	Commingled	Total
2nd Quarter 1977	0	0	4	13	17	0	0	0	0	0	1,232	0	555	5,391[5]	7,178
3rd Quarter 1977	2	0	5	9	16	0	2	0	0	0	2,585	0	157	183[5]	2,927
4th Quarter 1977	1	3	8	41	53	2,000	3,816[1]	0	1,000	0	4,627	0	4,753[2]	6,657[3a]	22,853
1st Quarter 1978	2	1	0	27	30	0	0	9	3,132	140	3,311	0	2,239[1]	0	8,831
2nd Quarter 1978	2	1	2	12	17	0	0	0	0	0	0	0	4,491	0	4,491
3rd Quarter 1978	2	4	3	17	26	0	2,151	0	0	0	1,949[1]	335	3,866	1,774[4]	10,075
4th Quarter 1978	12	0	6	22	40	0[1]	11,891	0	0	0	1,271	1,491	992	3,017[5]	18,663
1st Quarter 1979	0	2	5	42	49	0	6,730	0	0	0	5,171[6]	0	8,307[1]	4,004[3b]	24,212

1. IPF not available for one well.
2. IPF not available for two wells.

3a. Rollins/Cozzette/Corcoran - 4,422
Cozzette/Corcoran - 2,235

3b. Rollins/Corcoran/Cozzette - 1,284
Corcoran/Cozzette - 2,720

4. Cameo/Cozzette/Corcoran - 460
Morapos/Mancos - 481
Rollins/Cozzette/Corcoran - 833

5. Rollins/Cozzette/Corcoran - 183
6. IPF not available for five wells.

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

Table 5-3 Summary of Wells Completed—Piceance Basin[1]

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: 12-3-78 CP: 12-28-78	Chandler & Associates	11-18-1-1 Fork Unit	1	nesw 18/1S/101W Douglas Creek Field Rio Blanco Cty, CO	Mancos (2305-61)	2,650	Perf. 2305-61 Frac w/97,230 gal. water 211,000 lb. sand	DG - no cores or tests, Operator has 3 additional Mancos tests in the area.	480
SP: 10-28-78 CP: 12-5-78	Chandler & Associates	1-22 Fork Unit	2	nene 22/1S/102W North Douglas Creek Field Rio Blanco Cty, CO	Emery (2,210-2,264)	2,589	Perf. 2210-64 2,000 gal. acid 81,060 gal water 215,000 sand	DG - no cores or tests, Operator has 7 other Mancos tests in this locale.	1,255
SP: 11-27-78 CP: 1-5-79	Twin Arrow	4-14 C&K	3	nese 14/3S/101W Cathedral Rio Blanco Cty, CO	Mancos	1,645		D, no logs Cored 636-828 Cored 983-1,211, no tests, Operator has 4 other Mancos tests in the area.	D&A
SP: 9-7-78 CP: 12-18-78	Fuel Resources Development	0-28-3-101-S Federal	3	swse 28/3S/101W Cathedral Field Rio Blanco Cty, CO	Emery (3,852-4,137)	4,347 PB: 4,297	64,000 gal. gel 244,000 lb. sand	DG, log tops and core, no tests, Perf. Operator has 3 additional Mancos tests.	602
FR: 10-26-78 SP: 2-24-79	Provident Resources	5-35-4-102 Kirby-Robertson	4	nwsw 35/4S/102W Foundation Creek Field Rio Blanco Cty, CO	Mancos	3,565		D, WOCT	
SP: 2-23-78 CP: 1-12-79	Coseka Resources	1-R-22 Taiga Federal	4	sene 22/4S/102W Thunder Field Rio Blanco Cty, CO	Mancos B (4,196-4,215) gross	4,729 PB: 4,290	Perf. 4,196-4,202 acidized w/500 gal. Fract. w/18,000 gal. water, 14,000 gal. gel, 86,110 lb. sand	WOE, Mancos Extention-Thunder Field	100
FR: 10-3-78 SP: 10-24-78	Dome Petroleum	1-17 Baldy Creek Unit	5	senw 17/7S/90W Baldy Creek Field Garfield Cty, CO	Corcoran-Cozzette	10,325		D, ran production casing, WOCT	

[1] From Petroleum Information

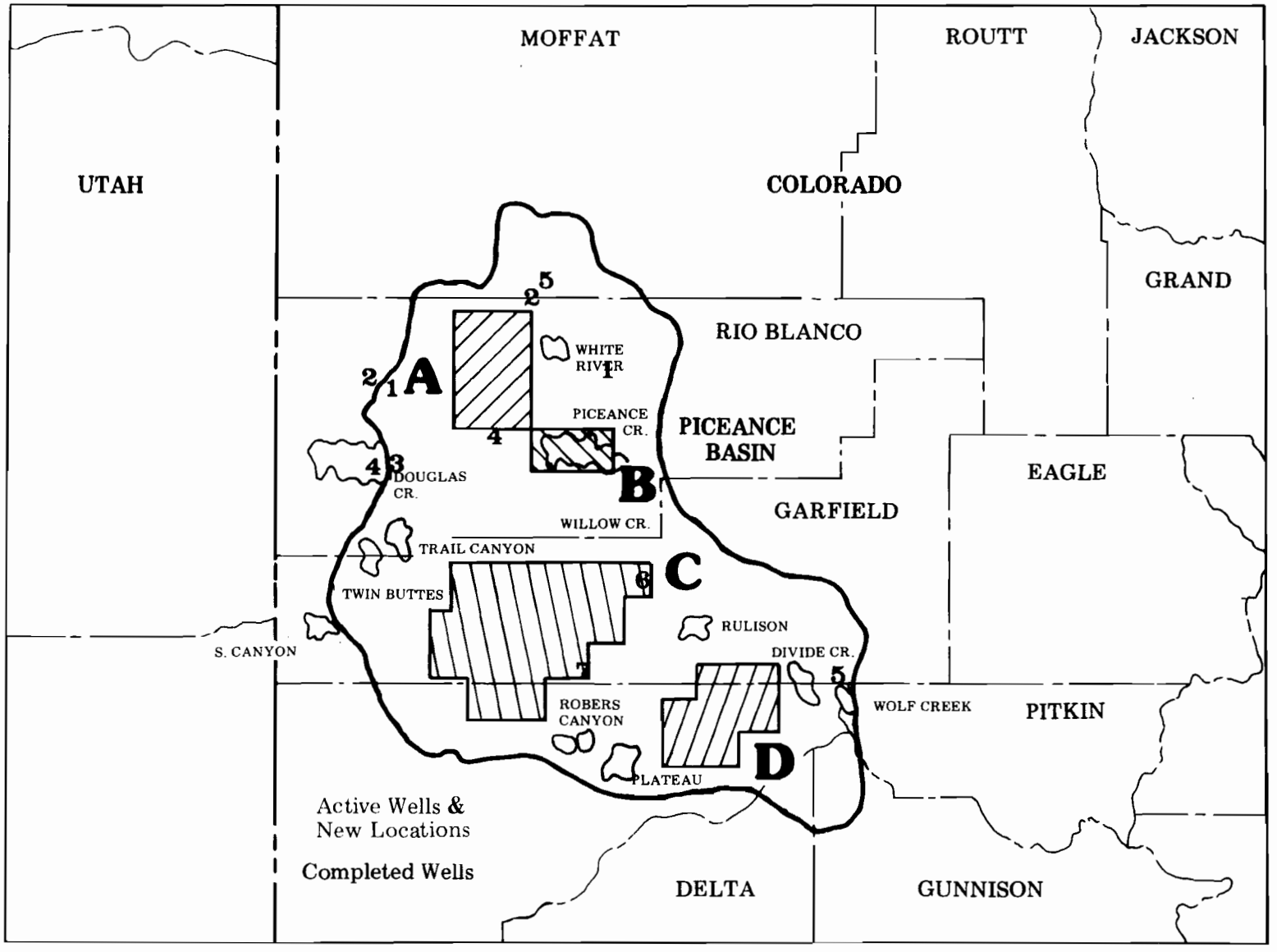


Figure 5-2 Wells Completed and Staked, USGS Designated Core Areas, Piceance Basin (refer to Tables 5-3 and 5-4)

Table 5-4 Summary of Active Wells and New Locations—Piceance Basin[1]

DATE	OPERATOR	WELL NAME	MAP INDEX NO.	LOCATION Sec/T/R	PROJECTED HORIZON (Depth in ft)	COMMENTS
FR: 2-16-79	Northwest Exploration	1 H D Lake	1	nese 22/1N/95W Powell Park Rio Blanco Cty, CO	12,550	DX, OWWO: old info: formerly Michigan-Wisconsin Pipeline 1 H D Lake, Sp: 4-21-75, OTD 12,704, Cp 10-31-75, 246 MCFG, PZ: Mvd 8,428-9,139 gross.
FR: 12-12-78	American Resources Management	19-1-S Govt.	2	sese 19/2N/97W White River Field Rio Blanco Cty, CO	Wasatch	D, located in core area A.
FR: 1-8-79	CSG Exploration	298-29-2 Govt.	3	senw 29/2S/98W Sulphur Creek Field Rio Blanco Cty, CO	Mancos (17,800)	WD, located near core area A & B.
FR: 11-29-78	Teton Energy	25-2 Indian Valley-Federal	4	senw 25/3N/97W Wildcat Field Rio Blanco Cty, CO	Morapos (8,000)	WF, close to core area A.
FR: 10-26-78	Northwest Exploration	2 Clough	5	sesw 21/6S/94W Rulison Field Garfield Cty, CO	8,700 test	WO
FR: 11-9-78	Norris Oil	36-3 Federal	6	nene 36/9S/97W Shire Gulch Field Mesa Cty, CO	Corcoran (3,400)	D, located near core area C.

[1] From Petroleum Information