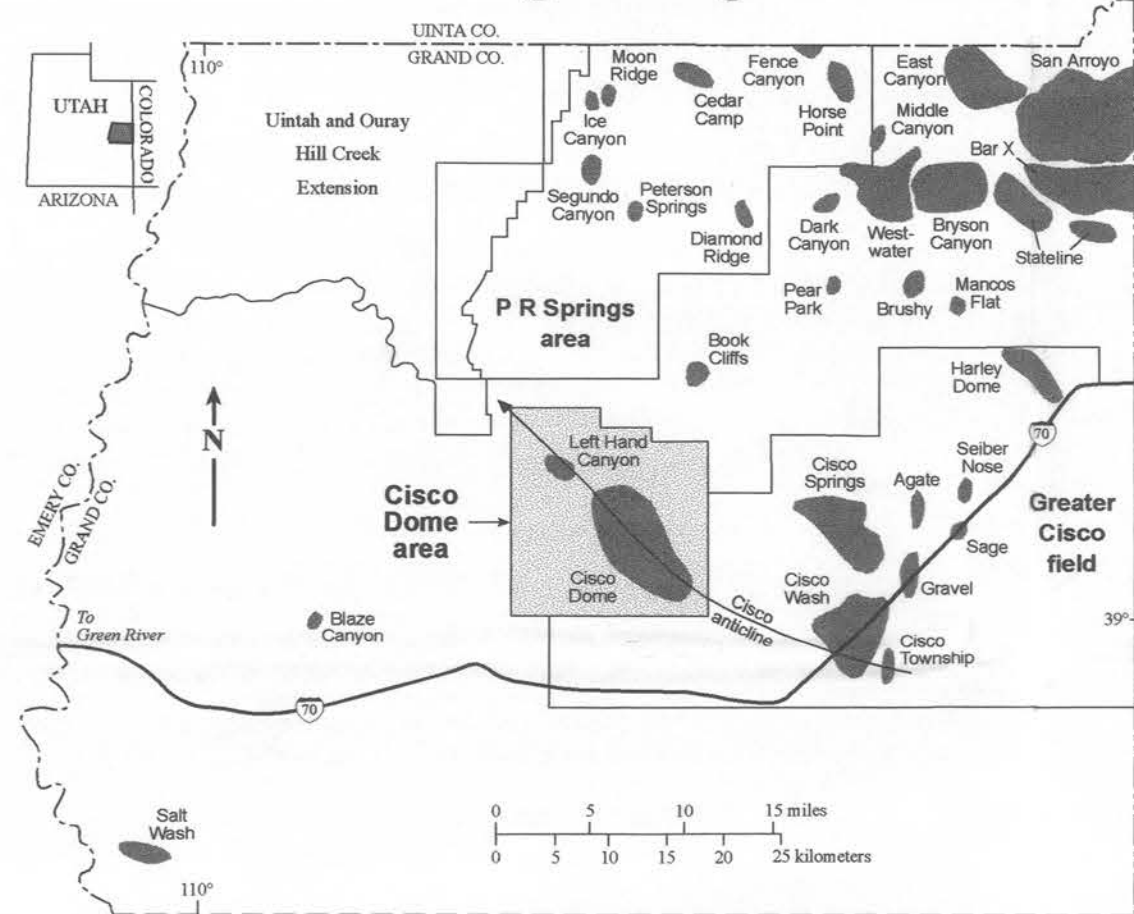
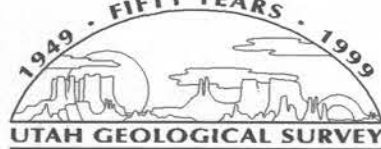


PETROLEUM GEOLOGY OF THE CISCO DOME AREA, GRAND COUNTY, UTAH

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INTRODUCTION

Cisco Dome is a Laramide-age asymmetrical, doubly plunging anticline in T. 19 - 20 S., R. 21 - 22 E., Salt Lake Base Line and Meridian, Grand County, Utah. Cretaceous Mancos Shale is exposed over most of the Dome with Tertiary-age Wasatch Formation exposed on the northern flanks of the structure. The Cisco Dome and Left Hand Canyon fields are located in the Cisco Dome area (index map above).

Hydrocarbons are produced from Cretaceous- and Jurassic-age sandstones in structural and combination stratigraphic/structural traps. Most of the production is from the Jurassic Morrison, and Cretaceous Cedar Mountain and Dakota Formations, and minor production is from the Jurassic Entrada Sandstone and Cretaceous Mancos Shale. Cisco Dome was considered a separate oil and gas field (figure 1) until 1978 when it was included in the larger Greater Cisco field (index map above), but in this report "Cisco Dome field" will be used. Northwest of Cisco Dome field is the Left Hand Canyon field (figure 1) which is not included in the Greater Cisco field.

This report is part of a study of the petroleum geology of the Cretaceous Dakota Sandstone of north Grand County. The study will be used to improve our knowledge of the geology, hydrocarbon production, and hydrocarbon potential of the Dakota and is intended to help determine the value of lands in the area managed by the Utah School and Institutional Trust Lands Administration.

STRUCTURE

Cisco Dome lies along the northwest flank of the ancestral Uncompahgre Highland and is a separate closure along the northwest-trending Cisco anticline. There is 600 feet (200 m) of closure at Cisco Dome mapped on the top of the Cretaceous Dakota Sandstone (figure 2). The structure is asymmetrical with a steeper, faulted south flank. Additional faults cut across the north flank of the structure.

The No. 1 well (SE1/4NE1/4 section 23, T. 20 S., R. 21 E.) (figure 1) was drilled on the crest of Cisco Dome in 1944 by Continental Oil Company to a depth of 4,747 feet (1,447.8 m). The well encountered Triassic Chinle Formation overlying Precambrian granite.

DEVELOPMENT AND PRODUCTION HISTORY

Utah Oil Refining Company discovered Cisco Dome field in 1925 with the completion of a gas well at a depth of about 2,000 feet (610 m) in the Dakota Sandstone (Quigley, 1961). By the end of 1929, eleven gas wells and six dry holes had been completed. Gas from Cisco Dome was used by a carbon black plant from 1927 to 1931 when the federal government issued a proclamation forbidding further exploitation of natural gas for carbon black. The wells were shut in and only one well was produced for local use at a farm from 1937 through 1954. Activity at Cisco Dome resumed in 1954 and eight wells were drilled during the following five years but remained shut in until 1972.

More than 16 billion cubic feet of gas (BCFG) (448 million m³) and 850,000 barrels of oil (BO) (119,000 MT) have been produced at Cisco Dome field as of December 31, 1996. Production from Cisco Dome field has been primarily gas but over 500,000 BO (70,000 MT) have been produced from the Cedar Mountain Formation in the Calf Canyon unit in the north portion of the field. Two wells on the crest of the structure have produced over 20,000 BO (2,800 MT) from the Entrada Sandstone.

The production history Cisco Dome field is not well documented. Older records are often incomplete and of questionable accuracy. Production, particularly abandoned production at the time of field or unit name changes, is not always carried over to the new field or unit name in the records. Table 1 shows the cumulative production, current status, and producing horizon, by well. The table undoubtedly is incomplete and contains some inaccurate numbers due to the poor records but is still a useful representation of the production history of the field. The producing horizons reported are based on my well-log correlations and may not always agree with what the operator reports.

In 1996, Cisco Dome field produced 6,400 BO (1,176 MT) and 283,064 thousand cubic feet of gas (MCFG) (7,925,792 m³). Figure 3 is a graph of the annual production from the Cisco Dome field. The sum of the annual production is 38 percent less oil and 14 percent less gas than the sum of the cumulative production from individual wells (table 1). Corrections (additions) to the cumulative production of a well are not shown in the annual record, therefore the higher values derived from table 1 are considered a more accurate record of the cumulative production from Cisco Dome field. Reporting and record keeping have improved and the annual production shown in figure 3 since 1984 should be accurate.

T. 19 S., R. 20 E.) at a drill depth of 4,750 feet (1,448.8 m) in the Jurassic Entrada Sandstone. The well produced a little more than 20,000 BO (2,800 MT) and was abandoned in 1978. The 30-5 well (section 30, T. 19 S., R. 20 E.) is completed as a gas well in the Dakota Sandstone but has never produced. The 29-13 well (section 29, T. 19 S., R. 20 E.) is completed in the Dakota and has produced 41,088 BO (5,752.3 MT) and 469.954 MCFG (13,158.71 m³) as of December 31, 1996. Left Hand Canyon field produced 34,987 BO (4,898.2 MT) and 7,052 MCFG (197.456 m³) from one well (29-13) in 1996.

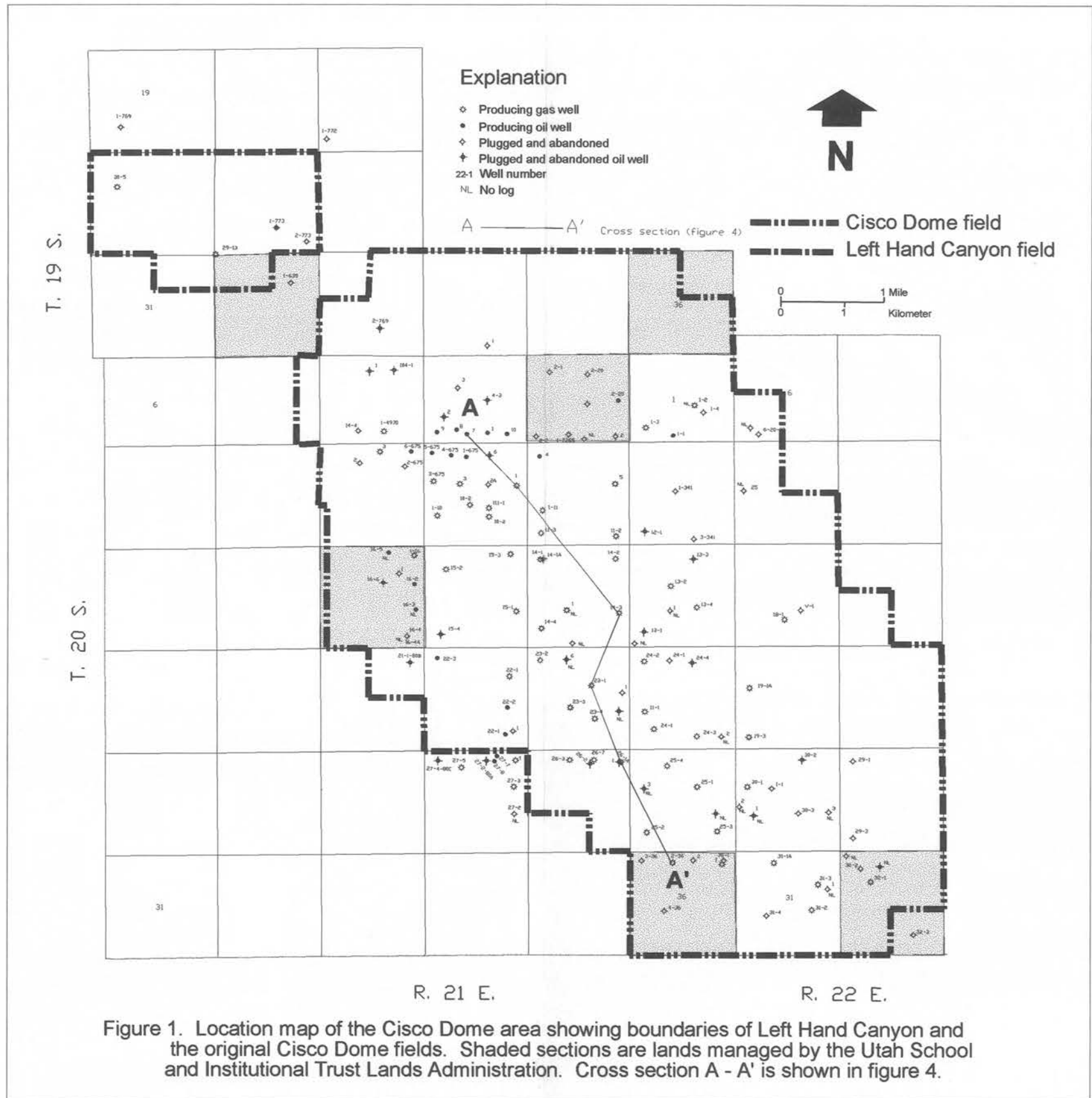


Figure 1. Location map of the Cisco Dome area showing boundaries of Left Hand Canyon and the original Cisco Dome fields. Shaded sections are lands managed by the Utah School and Institutional Trust Lands Administration. Cross section A - A' is shown in figure 4.

STRATIGRAPHY OF THE PRODUCING RESERVOIRS

Hydrocarbon production at Co Dome is from Jurassic- and Cretaceous-age sandstone, chiefly the Jurassic Morrison and Cretaceous Cedar Mountain and Dakota Formations (figure 4). A small amount of hydrocarbon has been produced from the Jurassic Entrada Sandstone and Cretaceous Mancos Shale. The Morrison, Cedar Mountain, and Dakota are separated by unconformities typically at the base of channels incised into the underlying formation. The reported production horizons in table 1 and the following discussions are based on geophysical well-log correlations. These formation contacts are difficult to identify so the picks in this study may not agree with picks made by the well operators or other workers.

Entrada Sandstone

The Entrada Sandstone is anolian deposit which occurs at a drill depth ranging from 4,750 feet (1,448.8 m) at Left Hand Canyon to 2,822 feet (860.7 m) on the crest of Cisco Dome. The Entrada reservoir is typically a porous, blanket-type sandstone productive from structural traps. The structurally highest penetration at the top of the Dakota Formation is the 25-4 well (NE1/4NW1/4 section 25, T. 20 S., R. 21 E.). The 25-4 well was completed in the Entrada in 1981 and produced 664 BO (92.9 MT) before it was recompleted in the Morrison Formation in 1985. The 25-2 well (SW1/4SW1/4 section 25, T. 20 S., R. 21 E.) is 229 feet (69.8 m) lower than the 25-4 well at the top of the Dakota but is 8 feet (2.4 m) higher at the top of the Entrada and has produced 20,487 BO (2,868.2 MT) from the Entrada as of December 31, 1996. The Federal 1-773 well (SW1/4SE1/4 section 29, T. 19 S., R. 20 E.) in Left Hand Canyon field was completed in 1972 and produced 20,003 BO (2,800 MT) from the Entrada before it was plugged and abandoned in 1978.

Morrison Formation

The Morrison Formation is a continental deposit of interbedded dome sandstone, variegated shale, and a few thin limestone beds, ranging from 350 to 698 feet (106.8-212.9 m) in drilled thickness in the Cisco Dome area. Gas and some oil have been produced from sandstone in both the Salt Wash and overlying Brushy Basin Members. Traps are formed where the channels cross the structural axis, or where bends in the channels create an updip pinch-out of the sandstone bed along the flank of the structure.

Cedar Mountain Formation

The Cedar Mountain Formation is a fluvial-lacustrine deposit of interbedded sandstone, siltstone, and some pale green shale, ranging from 49 to 158 feet (14.9-48.2 m) in drilled thickness in the Cisco Dome area. Some gas and most of the oil produced at Cisco Dome is from the Cedar Mountain. Most of the production is from the Buckhorn Conglomerate Member which forms the basal portion of the formation. Traps are formed similar to those in the Morrison Formation.

Dakota Sandstone

The Dakota Sandstone is a fluvial to littoral-marine deposit of sandstone and shale ranging from 56 to 180 feet (17.1-54.9 m) in drilled thickness in the Cisco Dome area. Gas and a minor amount of oil are produced primarily from one to three sandstone beds. Sandstone beds in the Dakota are labeled (in ascending order) Kd B, Kd A, and Kd Z in this report in keeping with the terminology used in Morgan (1998). Kd B and Kd A are incised fluvial channel deposits that trend west to east across Cisco Dome (figures 5 and 6). Based on well log correlations Kd Z does not appear to be incised and may be a tidal channel or nearshore bar deposit (figure 7). Traps are formed similar to those in the Cedar Mountain and Morrison Formations.

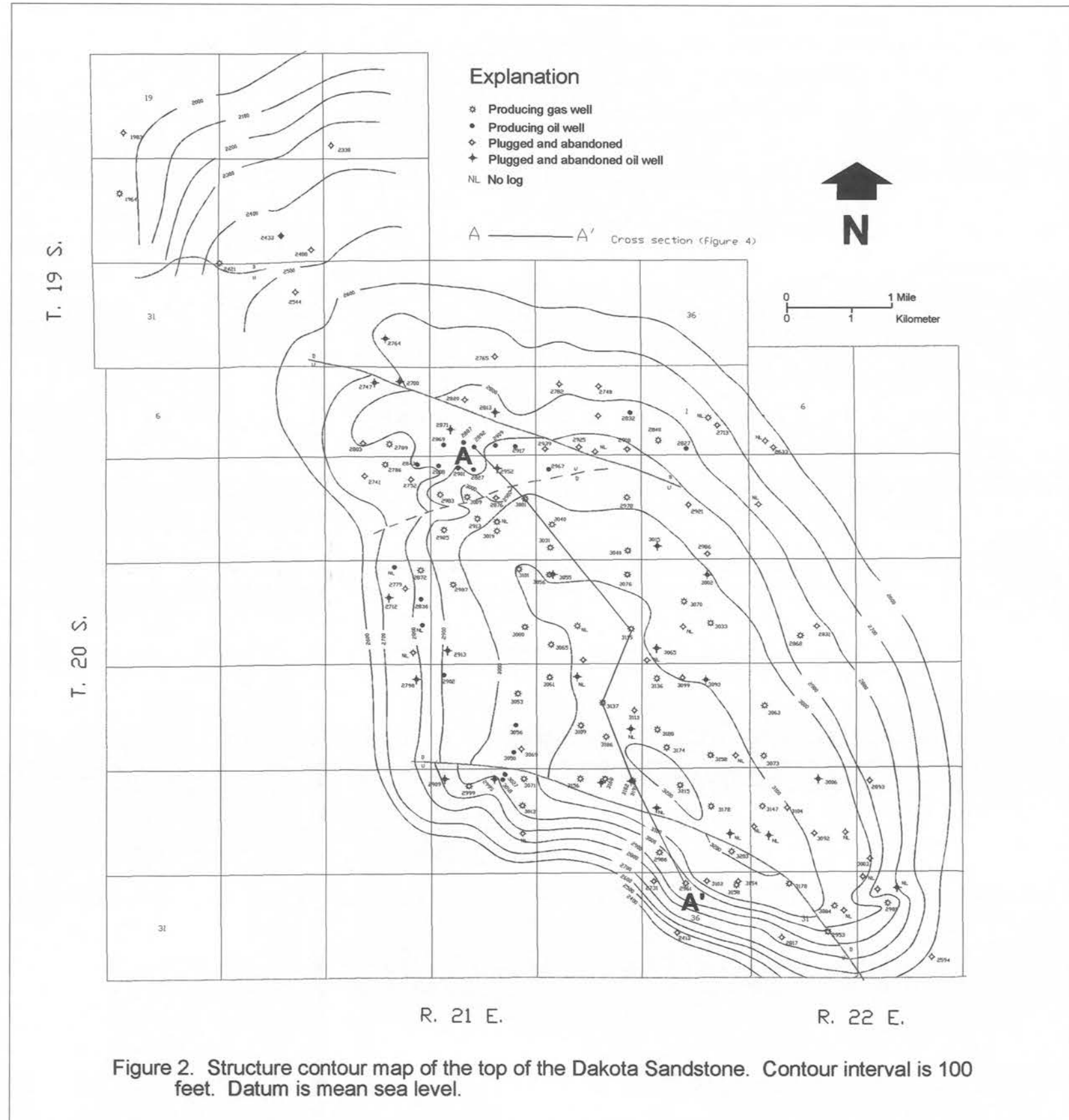


Figure 2. Structure contour map of the top of the Dakota Sandstone. Contour interval is 100 feet. Datum is mean sea level.

Mancos Shale

The Mancos Shale is a shallow marine deposit of mostly shale and some siltstone and thin sandstone and is exposed on the surface throughout most of the Cisco Dome area. Minor amounts of gas and oil are produced from the siltstone and sandstone intervals. Three wells have a combined production of about 1,500 BO (210 MT) and 37,000 MCFG (1,036,000 m³) from stratigraphic traps formed by variation in porosity or possibly fracture density in the reservoir.

CALF CANYON WATER-FLOOD UNIT

Calf Canyon Water-flood unit encompasses parts of sections 3, 4, 9, 10, and 11, T. 20 S., R. 21 E., on the north end of the Cisco Dome field. Oil was discovered at Calf Canyon in 1977 in the Buckhorn Conglomerate Member of the Cedar Mountain Formation. Almost 600,000 barrels (80,000 MT) of 36.5° API gravity oil had been produced (as of Dec. 31, 1996) at an average depth of 3,000 feet (915 m). At Calf Canyon the Buckhorn trends west to east about perpendicular to the structural axis, then turns southeast in section 11 where gas has been produced from the sandstone updip from the oil production (figure 8). Reservoir properties of the Buckhorn are shown in table 2. Secondary recovery (water flooding) was started at Calf Canyon in 1992 and was expected to last for about 22 years, but the water flood does not appear to have had an effect on the annual production from the unit as of December 31, 1996 (figure 9).

SUMMARY AND FUTURE POTENTIAL

More than 16 BCFG (448 million m³) and 800,000 BO (112,000 MT) have been produced from the Cisco Dome field at depths ranging from about 2,000 to 3,000 feet (600-900 m). Most production has been from combination stratigraphic/structural traps in the fluvial channel sandstone beds of the Morrison, Cedar Mountain, and Dakota Formations.

A minor amount of production has come from the Entrada Sandstone and Mancos Shale. Hydrocarbon accumulations in these reservoirs at Cisco Dome field appear to be very limited and do not offer much potential for future exploration. Additional potential may still exist in one of the productive beds in the Morrison, Cedar Mountain and Dakota Formations. Also, there are many fluvial channel sandstone beds in the Morrison that are not currently productive but may be good exploration targets. Calf Canyon unit is an example of how one sandstone bed can contain a large volume of oil at a shallow depth.

ACKNOWLEDGMENTS

Funding for this study was provided by the Utah School and Institutional Trust Lands Administration

Table 1. Cumulative oil, gas, and water production from wells in the Cisco Dome field as of December 31, 1996.
NA is data not available. Data sources: Stowe (1979) and Utah Division of Oil, Gas and Mining.

Township and Range	Section Well Number	Producing Formation (Member or Bed)	Formation at TD	Completion Date	Oil BO	Gas MCFG	Water BW	Status	API# 43-019-
T. 20 S., R. 21. E.	NWSE 1 1-2	Morrison	Curtis	1/82	0	0	0	shut in	30603
	SESW 1	Morrison (SW)	Curtis	11/79	47,493	95,576	0	shut in	30566
	SWSW 1 1-3	Morrison (BB)	Unknown	6/83	0	0	0	shut in	31037
	NESE 2 2-20	Morrison (BB)	Curtis	8/82	565	0	662	shut in	30699
	SWNE 3 4-3	Morrison (SW)	Morrison	5/82	132	0	0	PA	30807
	SESE 3 10	Cedar Mountain	Entrada	11/85	22,954	17,003	1,130	POW	31203
	SWSE 3 1	Cedar Mountain	Salt Wash	2/77	109,729	20,475	5,321	POW	30298
	SESESW 3 7	Cedar Mountain	Morrison	11/84	110,383	27,309	3,739	POW	31168
	SESW 3 8	Cedar Mountain	Salt Wash	9/85	32,766	5,625	1,270	Recompleted	31197
	SESW 3 8	Dakota	Morrison	1/94	1,314	23,467	43	PGW	31197
	SWSW 3 11	Cedar Mountain	Entrada	11/85	19,824	6,330	797	Injection	31209
	NWSW 3 2	Dakota (A) Morrison (BB)	Entrada	7/78	0	0	0	PA	30366
	NWNE 4 104-1	Dakota (A,B)	Entrada	7/78	0	43,641	N/A	PA	30375
	NENW 4 1	Morrison (BB)	Morrison	3/72	0	0	0	PA	30078
	SWSE 4 1-4970	Cedar Mountain	Entrada	1/79	811	390,048	50	shut in	30449
	NWNE 9 3	Morrison (BB,SW)	Salt Wash	4/75	3	12,244	10	shut in	30222
	NENE 9 6-675	Cedar Mountain	Morrison	12/85	5,361	2,763	591	shut in	31208
	NENW 9 2	Morrison (BB)	Entrada	5/72	Unknown	NA	NA	PA	30083
	NWNE 10 6	Dakota (A,B) Cedar Mountain Morrison (SW)	Entrada	7/78	Unknown	NA	NA	PA	30391
	SENE 10 1	Cedar Mountain	Morrison	12/83	6,311	549,267	396	PGW	30986
	SWNE 10 2A	Dakota Morrison (SW)	Summerville	11/78	496	548,021	398	PA	30471
	NWNWSE 10 III-1	Cedar Mountain	Morrison	6/58	0	431,904	0	shut in	15108
	SWNWSE 10 10-2	Morrison (BB)	Unknown	4/85	0	189	0	shut in	30168
	NESW 10 10-2	Morrison (BB)	Morrison	12/85	1,306	0	0	shut in	31210
	NWSW 10 1-10	Dakota (A,B)	Entrada	10/79	0	81,352	0	shut in	30484
	SENW 10 3	Morrison	Morrison	10/81	138,842	419,117	280	PGW	30836
	NWSW 10 3-675	Cedar Mountain	Morrison	10/83	0	13,314	0	shut in	31094
	NENW 10 1-675	Morrison (BB)	Morrison	4/78	182,932	47,423	1,255	POW	30376
	NWNW 10 4-675	Cedar Mountain	Morrison	6/85	47,043	31,416	6,481	POW	31187
	NWNW 10 5-675	Morrison	Morrison	9/85	14,507	10,691	159	POW	31199
	SENE 11 5	Dakota (A,B) Cedar Mountain	Entrada	6/78	23	13,316	147	shut in	30393
	SESE 11 11-2	Cedar Mountain	Summerville	1/81	0	285,953	0	shut in	30882
	SWSW 11 11-3	Cedar Mountain Morrison (BB)	Summerville	1/82	0	485,132	0	PGW	30884
	NWSW 11 II-1	Cedar Mountain	Morrison	5/79	0	1,824,532	72,241	PGW	30485
	NWNW 11 4	Cedar Mountain	Not Reported	7/78	41,949	0	458	shut in	30392
	SWSW 12 12-1	Morrison (BB)	Not Reported	5/82	0	0	0	shut in	30932
	NWNE 13 13-3	Morrison (SW)	Entrada	4/82	31	0	455	shut in	30883
	NWSE 13 13-4	Morrison (BB)	Summerville	6/82	0	12,893	0	shut in	30885

	Section Well Number	Producing Formation (Member or Bed)	Formation at TD	Completion Date	Oil BO	Gas MCFG	Water BW	Status	API# 43-019-
T. 20 S., R. 21. E.	SWSW 13 13-1	Morrison (BB)	Entrada	10/77	258	380	716	shut in	30348
	SENW 13 13-2	Morrison (BB)	Not Reported	10/80	0	625,899	0	PGW	30673
	NENE 14 14-2	Dakota (Z,A)	Entrada	5/79	0	160,185	5,048	PGW	30487
	NESE 14 14-3	Dakota (A)	Salt Wash	10/79	6,542	245,979	264	PGW	30488
	NESW 14 1	Dakota	Dakota	4/28	0	655,761	0	shut in	15119
	SWSW 14 14-4	Morrison (BB)	Entrada	5/82	0	263,206	0	PGW	30878
	NWNW 14 14-1	Dakota (Z,A,B)	Morrison	6/78	144	470,332	27,810	PGW	30403
	NWNW 14 14-1A	Cedar Mountain Morrison (BB,SW)	Entrada	5/79	0	1,853	0	shut in	30436
	NENE 15 15-1	Morrison (BB)	Morrison	7/80	0	205,863	9,046	PGW	30637
	NESE 15 15-3	Dakota (Z,A,B)	Entrada	8/80	747	0	163	shut in	30585
	SWSW 15 15-4	Dakota (B)	Entrada	5/82	0	0	0	shut in	30887
	NWNW 15 15-2	Dakota (B)	Morrison	3/81	0	345,451	0	shut in	30636
	NENE 16 1-16	Morrison(BB,SW)	Summerville	12/79	210	0	0	shut in	30546
	SENE 16 16-2	Dakota(Z)	Summerville	7/80	402	0	0	shut in	30590
	SWNE 16 16-6	Morrison	Unknown	5/81	0	0	0	shut in	30765
	NWNE 16 16-5	Morrison	Unknown	12/81	0	0	0	shut in	30722
	NESE 16 16-3	Dakota	Unknown	12/81	0	0	0	shut in	30675
	NENE 21 21-1-808	Morrison (SW)	Salt Wash	5/81	17	0	0	PA	30644
	SENE 22 22-1	Morrison (BB)	Entrada	8/80	0	618,303	0	PGW	30625
	NESE 22 22-2	Morrison (BB)	Entrada	11/80	9,836	199,274	0	PGW	30644
	SESE 22 22-1	Morrison (BB)	Salt Wash	11/80	18,222	740	375	POW	30684
	NWNW 22 22-3	Mancos	Entrada	12/85	1,509	3,932	0	shut in	30665
	SWNE 23 23-1	Dakota (Z)	Entrada	6/78	2,302	546,032	31	PGW	30355
	NWSE 23 23-4	Morrison (BB)	Entrada	6/81	0	94,534	0	PGW	30760
	NESW 23 23-3	Morrison (BB)	Morrison	8/80	0	519,741	0	PGW	30588
	NENW 23 6	Dakota	Dakota	11/28	Unknown	NA	NA	PA	10275
	NWNW 23 23-2	Dakota	Morrison	5/80	5,006	84,018	101	PGW	30586
	SWSE 24 24-3	Dakota (A)	Entrada	12/79	19	115,030	0	PGW	30432
	NESWSW 24 24-1	Dakota	Unknown	6/84	0	0	0	shut in	31010
	NWSW 24 11-1	Morrison (BB)	Base Salt	9/57	0	466,150	0	shut in	15107
	NWNW 24 24-2	Dakota (A,B) Cedar Mountain	Entrada	10/79	0	105,842	0	PGW	30530
	NWNE 25 25-1	Cedar Mountain	Entrada	5/78	0	873,368	0	PGW	30359
	NESE 25 25-3	Dakota	Morrison	9/26	Unknown	NA	NA	PA	05260
	SESE 25 25-3	Morrison (BB)	Salt Wash	12/79	0	118,844	0	PGW	30575
	SWSW 25 25-2	Entrada	Entrada	4/80	20,487	0	2,913	POW	30587
	NENW 25 25-4	Entrada	Entrada	6/81	664	0	0	Recompleted	30743
	NENW 25 25-4	Morrison (BB)	Entrada	5/85	0	194,941	0	PGW	30743
	NWNW 25 3	Morrison	Morrison	7/27	Unknown	NA	NA	PA	10272
	NENE 26 1	Dakota (Z,A,B)	Morrison	7/28	Unknown	NA	NA	PA	10274

Township and Range	Section Well Number	Producing Formation (Member or Bed)	Formation at TD	Completion Date	Oil BO	Gas MCFG	Water BW	Status	API# 43-019-
T. 20 S., R. 21. E.	NENE 26 26-1A	Dakota (Z,B)	Salt Wash	11/79	0	148,616	2,772	PGW	30477
	NWNE 26 26-2	Morrison	Unknown	Unknown	Unknown	NA	0	PA	
	NWNE 26 26-7	Dakota (B)	Morrison	7/85	0	0	0	shut in	31139
	NWNE 26 26-3	Mancos	Entrada	1/90	0	16,948	0	PGW	30582
	NENE 27 1	Dakota (A,B) Morrison (BB)	Cedar Mountain	12/79	0	265,647	0	shut in	30513
	NENE 27 1 (Mancos)	Mancos	Cedar Mountain	Unknown	0	19,139	0	PGW	30513
	SENE 27 27-3	Dakota (B)	Salt Wash	5/82	3	1,127	0	shut in	30643
	NWNE 27 2707	Morrison (SW)	Morrison	8/83	558	40	114	shut in	31068
	NWNE 27 27-6	Dakota (Z,A,B) Morrison (BB,SW)	Morrison	11/84	1,126	0	1,441	shut in	31165
	NWNE 27 27-9	Mancos	Morrison	1/85	0	19,132	0	PGW	31165
	NENW 27 27-5	Mancos	Entrada	4/87	0	14,287	0	PGW	30715
	NWNW 27 27-4-80C	Morrison (SW)	Salt Wash	8/82	Unknown	NA	NA	PA	30695
	NENE 36 1	Dakota (Z,A,B) Cedar Mountain	Morrison	7/55	4	121,621	5	shut in	15106
T. 20 S., R. 22 E.	SESW 18 18-1	Dakota (A)	Entrada	11/83	0	4,602	0	shut in	30875
	SWSW 19 19-3	Dakota (A)	Morrison	3/77	275	307	0	shut in	30302
	SWNW 19 19-1A	Dakota (Z,A)	Entrada	3/84	0	143	0	shut in	20896
	NWNE 30 30-2	Mancos	Entrada	10/79	0	0	0	PA	30492
	NWSW 30	Dakota	Kayenta	4/25	Unknown	NA	NA	PA	11390
	SWNW 30 30-1	Dakota (Z)	Entrada	7/78	0	70,198	0	shut in	30429
	SENE 31 31-3	Dakota (B)	Entrada	6/78	0	88,146	0	shut in	30428
	NESE 31 31-2	Dakota (AB) Cedar Mountain Morrison (BB)	Entrada	6/82	0	4,530	0	shut in	30876
	NENW 31 31-1A	Dakota (Z,A)	Morrison	4/77	0	77,637	0	PGW	30308
	NENW 32	Dakota	Dakota	9/28	Unknown	NA	NA	PA	11246
	SENW 32 32-1	Morrison (SW)	Entrada	10/77	0	96,335	0	PGW	30347
	Original 16 Wells	Dakota Cedar Mountain Morrison	Variable	10/20s	Unknown	NA	NA	PA	NA
T. 19 S., R. 21 E.	NWSE 33 2-769	Cedar Mountain	Entrada	5/78	134	0	3,838	PA	30431
Totals					853,240	16,406,062	150,579		

Dakota (Z,A,B): sandstone beds in the Dakota Sandstone, see figure 4.
Morrison (BB): Brushy Basin Member of the Morrison Formation
Morrison (SW): Salt Wash Member of the Morrison Formation
BO: Barrels of oil
MCFG: Thousand cubic feet of gas
BW: Barrels of water
API #: American Petroleum Institute well index number; first five numbers given in heading.
PA: Plugged and abandoned
PGW: Plugged gas well
TD: Total Depth

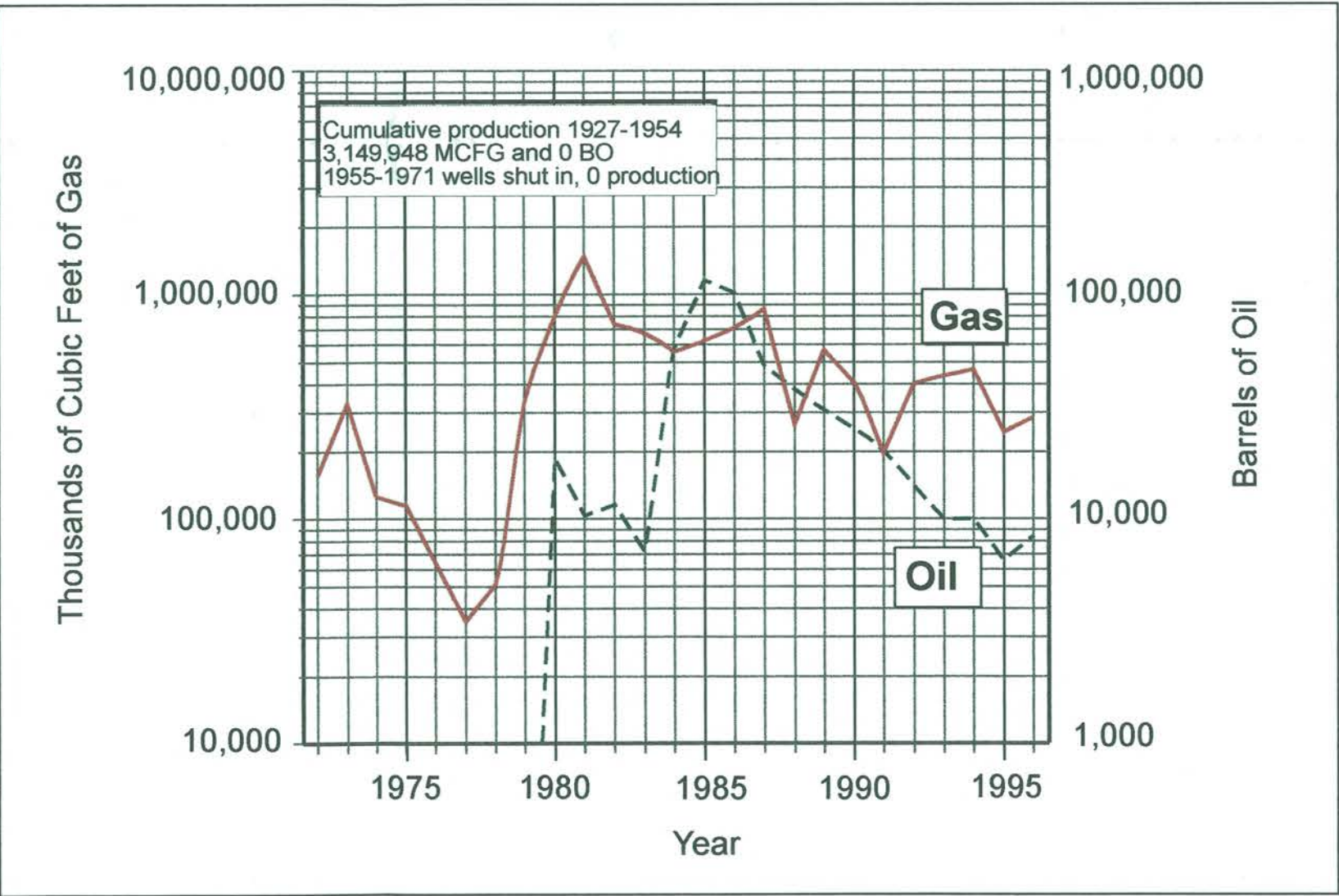
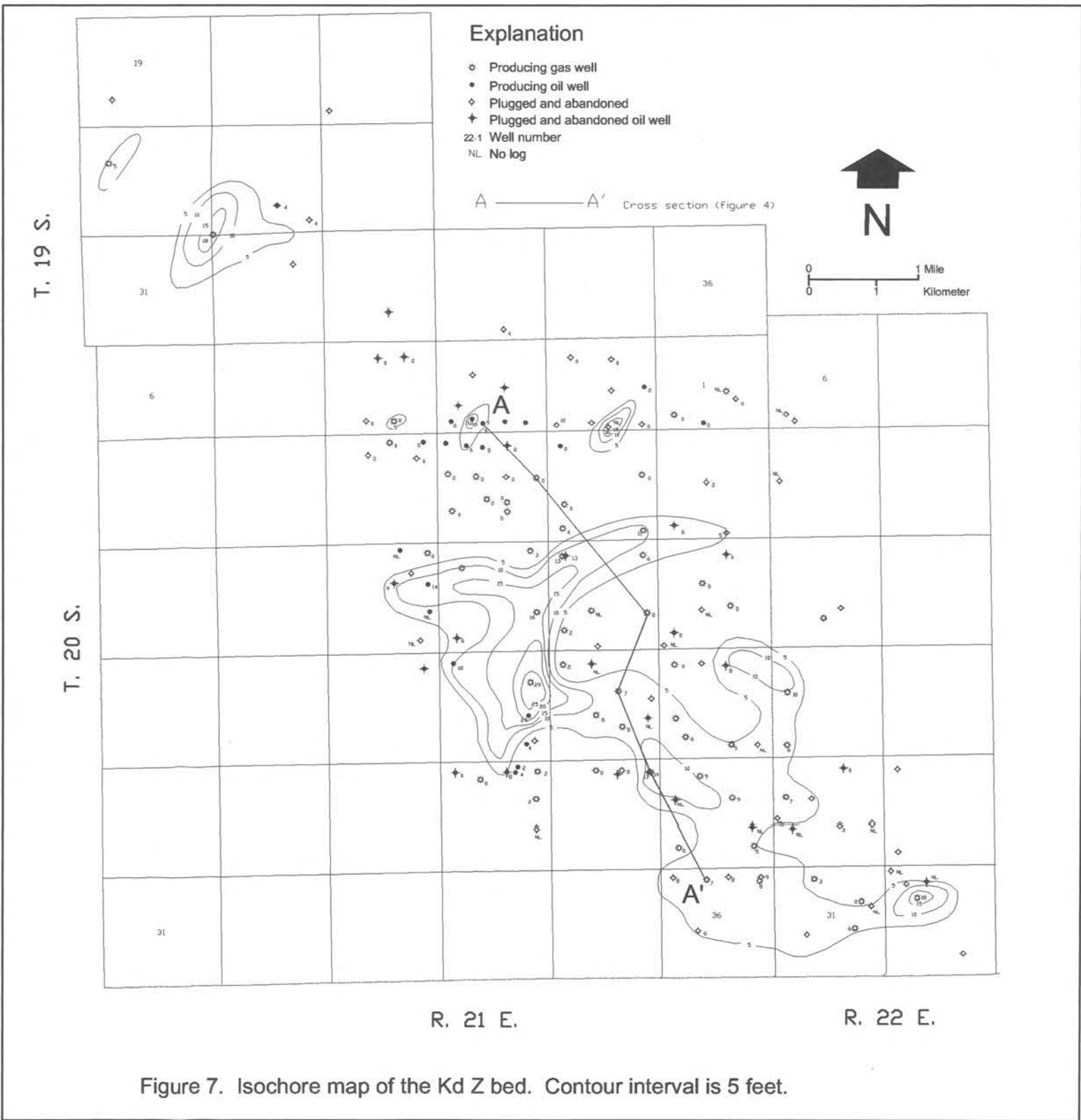
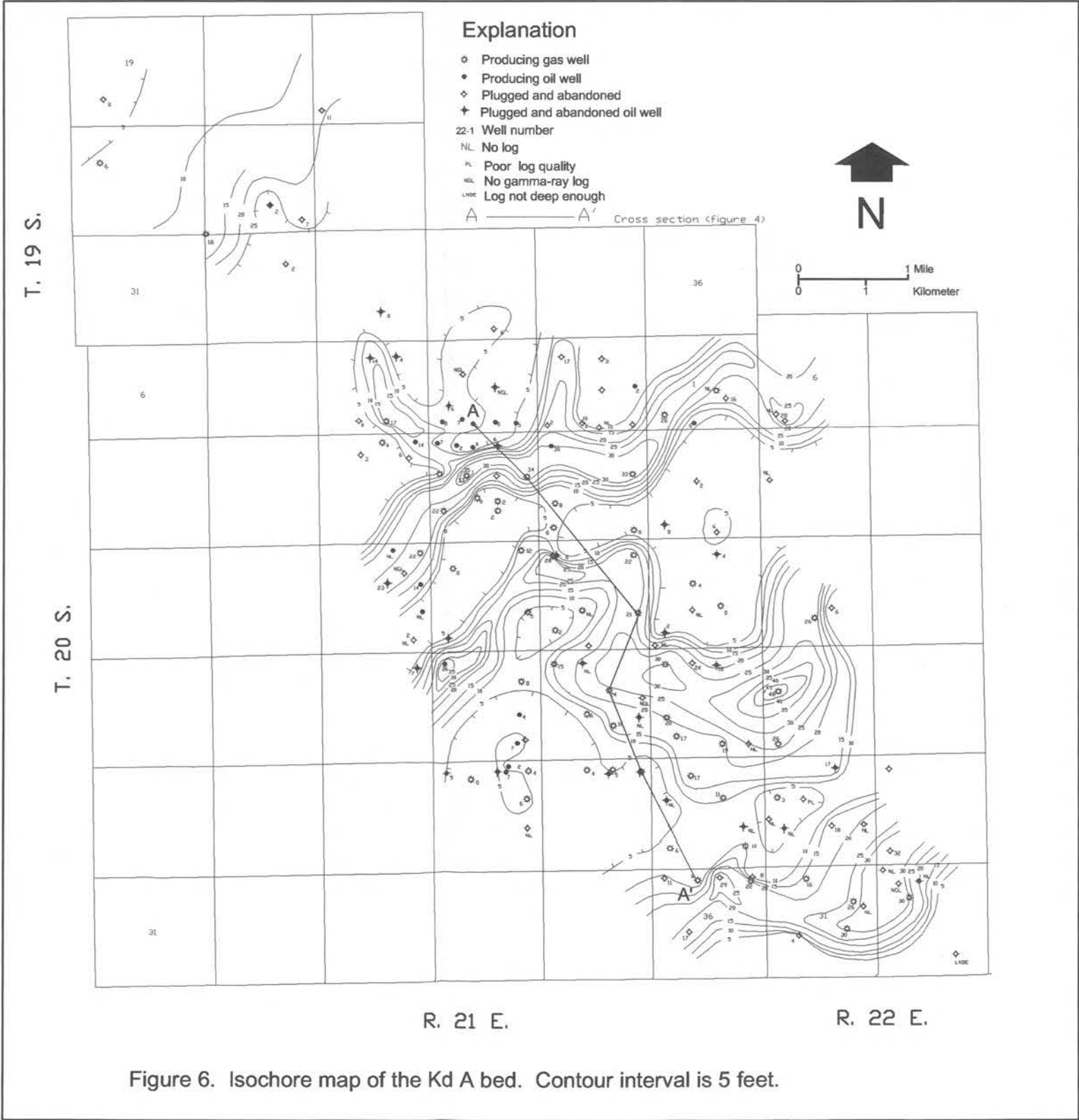
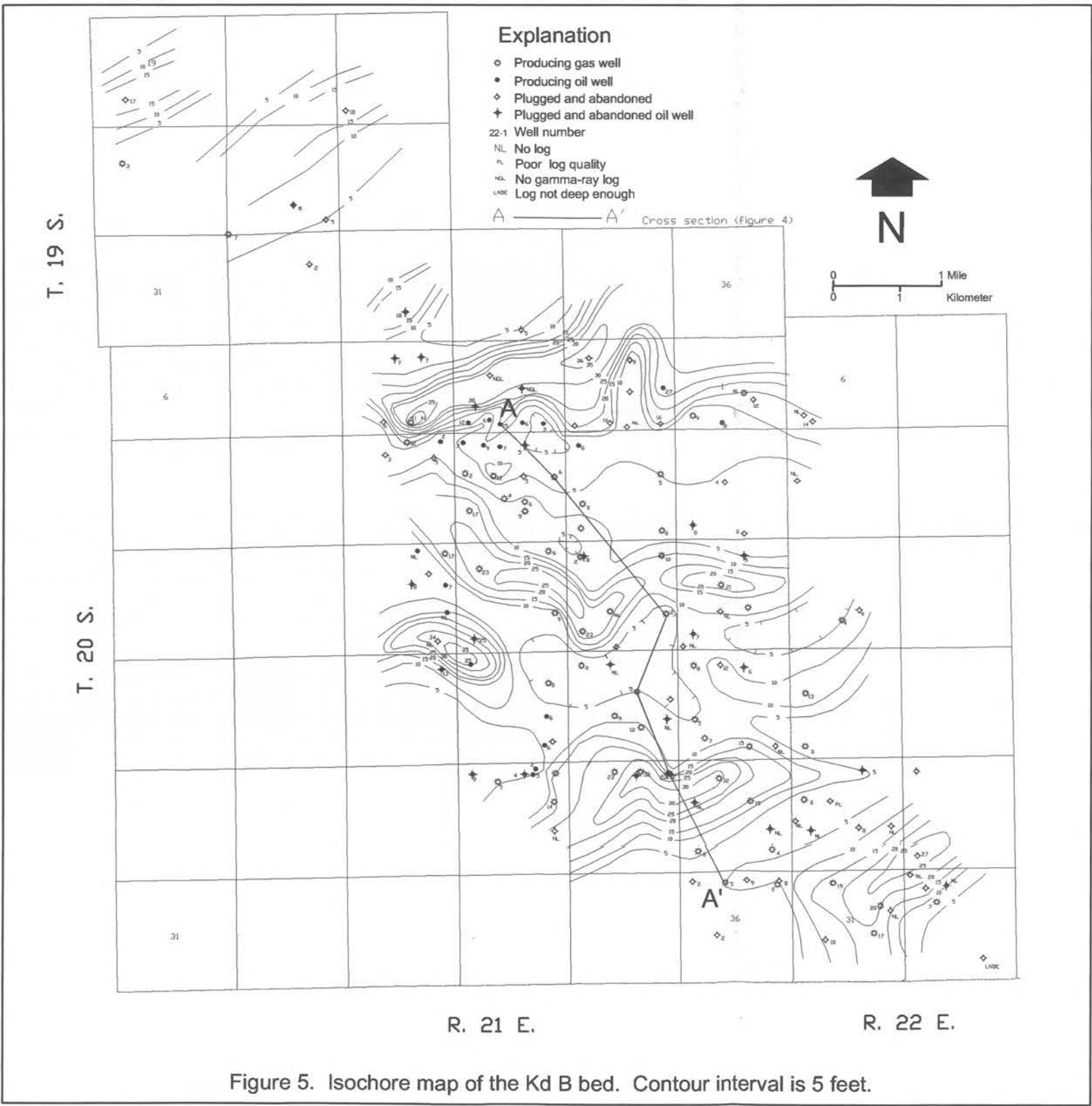
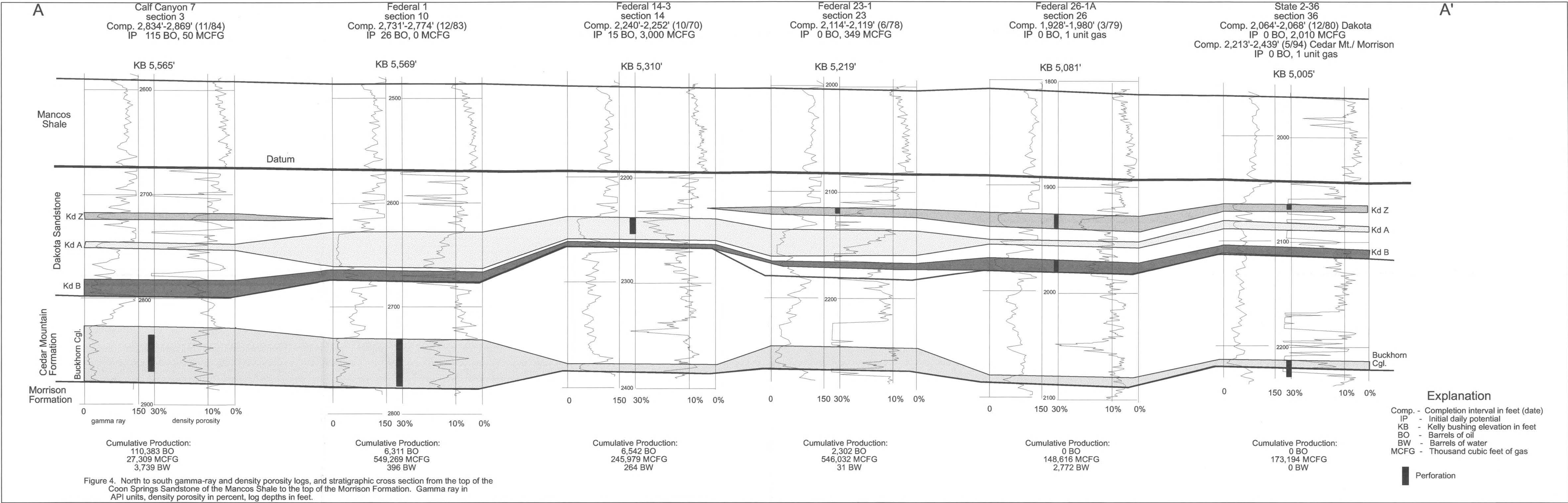


Figure 3. Annual production of gas and oil from the Cisco Dome field. Data source: Utah Division of Oil, Gas and Mining records.



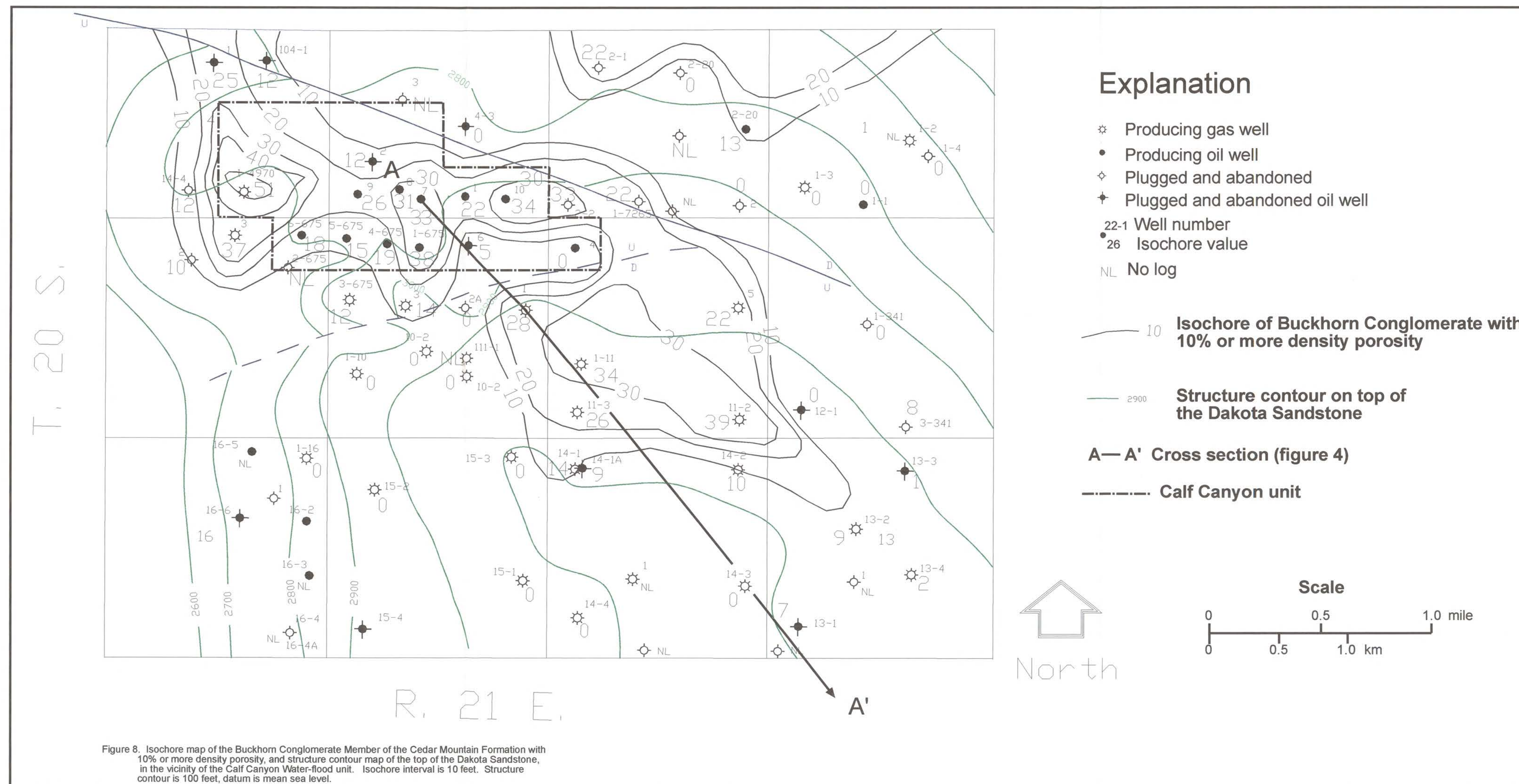


Figure 8. Isochore map of the Buckhorn Conglomerate Member of the Cedar Mountain Formation with 10% or more density porosity, and structure contour map of the top of the Dakota Sandstone, in the vicinity of the Calf Canyon Water-flood unit. Isochore interval is 10 feet. Structure contour is 100 feet, datum is mean sea level.

Table 2. Reservoir properties of the Buckhorn Conglomerate Member of the Cedar Mountain Formation at Calf Canyon unit. Data source, Board of the Utah Division of Oil, Gas and Mining hearing file, Cause 102-75.

Number of producers	8 (40 acre spacing)
Number of injectors	1 (Calf Canyon 11, SWSW section 3)
Average well depth	3,000 feet
Primary producing mechanism	solution gas drive
Oil reservoir area	640 acres
Average pay thickness	19.41 feet
Reservoir pore volume	2,179 acre-feet
Average porosity and permeability	15.6% and 5 md
Average connate water saturation	44.8%
Original bottom-hole pressure and temperature	900 psi and 120 °F
Original oil in place (OOIP)	4,441,049 BO
Estimated primary recovery (percent of OOIP)	592,816 BO (13.3%)
Estimated secondary recovery (percent of OOIP)	325,596 BO (7.33%)
Estimated ultimate recovery (percent of OOIP)	918,412 BO (20.68%)

