

ESTIMATED OIL AND GAS RESERVES FOR RIO BLANCO COUNTY, COLORADO

Compiled by
A. H. Scanlon

Funded by the Colorado Oil and Gas Conservation Commission
and the Department of Local Affairs--
Division of Commerce and Development



Colorado Geological Survey
Department of Natural Resources
State of Colorado
Denver, Colorado
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However, I assume full responsibility for any errors or omissions in these tabulations. Users of this OPEN-FILE REPORT could provide a significant service if they would inform the Colorado Geological Survey of any misinformation or omissions.

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A. H. Scanlon
Senior Geologist

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ESTIMATED OIL AND GAS RESERVES FOR RIO BLANCO COUNTY, COLORADO

Introduction

This report is the second* in a series of oil and gas reserve investigations undertaken for those counties in which oil and/or gas is currently being produced.

This study involves Rio Blanco County, located in northwestern Colorado, approximately 45 miles north of Grand Junction, Colorado. The major structural features in this area are the eastern edge of the Uinta Basin, the Douglas Creek Arch and the northern half of the Piceance Basin. Rio Blanco county covers 3,264 square miles. In this county oil and gas are produced from, in descending order of age, the Green River (Douglas Creek) Formation, Wasatch Sandstone, Fort Union Sandstone, Mesaverde Sandstone, Emery Sandstone, Niobrara Limestone, Mancos Shale, Dakota Sandstone, Cedar Mountain Shale, Morrison Sandstone, Sundance (Entrada) Sandstone, Shinarump Conglomerate and Weber Sandstone. Gas alone is produced from, in descending order of age, the Castlegate Sandstone, Morapas Sandstone and Buckhorn Sandstone.

There are 34 fields considered active producers as of December 31, 1982. Of these, 7 are classified as oil fields (based on cumulative gas-oil ratio (GOR) or $<15:1$), and 27 are classified as gas fields (based on cumulative GOR $> 15:1$).

Two of the oil fields are undergoing secondary recovery by injected fluids. They are Rangely Field in the Weber Sandstone and Wilson Creek Field in both the Sundance Sandstone and Morrison Sandstone. Table I shows the amounts of injected fluids for 1982 and the cumulative amount of injected fluids through 1982.

* Refer to:

OPEN-FILE REPORT 84-3: Estimated Oil and Gas Reserves for Washington County, Colorado.

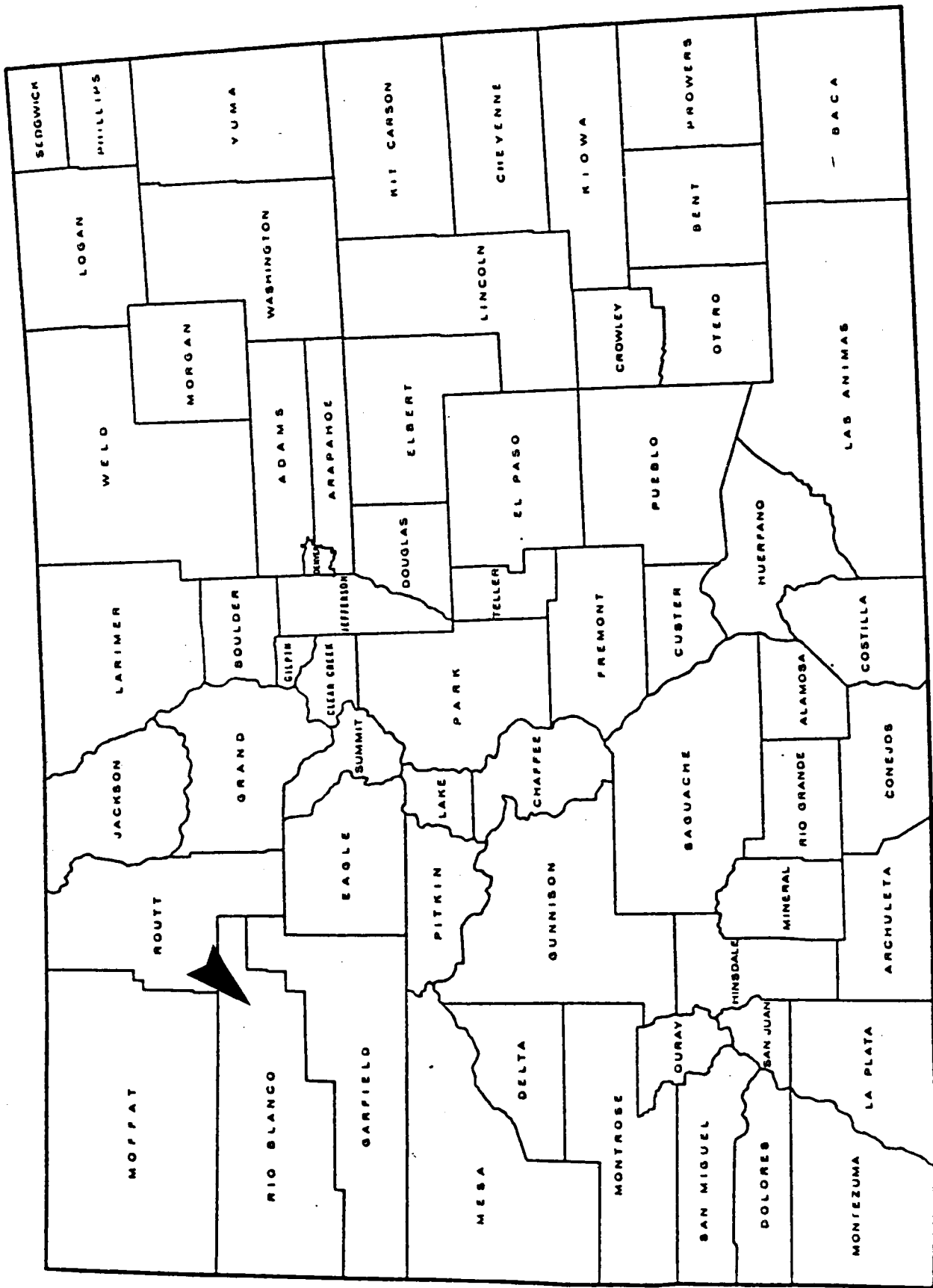


Figure 1 County Location Map

TABLE I

Summary of Secondary Recovery Projects
by Injected Fluids
for Rio Blanco County

Field Name/ Horizon	Operator	Initial Inj. Date	Injected Water (bbls or MCF) 1982	Cumulative through 1982
Rangely/ Weber Sand	Chevron Oil Co.	12-25-57	142,631,474 (bbls.)	2,113,033,473 (bbls.)
Rangely-NE Unit/ Weber Sand	Grace Pet. Corp.	2-06-77	528,747 (bbls.)	1,199,279 (bbls.)
Wilson Ck./ Morrison	Texaco Inc.	1-20-59	9,440,062 (bbls.)	150,580,438 (bbls.)
	Texaco Inc.	5-14-46		31,310,330 (MCF)
Wilson Ck./ Sundance	Texaco Inc.	3-07-61	3,758,400 (bbls.)	125,557,005 (bbls.)
			224,114 (MCF)	1,495,642 (MCF)

The most significant production in this county is from Weber Sandstone in Rangely Field. In 1981, production from the Weber in Rangely accounted for 96 percent of the county total oil production and over 50 percent of the total state oil production.

Method of Approach

Production decline curves are plotted for each currently producing horizon within each field, hereafter referred to as a field-horizon. There are 74 production decline curves plotted, one for each field-horizon. Production data were obtained from the C.O.G.C.C. annual production books. These books contain records of yearly production data, dating back to 1952. Prior to this date, no such records were kept by the Commission. Though several fields began producing prior to 1952, the decline rates applied to these reserve calculations are well established after this date, and there was no need to obtain annual production prior to 1952. All production decline curves are plotted as rate (annual production in barrels of oil or MCF of gas) versus time (in years), with the exception of Rangely Field, Weber Sandstone production, which is discussed in the following section. For each production decline curve, the rate scale was adjusted to accommodate each field-horizon.

Oil Reserve Calculations

Of the 12 oil fields-horizons, 9 decline rates were calculated based on the rate vs. time production decline curve. Two fields, Duck Creek and McHatlon, have only been producing since 1982 and therefore no reserve estimates could be made using this method. Weber Production from Rangely Field is discussed independently.

All decline rates calculated for oil except for Rocky Point Field are reasonably well established. Production from Rocky Point has been erratic since its first reported production in 1976. A 9.5 percent decline rate was assigned to this field based on the average of five nearby fields with established Mancos oil production.

Once the decline rates were determined for each of these oil field-horizons (see Table II), the remaining reserves were calculated using the equation:

$$R_r = \frac{q - q_f}{-\ln(-dy)}$$

where: R_r = remaining reserves
 q = current annual production
 q_f = final economic production rate
 (see note below.)
 $-\ln$ = negative natural log
 dy = yearly decline rate (in percent)

The ultimate recoverable was then determined by adding the estimated reserves to the cumulative production.

Note that the final economic production rate used was one barrel of oil per day per well, for one year; there 365 barrels, multiplied by the number of wells needed to keep field production economic. In most cases this was one well. The number of wells used was determined at the discretion of the author.

For associated gas production, estimated reserves were calculated in the same manner as that described in the Gas Reserve Calculations section.

Rangely Field, Weber production proved to be the exception among the oil field horizons regarding decline rates. Rangely presently produces from the Mancos, Morrison and Weber Formations, but has produced oil and/or gas from the Shinarump, Entrada and Dakota Formations. The author used the decline curve method discussed earlier for reserve estimates for production from the Mancos and Morrison Formations in Rangely Field. As seen from the rate-time production graph for the Rangely Weber (Fig. 2), it is difficult to assign a decline rate to the oil production when presented in this manner. After discussing the Weber production with Mr. Stan Walker with Chevron in Denver, it was determined that to obtain reasonably accurate reserves for this field-horizon, a plot of the water-oil ratio (WOR) versus cumulative production was needed. Water production figures were obtained from the annual production books in the C.O.G.C.C. The WOR was then calculated for each year from 1954 through 1982 and plotted against the cumulative production (Fig. 2). This curve was then extrapolated to the 98 percent WOR (economic limit for oil production), dropped vertically to the cumulative production axis to determine the ultimate recoverable amount of oil. This amounted to approximately 850,000,000 barrels of oil. This figure does not account for any recovery methods not already in progress. An annual rate of 7.5 percent was then obtained by backing into the annual production versus cumulative production plot using the equation:

$$\begin{aligned} \text{Decline rate} &= \frac{1982 \text{ oil production}}{\text{ultimate recoverable-cumulative production}} \\ &\text{or} \\ .0746 &= \frac{14,924,165}{850,000,000 - 650,144,763} \end{aligned}$$

Present cumulative production from the Weber is ± 650 million barrels, leaving oil reserves of ± 200 million barrels.

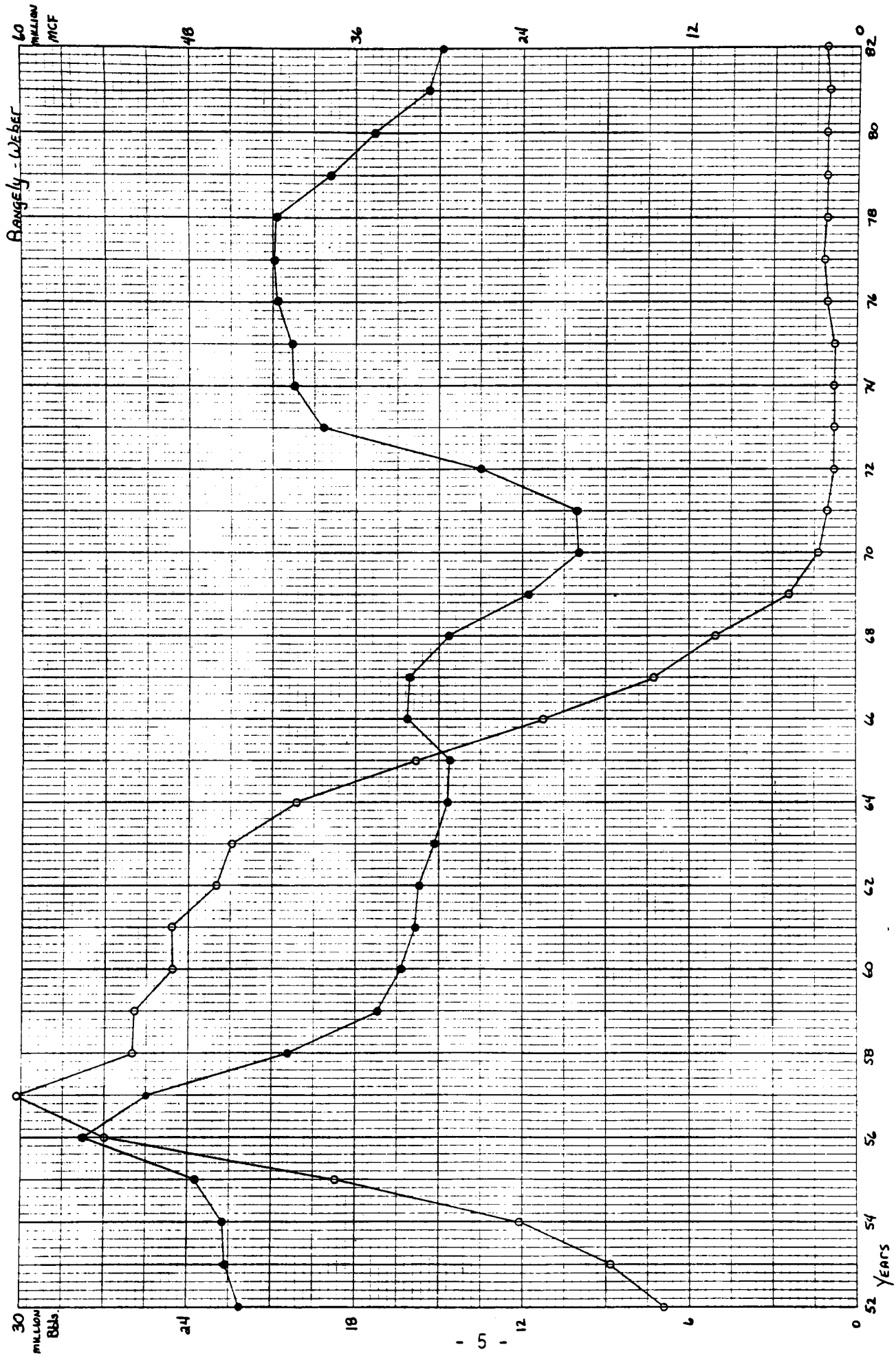


Figure 2. Rate-time historical production graph for Rangely-Weber

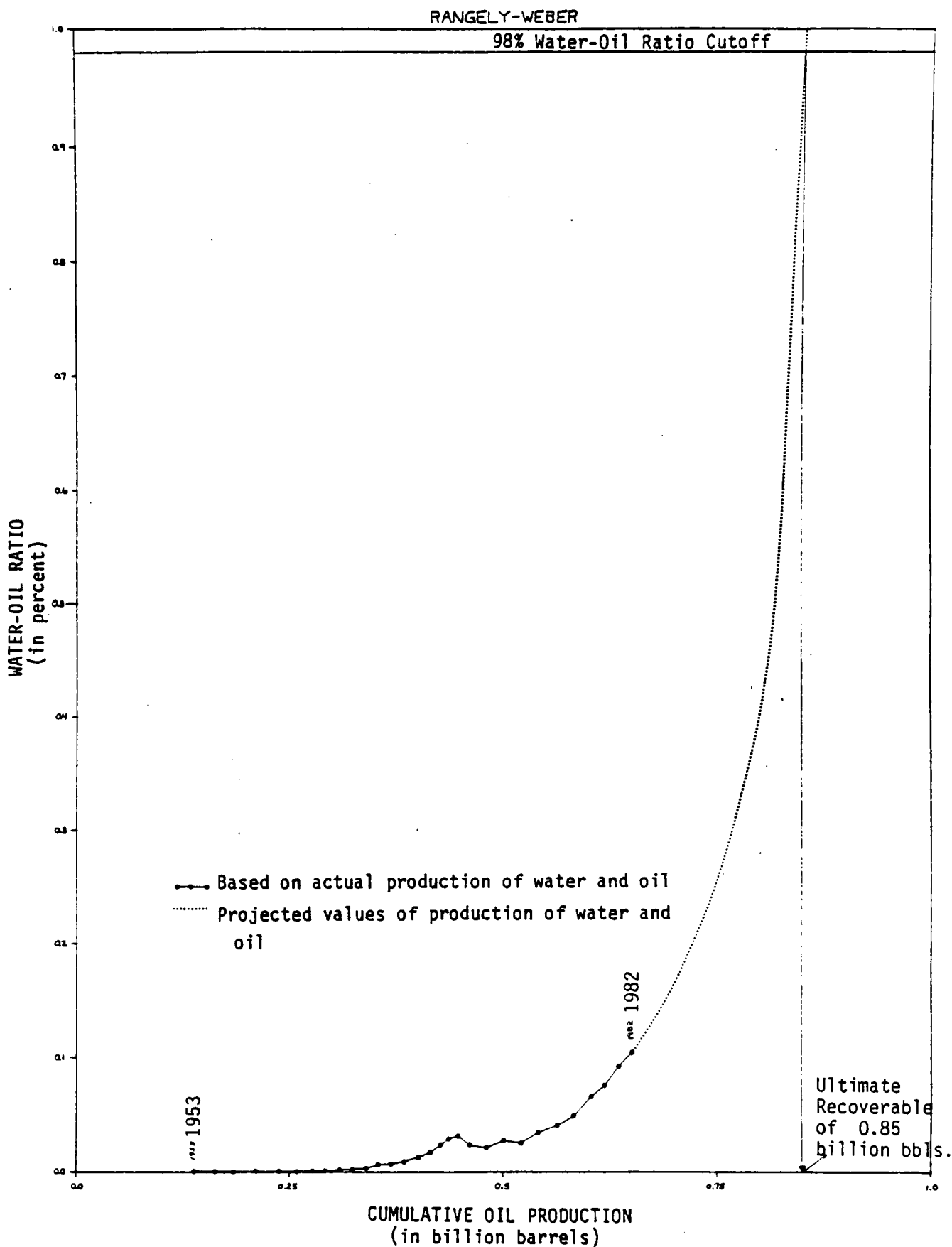


Figure 3. Water-oil Ratio versus cumulative historical production graph for Rangely-Weber.

Gas Reserve Calculations

For the 62 gas field-horizons decline rates were calculated for 41 of these based on historical production rates, and applied to the equation:

$$S = \frac{a(1-r^n)}{1-r}$$

Where: S = gas reserves
a = current annual gas production
r = (1-dy) where dy = annual decline rate
n = number of years -- 20 years was used
in all cases except where noted in
the remarks column of Table II.

Results can be found in Table II.

For those fields in which oil is produced with gas, it was intended that the GOR be used to determine gas reserves. These ratios were rarely found to have any consistency. In all cases, decline rates could be determined from the actual oil production decline curve. These rates were then applied to the oil reserve equation and reserve estimates calculated.

Results

The following figures are for those field-horizons for which reserves could be calculated. Estimated oil reserves for Rio Blanco County totaled 215,231,570 barrels. The Rangely-Weber production accounts for approximately 93 percent of the oil reserves for this county. Estimated gas reserves for Rio Blanco County totaled 327,581,003 MCF. Note that the gas reserve calculations are based on a 20-year projection, therefore they do not account for gas production after the year 2002.

In nine to ten years, roughly half of the estimated oil reserves in Rio Blanco County will have been produced. In seven to eight years roughly half of the gas reserves will have been produced.

Note again, that estimated oil reserves for Weber production in Rangely Field do not consider possible reserves under future secondary and tertiary recovery projects.

It should also be noted that many recent proposals dealing with secondary recovery projects for production from the Weber Sandstone in Rangely Field intend to use the gas produced from this field-horizon for future injection into this horizon. If this is the case, estimated gas reserves for this field-horizon should not be considered for tax revenue purposes, as it will not be sold, and therefore not taxed.

These figures also do not account for production increases due to secondary and/or tertiary recovery not already in progress, or account for undiscovered reserves, nor do they reflect changes in economics and demand.

In this county there are two classes of field-horizons: I) those with a long enough production history to calculate reserves with confidence, and II) those new field-horizons with essentially no production history, or for other reasons, reserves cannot be calculated.

To be able to calculate total county oil and gas reserves, it was necessary to apply the overall decline rates (6.93 percent per year for oil and 6.76 percent per year for gas) obtained from class I field-horizons to the current production from Class II field-horizons.

Using this approach on current production from Class II field-horizons (7.174 Bbls. of oil and 1,143,792 MCF of gas), additional reserves of 94,809 Bbls. of oil and 12,747,026 MCF of gas were obtained. This gives total county reserves (Class I and II) of 215,326,379 Bbls. of oil and 340,328,029 MCF of gas.

To insure that the reserve figures calculated for Class II are reasonable using this method, a comparison was made between the sources (producing horizons) of the Class I and Class II field-horizons. It was determined that there were no significant differences in the sources of production for the two groups. Therefore, it is concluded that the overall decline rates can be applied with confidence.

LIST OF ABBREVIATIONS USED IN TABLE OF RESERVE DATA

'a'	annual gas production
ABD.	abandoned
Approx.	approximate, approximately
Avg.	average, averaged
Bbls.	barrels
B.W.E.	Bottom Water Encroachment
calc.	calculate, calculated
Co.(s)	county (counties)
cond.	condensate
ck.	Creek
Cum.	cumulative
Dak.	Dakota Sandstone
Deplet.	Depletion
dy	annual decline rate
Econ.	Economic
Est.	Estimated
Exp.	Expansion
g	gas
Gas Exp.	Gas Expansion
G.C.E.	Gas Cap Expansion
G.E.	Gas Expansion
GOR	Gas-Oil Ratio
Inc.	Increase, increasing, increased
Inj.	Injection, injected
Lmtd.	Limited
MCF	Thousand cubic feet
Miss.	Mississippian
Mos.	Months
Mtn.	Mountain
N	North
N.P.	New Production or less than five years production, therefore, no reliable annual decline rate could be calculated to apply to the equations to calculate reserves.
No.	number, numbers, North
o	oil
P and A	Plug (ged) and Abandon (ed)
Poss.	Possible
Prod.	Production, produced
Proj.	Projection, projected
q	current annual production of oil
qf	final economic production of oil
react.	reactivated
Rr	Remaining reserves-oil
S	Remaining reserves-gas
S.G.D.	Solution Gas Drive
S.I.(SI)	Shut-in
So	South
W	West
W.D.	Water Drive
Yr or Yrs	Year or years

TABLE II OPEN-FILE 84-4 RESERVE DATA FOR RIO BLANCO COUNTY										
FIELD NAME/ PROD. HORIZON	GENERAL DATE OF LOCATION DISCOVERY	TYPE OF DRIVE	dy (in %)	CUMULATIVE PRODUCTION		ESTIMATED OIL (bbls) (1) Condensate	RESERVES GAS (MCF) (1) Condensate	ULTIMATE OIL (bbls) (1) Condensate	RECOVERABLE GAS (MCF) (1) Condensate	REMARKS *
				OIL (bbls) (1) Condensate	GAS (MCF) (1) Condensate					
1. Banta Ridge/ Dakota	15-103W	1972		1,484	93,058					Only Produced in '73 and '82
2. Banta Ridge/ Mancos	15-103W				51,359					'82 Prod. Only
3. Banta Ridge/ Mesaverde	15-103W				102,176					'82 Prod. Only
4. Baxter Pass/ Dakota- Morrison	45-103W	1958	Possibly Gas Exp.	1,178	2,694,186		16,307,071	1,178	19,001,257	Also Prod. in Garfield County May Include Mancos, Buck- horn and Mesaverde Prod. '82 Prod. Only
5. Big Ridge/ Mancos	15-100W	1981		91	2,878					'82 Prod. Only
6. Blue Cloud/ Dakota	45-102W	1974			71,286					'82 Prod. Only
7. Blue Cloud/ Mancos	45-102W		Gas Exp.		761,371		1,813,960		2,575,331	
8. Cathedral/ Dakota	35-100W	1960			610,918		1,004,895		1,615,813	
9. Cathedral/ Emery	35-100W		Depletion		49,450					'80-'82 Prod. Only
10. Cathedral/ Mancos	35-100W		Depletion	6,433	11,211,732	20,544	22,768,470	26,977	33,980,202	
11. Cathedral/ Mesaverde	35-100W				954					'82 Prod. Only
12. Cathedral/ Morrison	35-100W				30,207					'82 Prod. Only
13. Colorow Gulch 3N-97W /Shinarump	3N-97W	1978			431,489		275,862		707,351	
14. Corral Creek/ Dakota	15-100W	1978			133,163					'81-'82 Prod. Only
15. Corral Creek/ Dakota-Morrison	15-100W			(23)	367,896					'80-'82 Prod. Only
16. Corral Creek/ Mancos	15-100W		Gas Expansion		203,367		642,211		845,578	Based on '81-'82 Prod.
17. Douglas Creek/ /Dakota	263 S- 101k102 W	1943	6. C. E. with Bottom W. D.		8,597,819		161,998		8,759,817	
18. Douglas Creek/ Mancos (Emery)	263S- 101k102W		Gas Exp.		15,567,658		8,937,600		24,505,258	
19. Douglas Ct. North/Dakota	15-101 k 102 W	1956		(1,665)	445,492					'82 Prod. Only
20. Douglas Ct No /Emery (Mancos)	15-101k 102W		Gas Exp.		10,805,093		38,874,829		49,679,922	
21. Dgls. Ct. No. Morapas (Mancos)	15-101k 102W		W. D.		15,390,450		823,607		16,214,057	

TABLE 11
OPEN-FILE 84-4
RESERVE DATA FOR RIO BLANCO COUNTY

FIELD NAME/ PROD. HORIZON LOCATION	GENERAL DATE OF DISCOVER	TYPE OF DRIVE	dy (in ft)	CUMULATIVE PRODUCTION 12/31/82		ESTIMATED OIL (bbls) (1)Condensate	RESERVES GAS (MCF) (1)Condensate	ULTIMATE OIL (bbls) (1)Condensate	RECOVERABLE GAS (MCF) (1)Condensate	REMARKS *
				OIL (bbls) (1)Condensate	GAS (MCF)					
22. Douglas Creek 1S-101E No./Morrison 102W				380						'82 Prod. Only
23. Douglas Creek 1S-101E No./Meber 102W		M. D.	10.0-g	27,352		18,309		45,661		
24. Douglas Creek 344 S- So./Buchhorn- 101-102 W	1963		8.0-g	(216)	1,752,743		1,620,788	(216)	3,373,531	Also Incl. Soe Dak. Prod.
25. Douglas Creek 344S- So./Mancos 101-102W		Gas Exp.	10.0-g		845,313		1,169,058		2,014,371	
26. Douglas Creek 344S- So./Morapas 101-102W			8.0-g		244,377		354,287		598,664	
27. Douglas Creek 344S- So./Niobrara 101-102W			25.0-g		69,690		4,199		73,889	
28. Douglas Creek 2S-102 & W./Mancos 'B' 103 W	1953	Gas Exp.	3.0-g	(337)	22,285,442		19,846,041	(337)	42,131,483	
29. Dragon Trail/ 2 & 3 S Eaery(Mancos) 101&102 W	1959	Gas Exp.	16.0-o 6.0-g	9,046	106,226,475	1,623	77,191,623	1,623	183,418,098	
30. Dragon Trail/ 1S-101W No./Mancos 'B'	1961	Gas Exp.	6.0-o 10.0-g		379,781		434,284		814,065	No Oil Produced Last 2 Years '82 Prod. Only
31. Duck Creek/ 1S-97W Wasatch	1982			212						
32. Evacuation 4S-102W Ck./Mancos 'B'	1977	Gas Exp.	8.0-g		728,268		2,303,573		3,031,841	Also Prod. in Garfield Co.
33. Foundation 4S-102W Ck./Buchhorn	1973		8.0-g		151,558		198,983		350,541	Also Prod. in Garfield Co.
34. Foundation 4S-102W Ck./Cedar Mtn.				(6,688)	558,083					SI in '82-dy greater than 201, Also Prod. in Garfield County '81-'82 Prod. Only Also Prod. in Garfield County
35. Foundation 4S-102W Ck./Dakota				(6)	186,713					
36. Foundation 4S-102W Ck./Mancos		Gas Exp.	8.0-g	(32)	1,602,698		3,657,796		5,260,494	
37. Lower Horse Draw/Dakota	1960		8.0-g	65 (492)	1,788,304		1,980,542	65 (492)	3,768,846	Erratic decline
38. Lower Horse Draw/Mancos (Eaery)		Gas Exp.	7.0-g	3,545 (27,785)	45,058,683		20,784,442	3,545 (27,785)	65,843,125	
39. McHatten/ 1N-93W Niobrara	1982			2,900						'82 Production Only
40. MineHile/ Dakota	2N-92&93W 1966		11.6-o	988,440		71,063		1,059,503		
41. Philadelphia 2S-101W Ck./ Mancos	1975	Gas Exp.	20.0-g	(216)	2,537,254		3,273,346	(216)	5,810,600	
42. PiceanceCk./ GreenRiver	2&3 S-95, 1930 96, 197W	Gas Exp. & M.D.	5.0-g		51,706,059		3,524,427		55,230,486	

TABLE II
OPEN-FILE 84-4

FIELD NAME/ PROD. HORIZON LOCATION	GENERAL DATE OF DISCOVER	TYPE OF DRIVE	dy (in %)	RESERVE DATA FOR RIO BLANCO COUNTY		ESTIMATED OIL (bbls) (1)Condensate	RESERVES GAS (MCF) (1)Condensate	ULTIMATE OIL (bbls) (1)Condensate	RECOVERABLE GAS (MCF) (1)Condensate	REMARKS *
				CUMULATIVE 12/31/82 OIL (bbls) (1)Condensate	GAS (MCF) (1)Condensate					*See Last Page of TABLE II for Definition of # Code
43. Piceance Ck./ 283 S-95, Mesaverde 96, 97W		Gas Exp. & M.D.	20.0-g	(110,209)	1,519,765		916,322	(110,209)	2,436,087	
44. Piceance Ck./ 283S-95, Wasatch 'A' 96, 97W		Gas Exp. & M.D.	11.5-g	70,708,035 (7,997)	340,389		25,845,820	70,708,035 (7,997)	26,186,209	
45. Piceance Ck./ 283S-95, Wasatch 'F' & 'G' 96 & 97W		Gas Exp. & M.D.	20.0-g	(431)	513,576		247,760	(431)	761,336	
46. Piceance Ck./ 283S-95, Wasatch 'G' 96 & 97W		Gas Exp. & M.D.	7.0-g	(101,835)	62,317,100		9,767,863	(101,835)	72,084,963	
47. Piceance Ck. 3S-95 & 96W So./Douglas Ck.	1954	Gas Exp.	6.5-g	450	2,243,397		268,392	450	2,511,789	
48. Pinnacle/ Shinarump	1956		4.0-o	121,935	24,574	43,212		165,147	24,574	
49. Rangely/ Mancos	1902		7.5-o	13,245,250	139,134	1,061,998		14,307,248	139,134	
50. Rangely/ Morrison			14.0-o	50,231	1,916,308	1,631		51,862	1,916,308	
51. Rangely/ Weber		S. 6. D. & GasCap w/ Latd. M. D.	7.2-o 2.0-g	650,175,073	690,130,018	200,000,000	36,832,194	850,175,073	726,962,212	
52. RockyPoint/ Mancos	1976	Gas Exp.	9.5-o 8.0-g	9,525 (442)	5,042	13,544	21,449	23,069	26,491	
53. Sage Brush Hills/Mancos	1978				118,251					
54. Sage Brush Hills/ Mesaverde					6,495					
55. SoldierCanyon /Dakota	1976	Gas Exp.	9.0-g		62,024		73,279		135,303	
56. SulphurCrtk./ Ft. Union - Wasatch	2 & 3 S - 1955			122	3,575					'80 & '82 Prod. Only, St both years
57. SulphurCrtk./ Mesaverde	283S- 97-99W	Exp.		229	113,735					Also Prod. in Garfield County N. P.
58. SulphurCrtk./ Wasatch	283S- 97-99W		5.5-g	(581)	3,178,290		3,209,670	(581)	4,387,960	
59. Texas Mtn./ Castlegate	3S-102W		7.3-g		1,049,632		807,167		1,876,799	
60. Texas Mtn./ Castlegate- Mancos	3S-102W		25.0-g		489,567		87,346		576,913	
61. Texas Mtn./ Dakota	3S-102W		6.0-g		1,462,688		1,633,300		3,059,988	
62. Texas Mtn./ Mancos 'A'	3S-102W		10.0-g 8.0-g	62,931	289,106	13,743	97,996	76,674	387,102	
63. Texas Mtn./ Mancos	3S-102W		11.5-g		2,908,415		404,604		3,313,019	

FIELD NAME/ PROD. HORIZON	GENERAL DATE OF LOCATION DISCOVER	TYPE OF DRIVE	dy (in %)	CUMULATIVE PRODUCTION		ESTIMATED OIL (bbls) (1) Condensate	RESERVES GAS (MCF) (1) Condensate	ULTIMATE OIL (bbls) (1) Condensate	RECOVERABLE GAS (MCF) (1) Condensate	REMARKS *
				OIL (bbls) (1) Condensate	GAS (MCF) (1) Condensate					
64. Thunder/ Dakota	45-102N	1977	20.0-g	(977)	1,448,088		707,048	(977)	2,155,136	
65. Thunder/ Mancos	45-102N	Gas Exp.	8.0-g		1,574,443		3,164,238		4,738,681	
66. Taiga Mtn./ Castlegate	1N-103W	1981		(72)	264,107					'82 Prod. Only
67. Taiga Mtn./ Dakota	1N-103W			(676)	81,383					'82 Prod. Only
68. TrailCanyon/ Dakota	45-101W	1969	6.0-g		4,017,710		5,265,282		9,282,992	Also Prod. in Garfield Co.
70. TrailCanyon/ Dakota-Harrison	45-101W			(47)	17,776					'81 - '82 Prod. Only Also Prod. in Garfield County
71. TrailCanyon/ Mancos '8'	45-101W	Gas Exp.	8.0-g	4,010 (248)	790,410		1,008,860	4,010 (248)	1,799,270	Also Prod. in Garfield County
72. White River/ Mesaverde	1 & 2 N - 96 & 97 W	1890	14.0-o	13,946 (5,396)	1,373,378	550,571	763,982	564,517 (5,396)	2,137,360	Also Prod. in Garfield County Used to be called White River Dome
73. White River/ Wasatch	142 N - 96-97W		4.0-g 10.0-g		373,940		2,531,168		2,905,108	
74. WilsonCreek/ Harrison	243N-94W	1938	4.0-o	380,090	56,634,772	9,275,147	4,566,261	9,655,237	61,201,033	
75. WilsonCreek/ Sundance	243 N - 94W		6.0-g 2.0-o 5.0-g	27,795,170	4,945,151	4,160,185	1,407,110	31,955,355	6,352,261	

COUNTY TOTAL OF ESTIMATED RESERVES

215,231,570 BBls.
327,581,003 MCF

Reference List

Colorado Oil and Gas Conservation Commission Production Records and Injected Fluids - Water and/or Gas-File.

Crouch, M.C., III, editor, 1982 Oil and Gas Fields of Colorado, Nebraska and Adjacent Areas: Rocky Mountain Association of Geologists, vols. I and II, 791 pp.

Haun, J.D., Cardwell, A.L., Herrod, W.H. and Cronoble, J.M., 1976. Oil and Gas Reserves of Colorado in Colorado School of Mines Research Institute, Mineral Industries Bulletin, v. 19, #5.

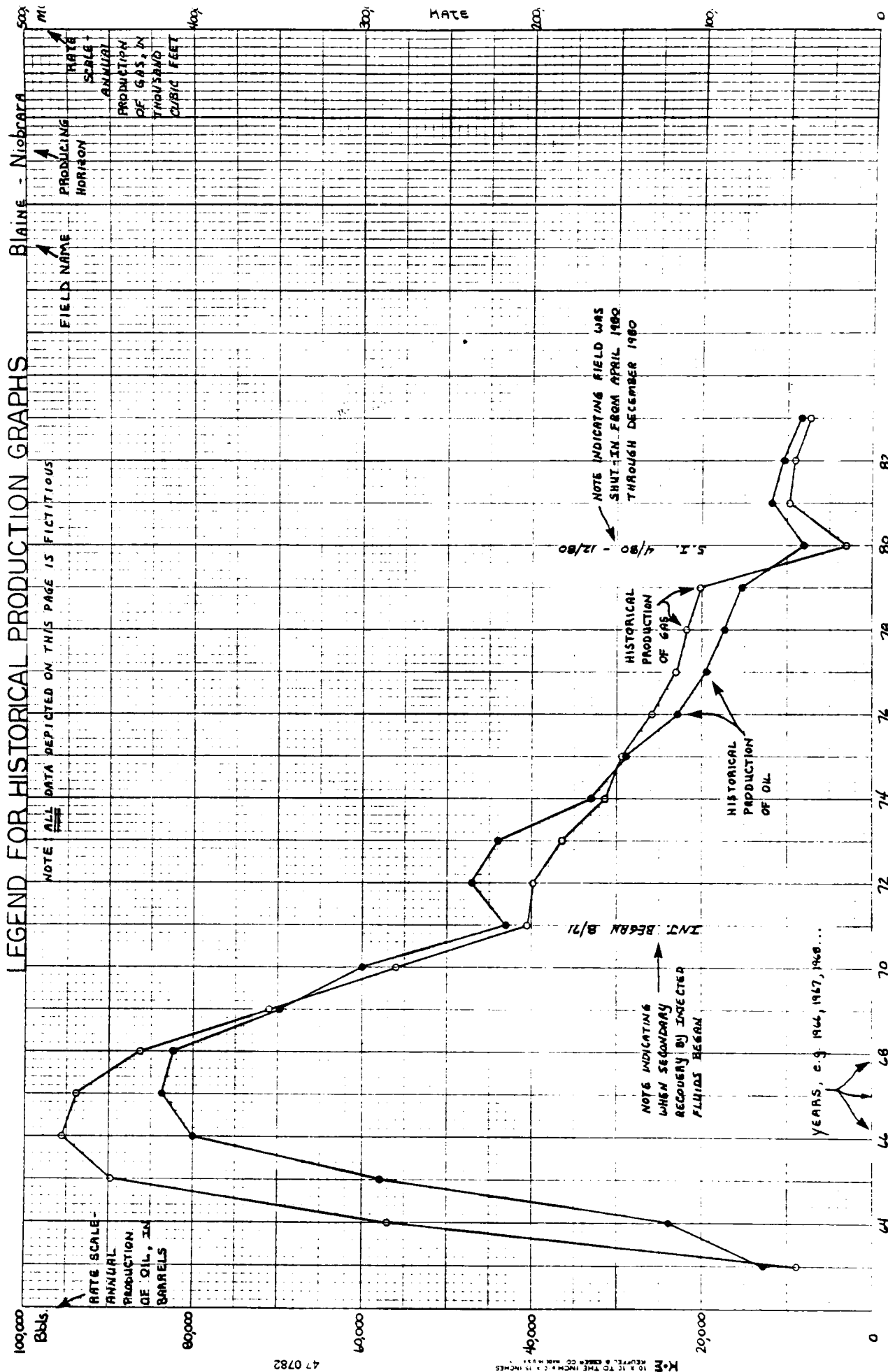
Parker, J.M., editor, 1961 Oil and Gas Field volume: Colorado-Nebraska: Rocky Mountain Association of Geologists, 389 pp.

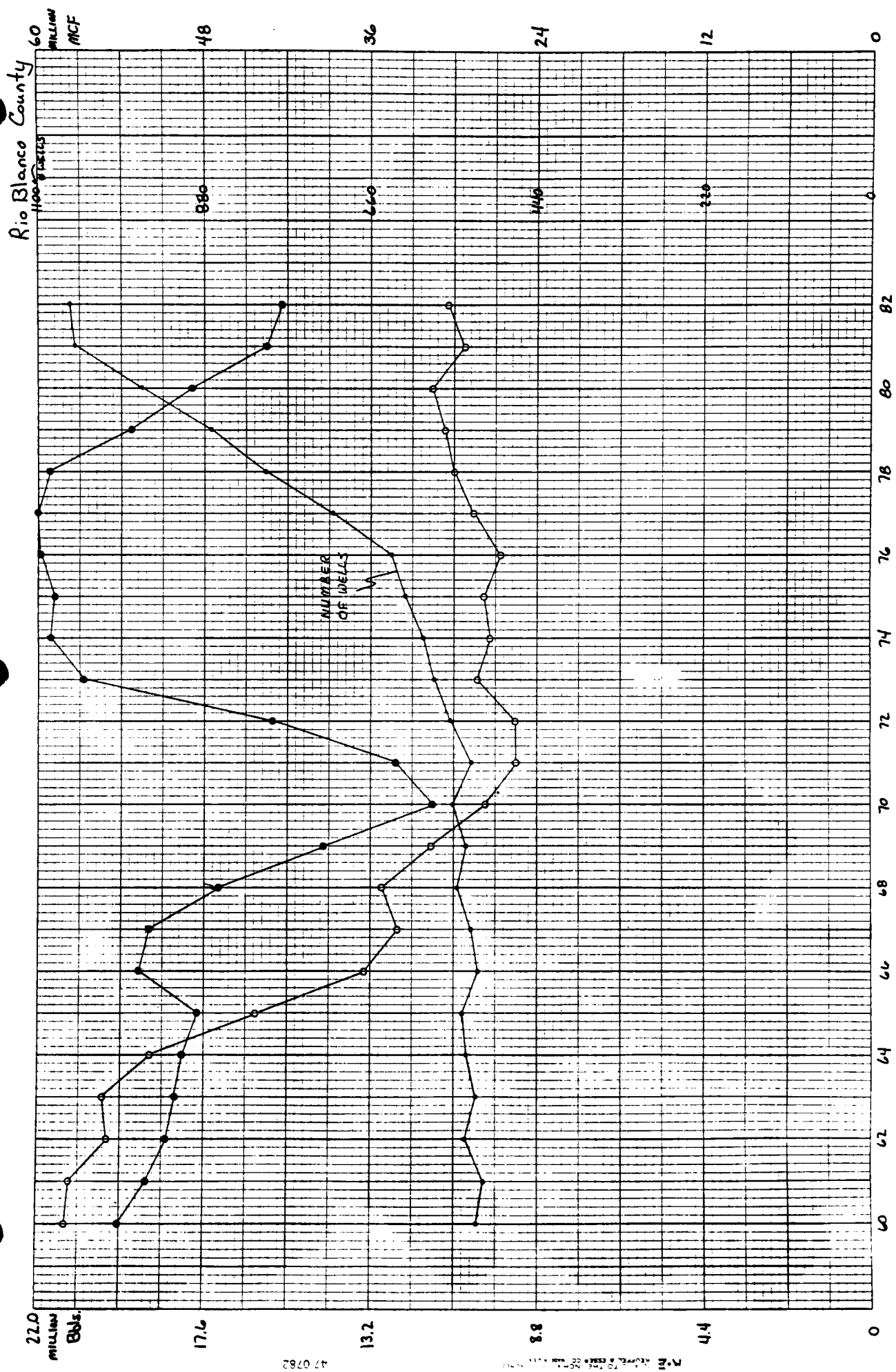
Appendix I

Historical production decline curve graphs for Rio Blanco County. These graphs are presented in alphabetical order by Field name and then by producing horizons within each field.

Note that only those fields actively producing as of 12-31-82 are included. Abandoned fields or field-horizons are not included.

LEGEND FOR HISTORICAL PRODUCTION GRAPHS





Banta Ridge - Dakota
5000
BBLs

Rate
100,000
MCF

4,000

80,000

3,000

60,000

2,000

40,000

1,000

20,000

0

0

Years

ST
Prod 4 ms

Banta Ridge - Mancos

Rate
100,000
MCF

80,000

60,000

40,000

20,000

0

Years

47 0702

K-2
KUPPEL TO 4-6 INCH
10-12 INCH
13-14 INCH
15-16 INCH
17-18 INCH
19-20 INCH
21-22 INCH
23-24 INCH
25-26 INCH
27-28 INCH
29-30 INCH
31-32 INCH
33-34 INCH
35-36 INCH
37-38 INCH
39-40 INCH
41-42 INCH
43-44 INCH
45-46 INCH
47-48 INCH
49-50 INCH
51-52 INCH
53-54 INCH
55-56 INCH
57-58 INCH
59-60 INCH
61-62 INCH
63-64 INCH
65-66 INCH
67-68 INCH
69-70 INCH
71-72 INCH
73-74 INCH
75-76 INCH
77-78 INCH
79-80 INCH
81-82 INCH
83-84 INCH
85-86 INCH
87-88 INCH
89-90 INCH
91-92 INCH
93-94 INCH
95-96 INCH
97-98 INCH
99-100 INCH

Banta Ridge - Mesa Verde

Rate
200,000
MCF

160,000

120,000

80,000

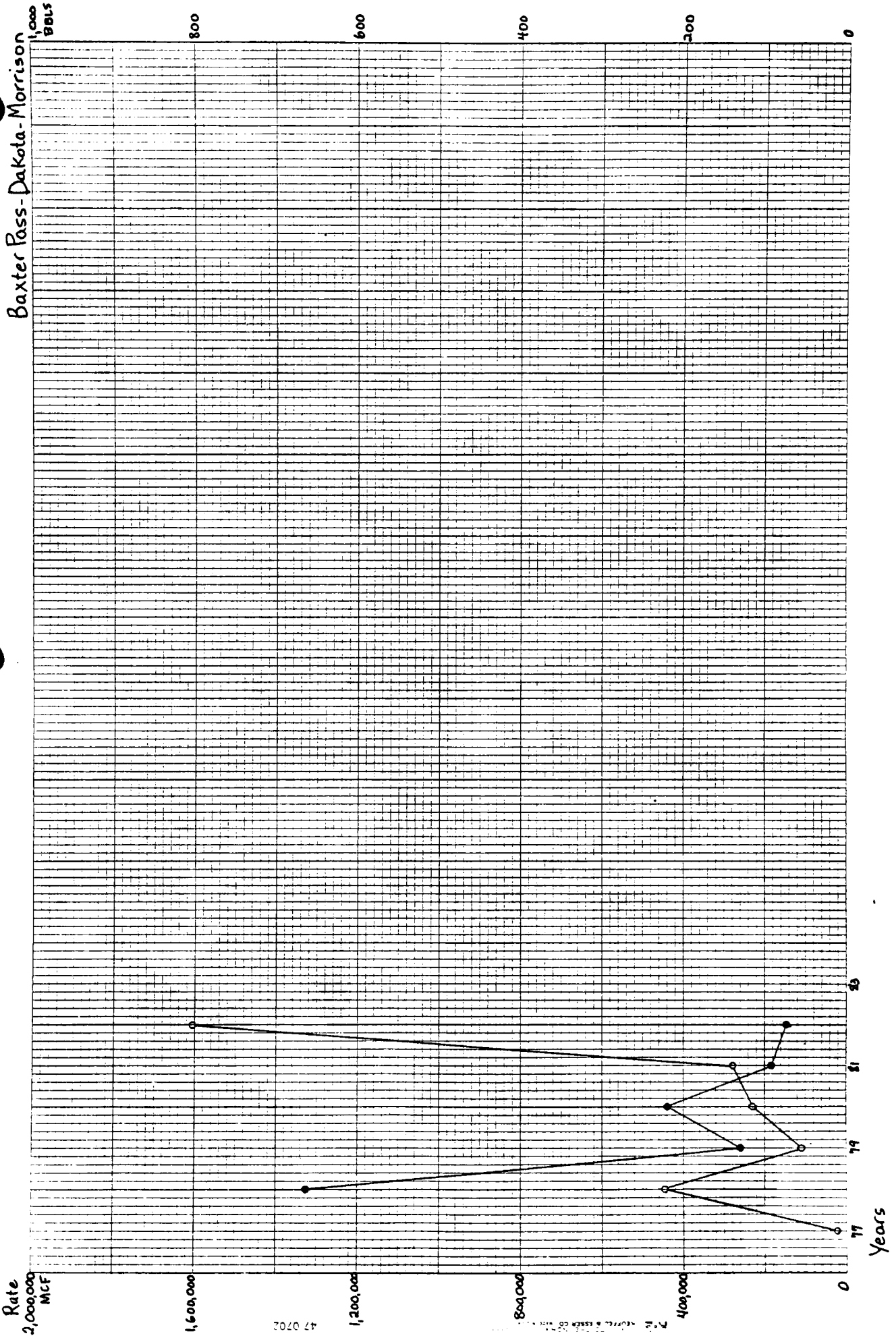
40,000

0

1982
Years

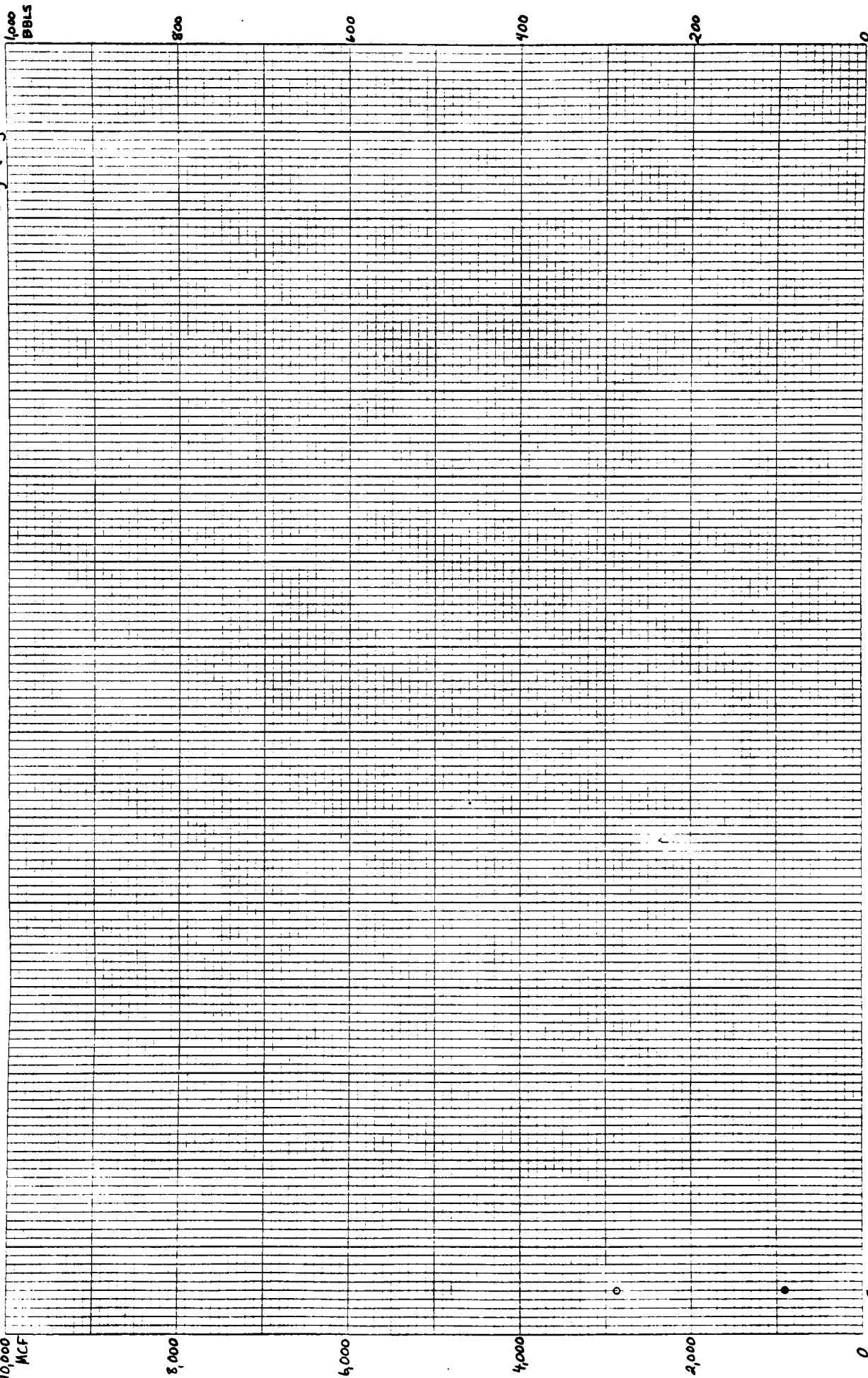
47 0702

NOT RECORDED IN 1982



Big Ridge - Mancos

Rate 10,000 MCF



Years

Blue Cloud-Dakota

Rate
100,000
MCF

80,000

60,000

40,000

20,000

0

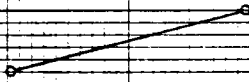
47 0702

MCF
100,000
80,000
60,000
40,000
20,000
0

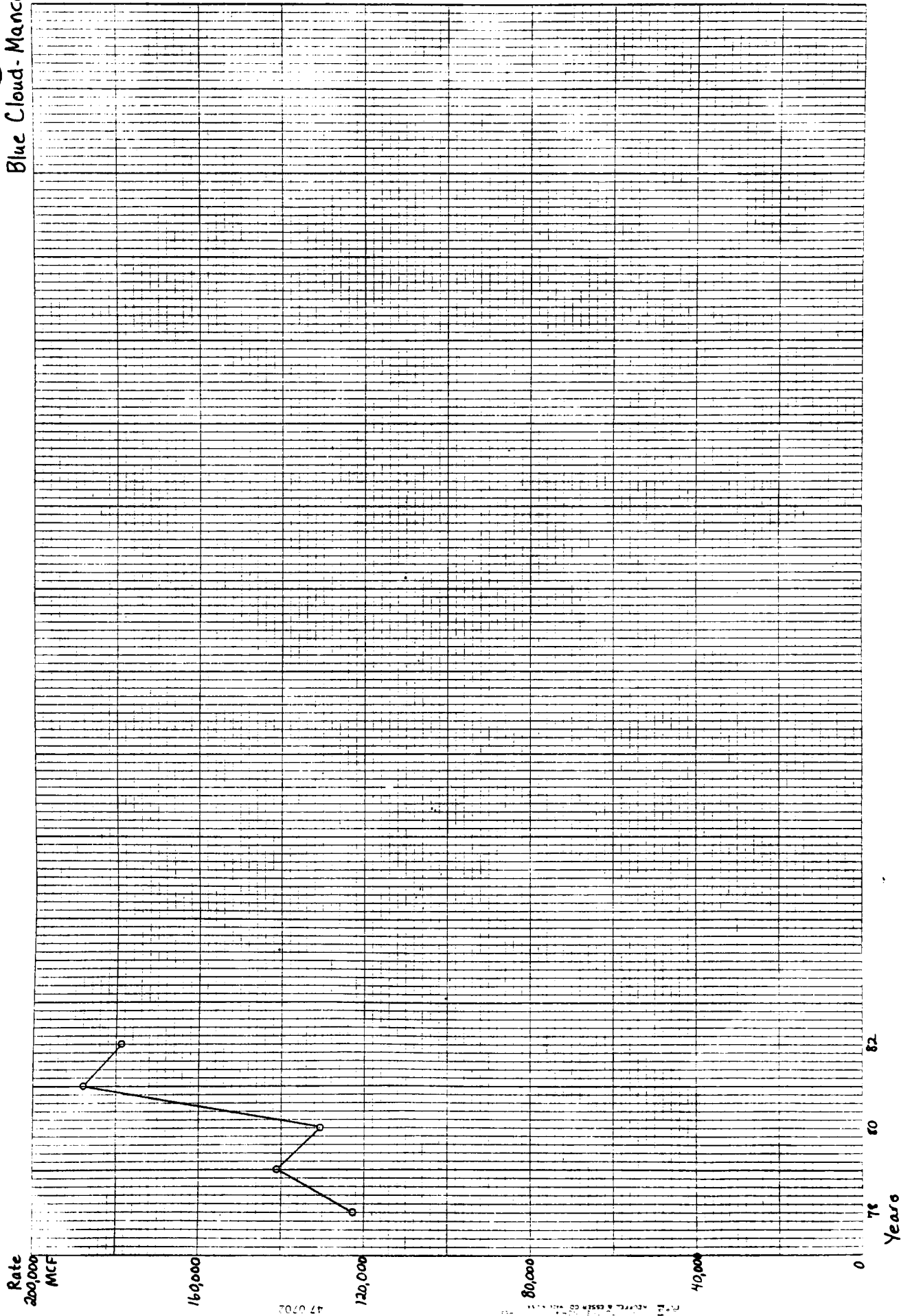
65

61

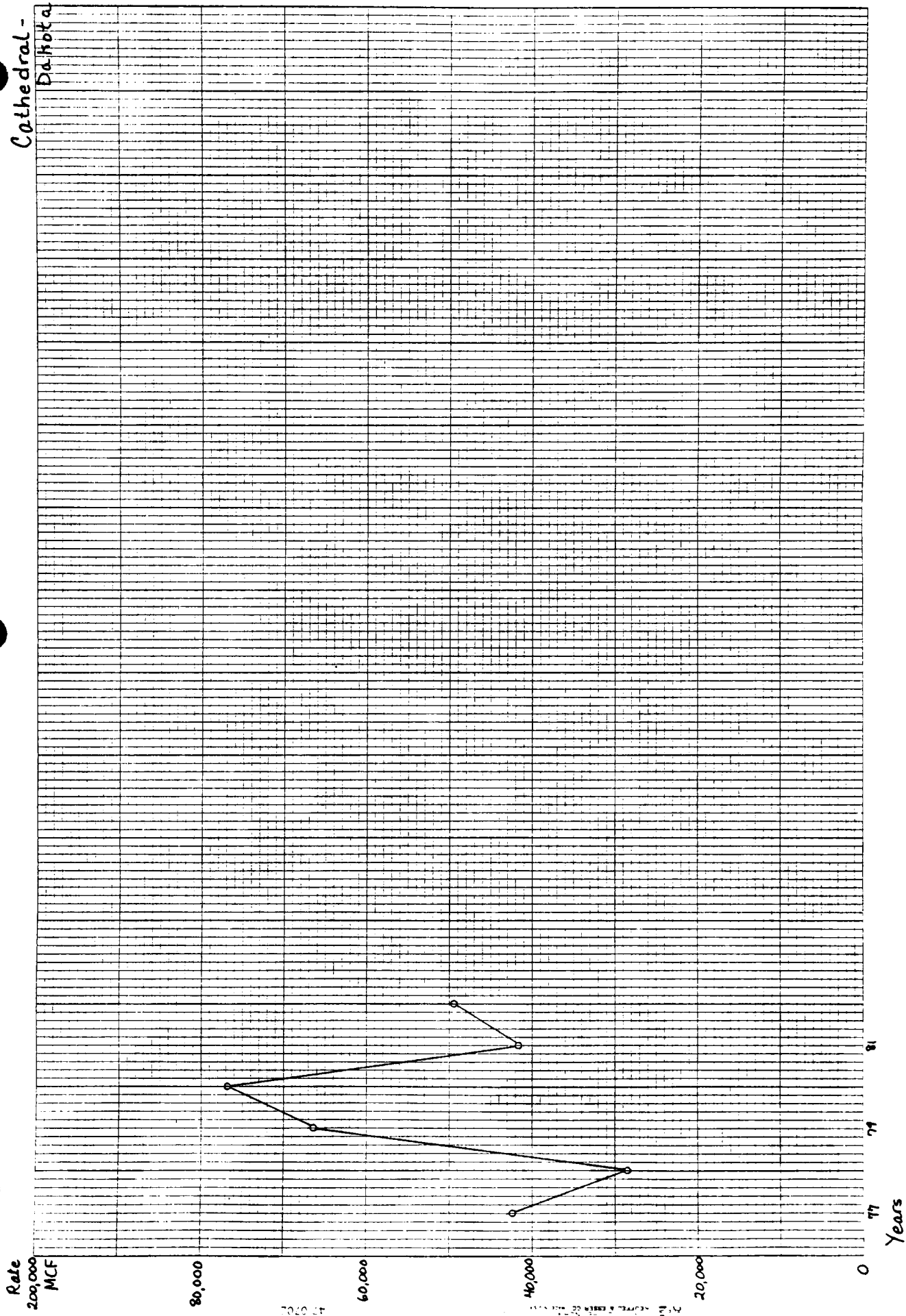
Years



Blue Cloud - Mancos



Cathedral - Dakota



Cathedral - Emery

Rate
MCF

50,000

40,000

30,000

20,000

10,000

0

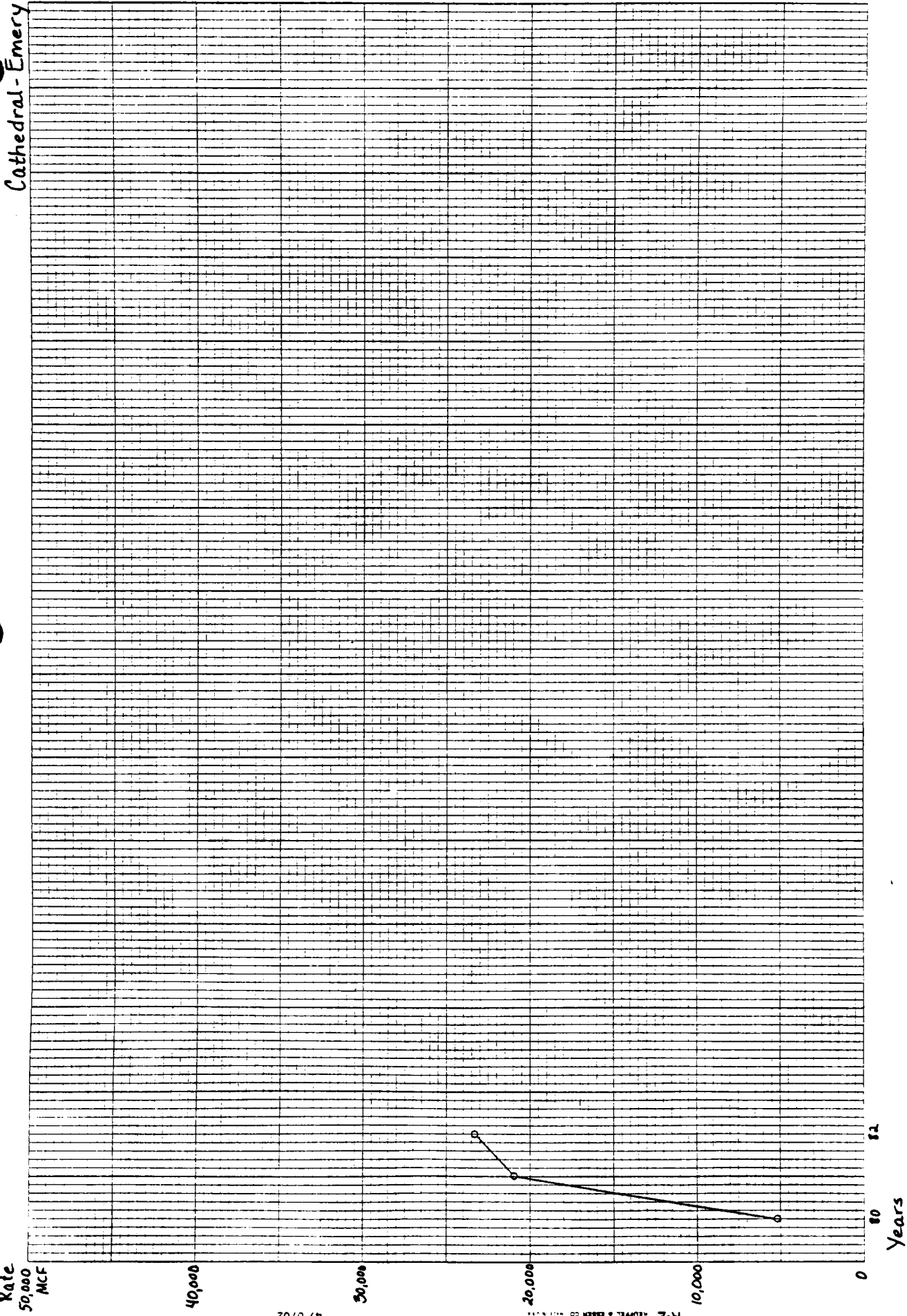
47 0702

Rate MCF

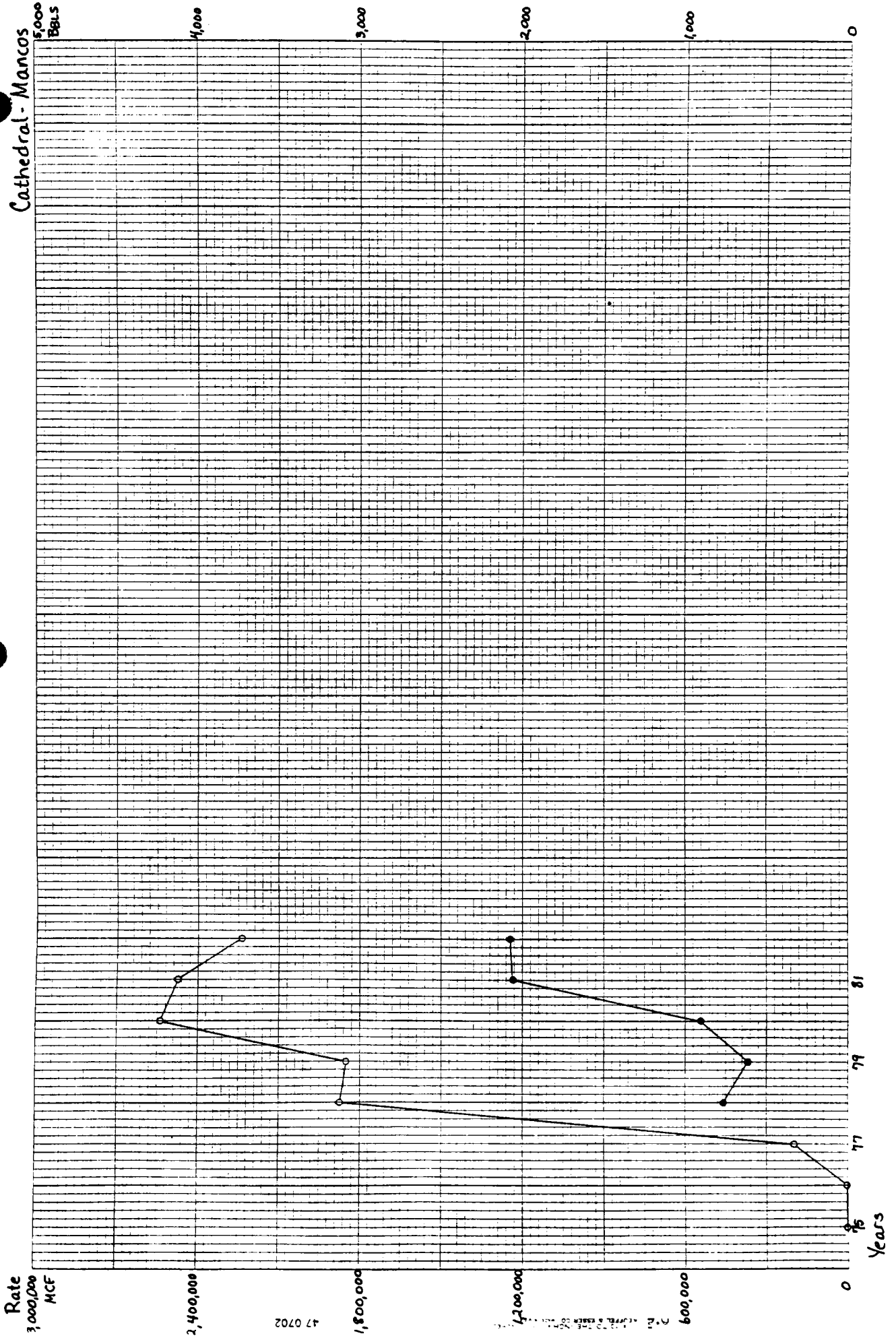
11

10

Years



Cathedral - Mancos



Cathedral - Mesa Verde

Rate
5,000
MCF

4,000

3,000

2,000

1,000

0

12
Years

47 0702

NO. 2 REPORT TO THE COMMISSIONER OF THE GEOLOGICAL SURVEY

9

Cathedral-Morrison

Rate
50,000
MCF

40,000

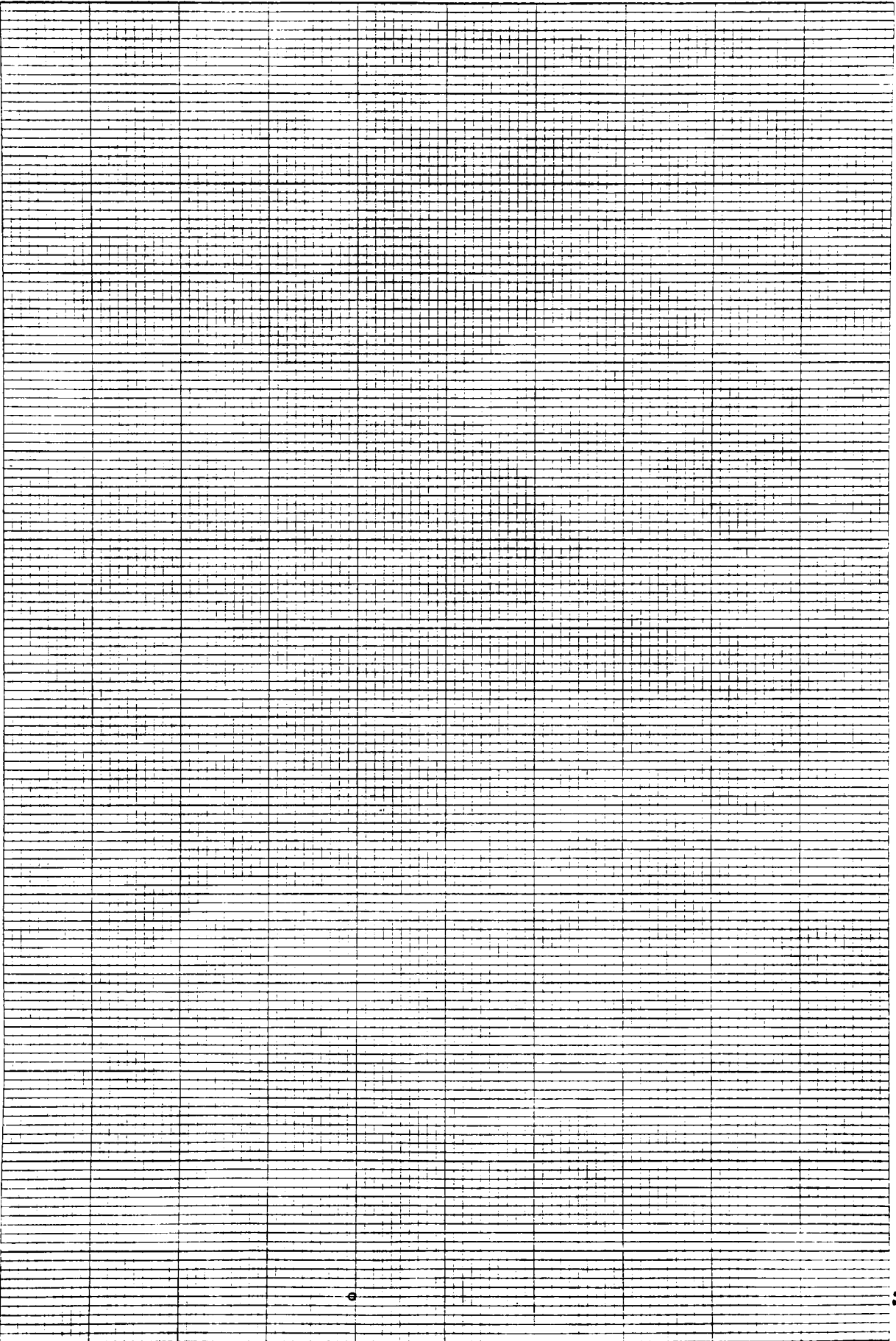
30,000

20,000

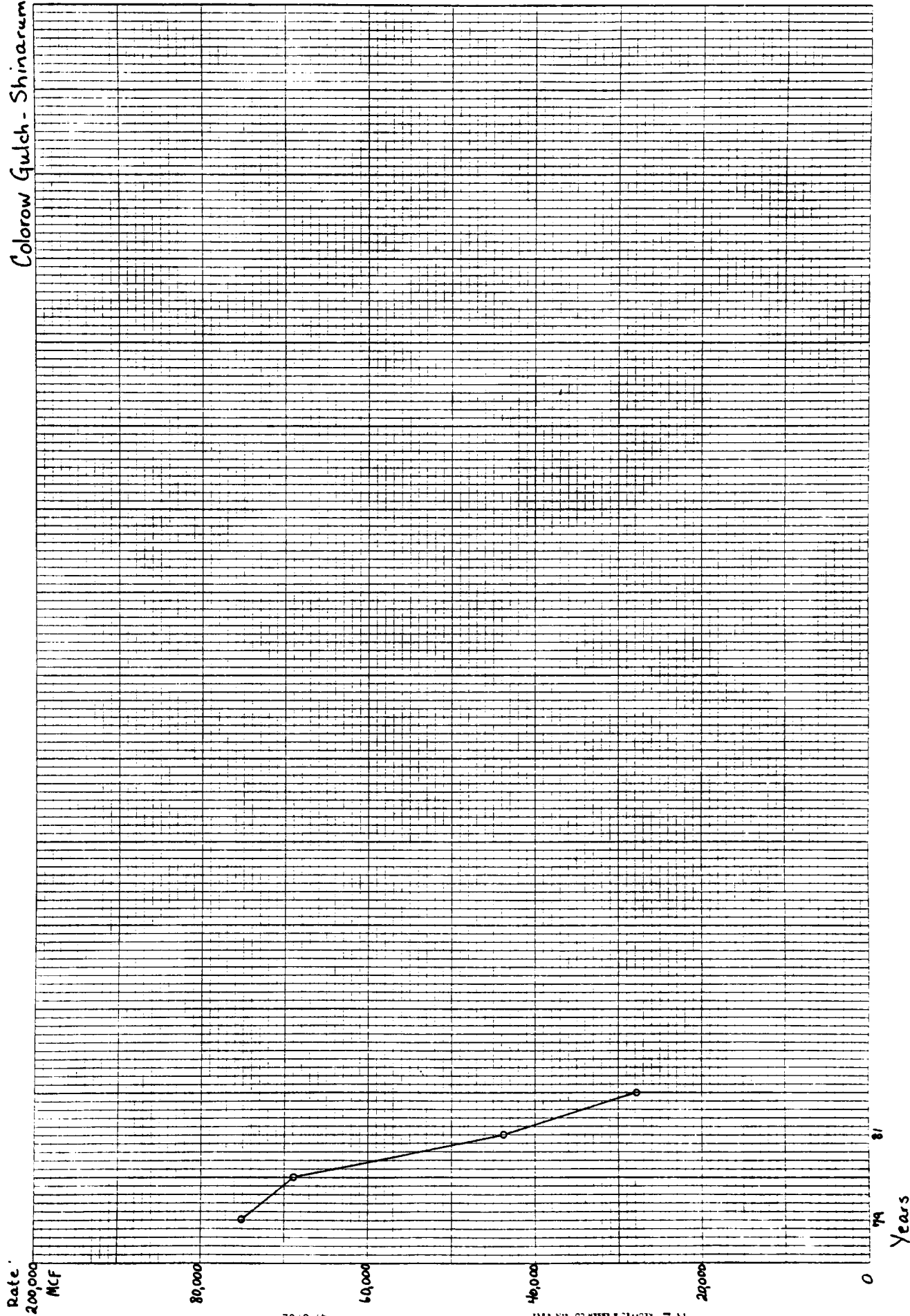
10,000

0

Years



Colorow Gulch - Shinarump



47 0702

7. IN RECOVER, A LARSEN CO. WITH 100% INTEREST

Corral Creek - Dakota

Rate
100,000
MCF

20,000

47 0702

60,000

40,000

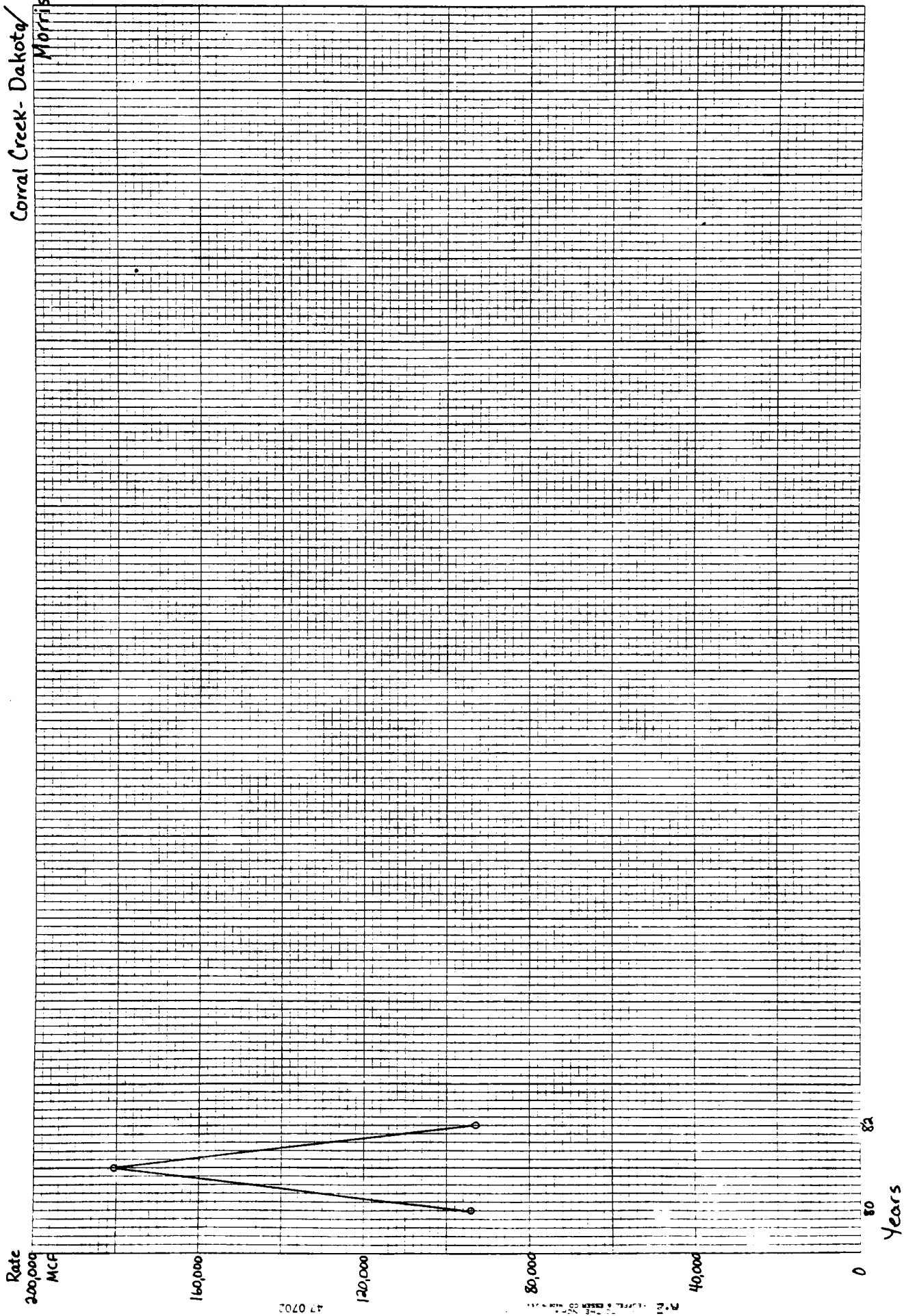
20,000

0

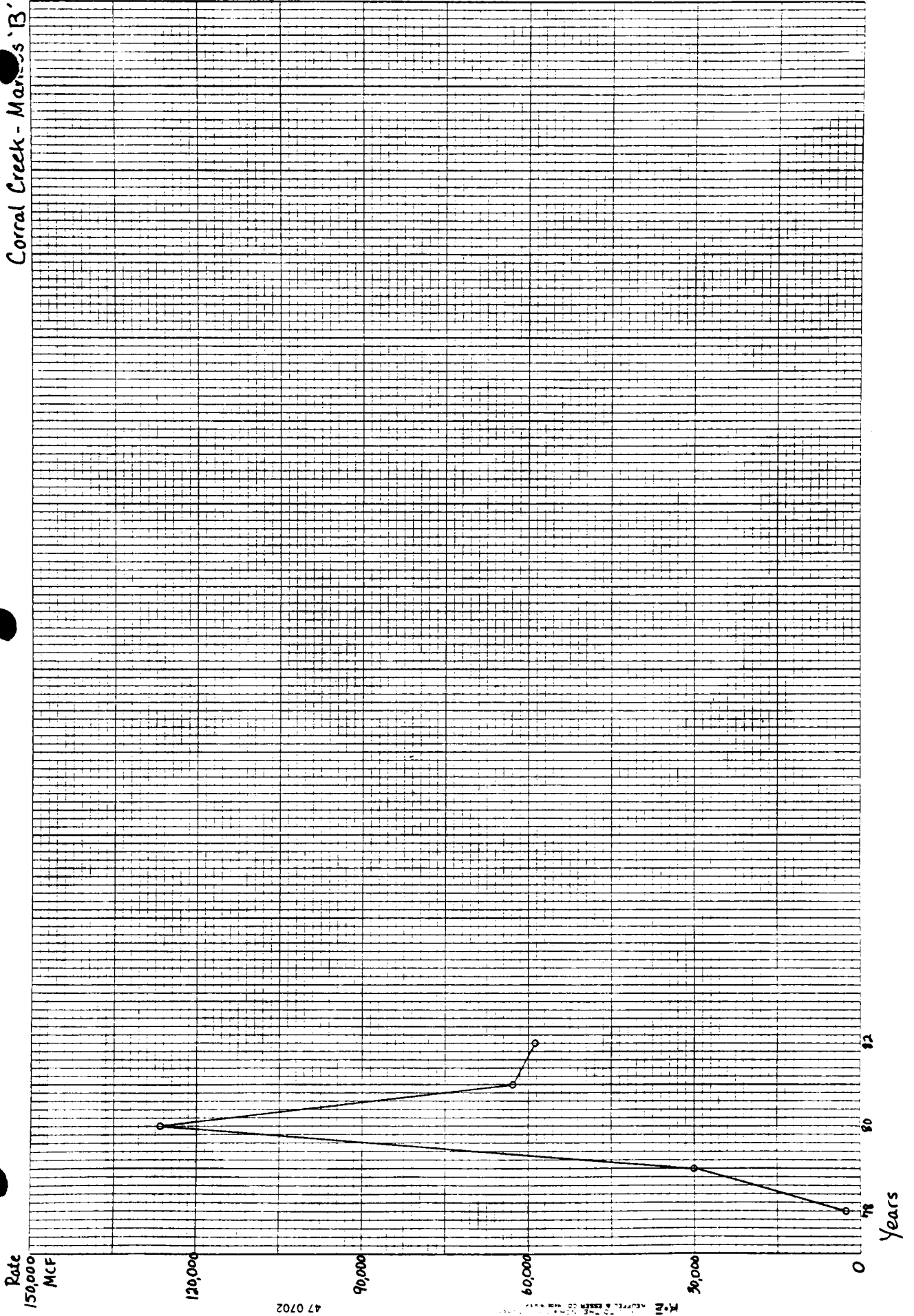
18
Years



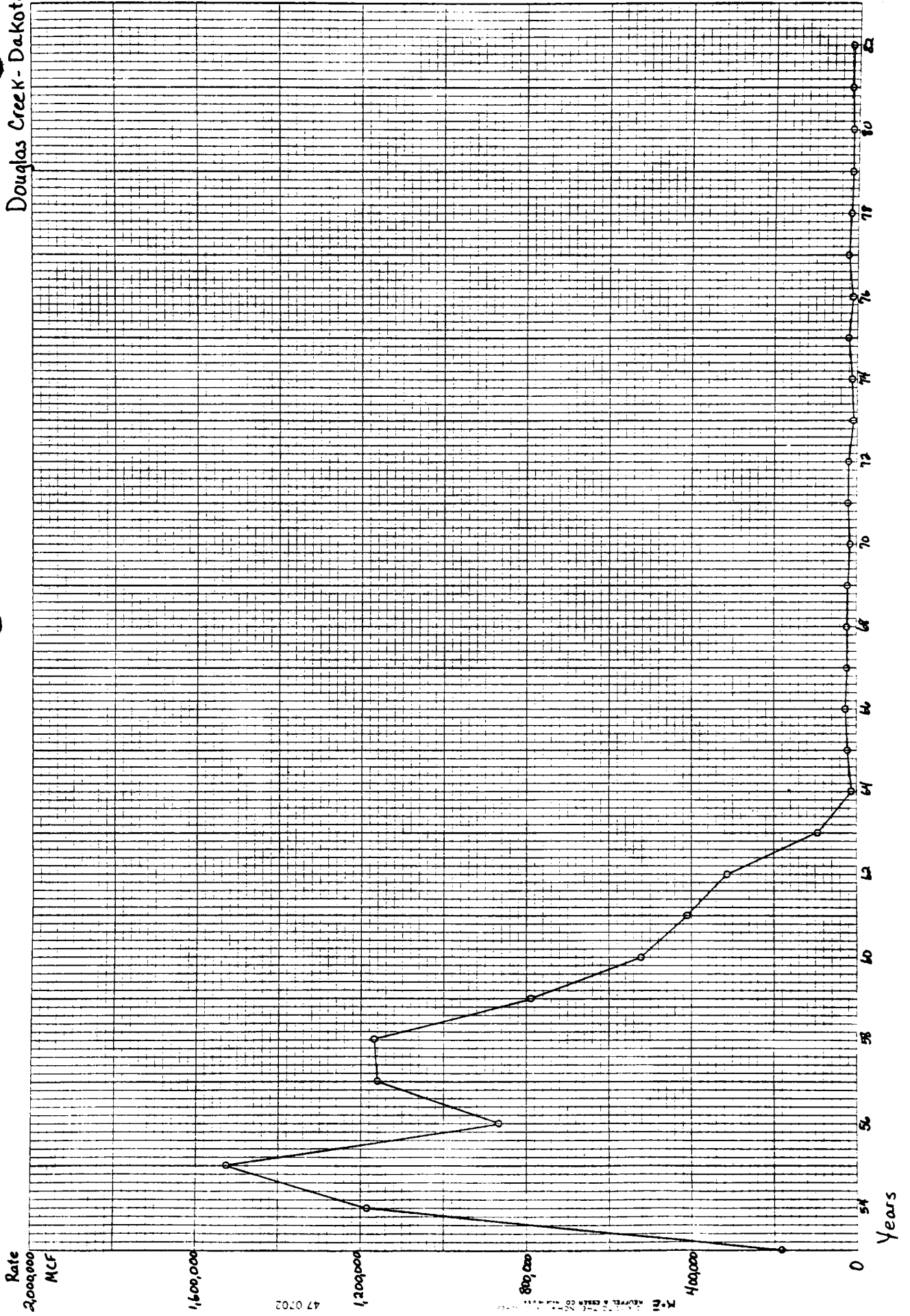
Corral Creek - Dakota / Morrison



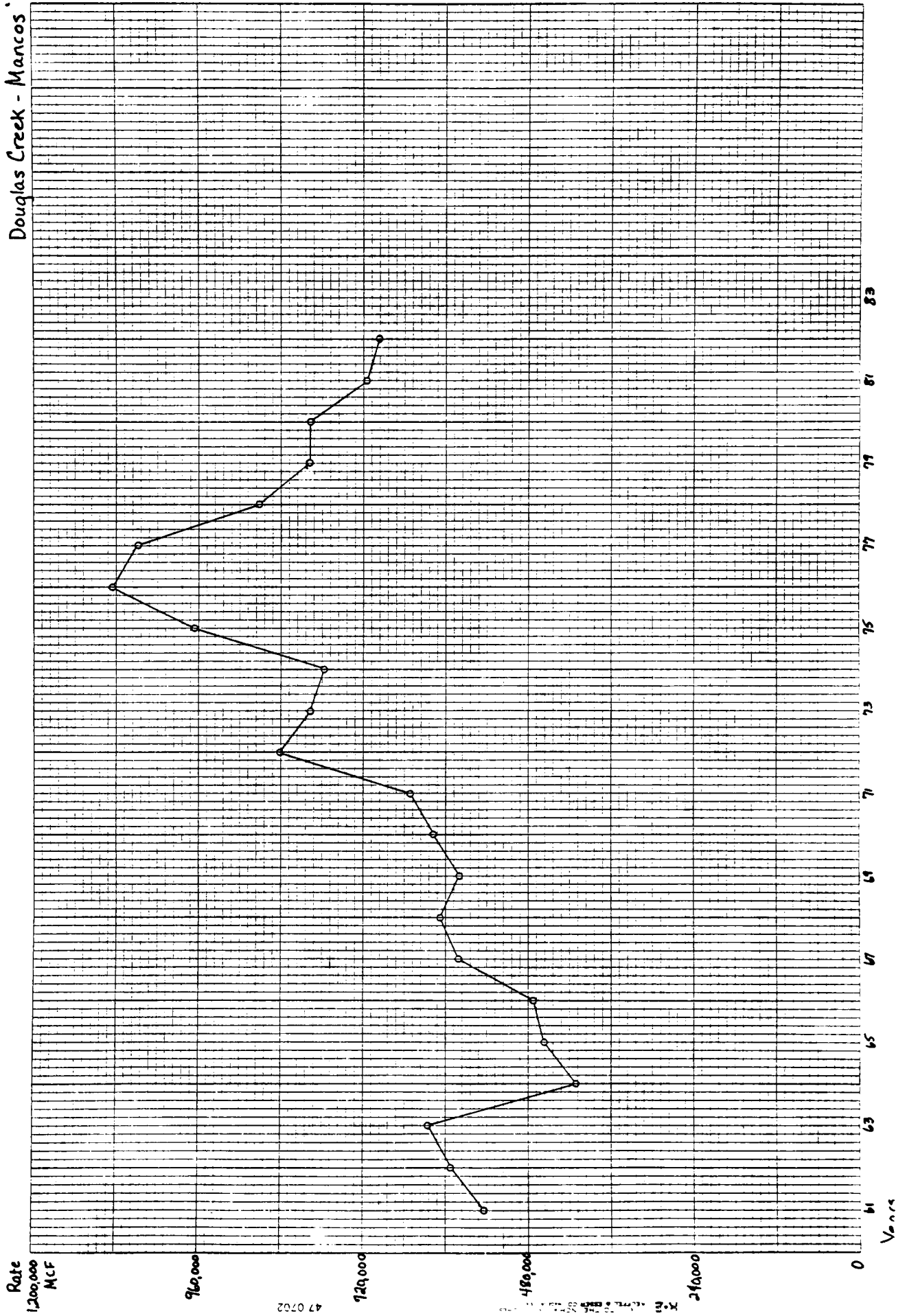
Corral Creek - Mainline 'B'



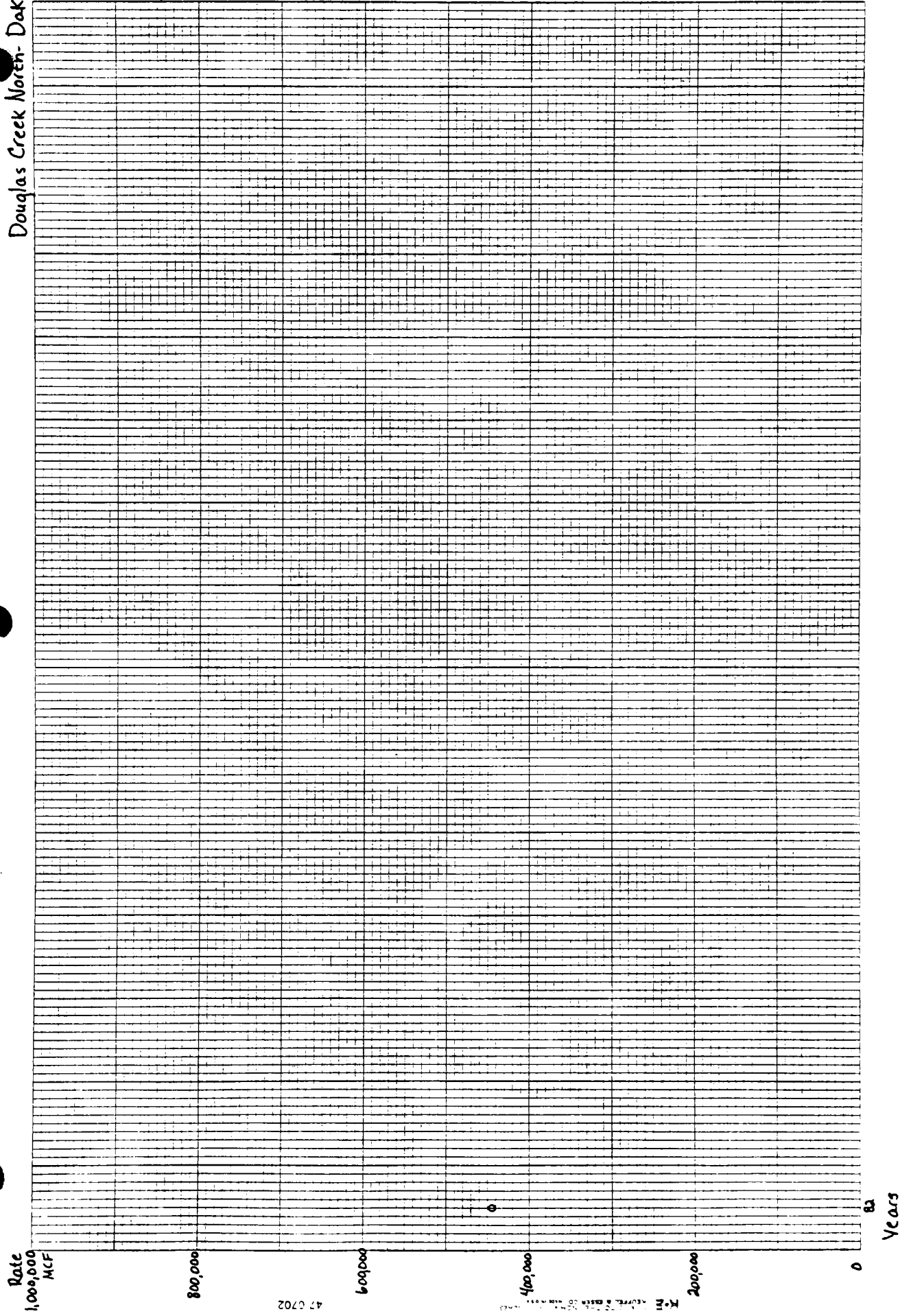
Douglas Creek - Dakota



Douglas Creek - Mancos 'B'



Douglas Creek North- Dakota

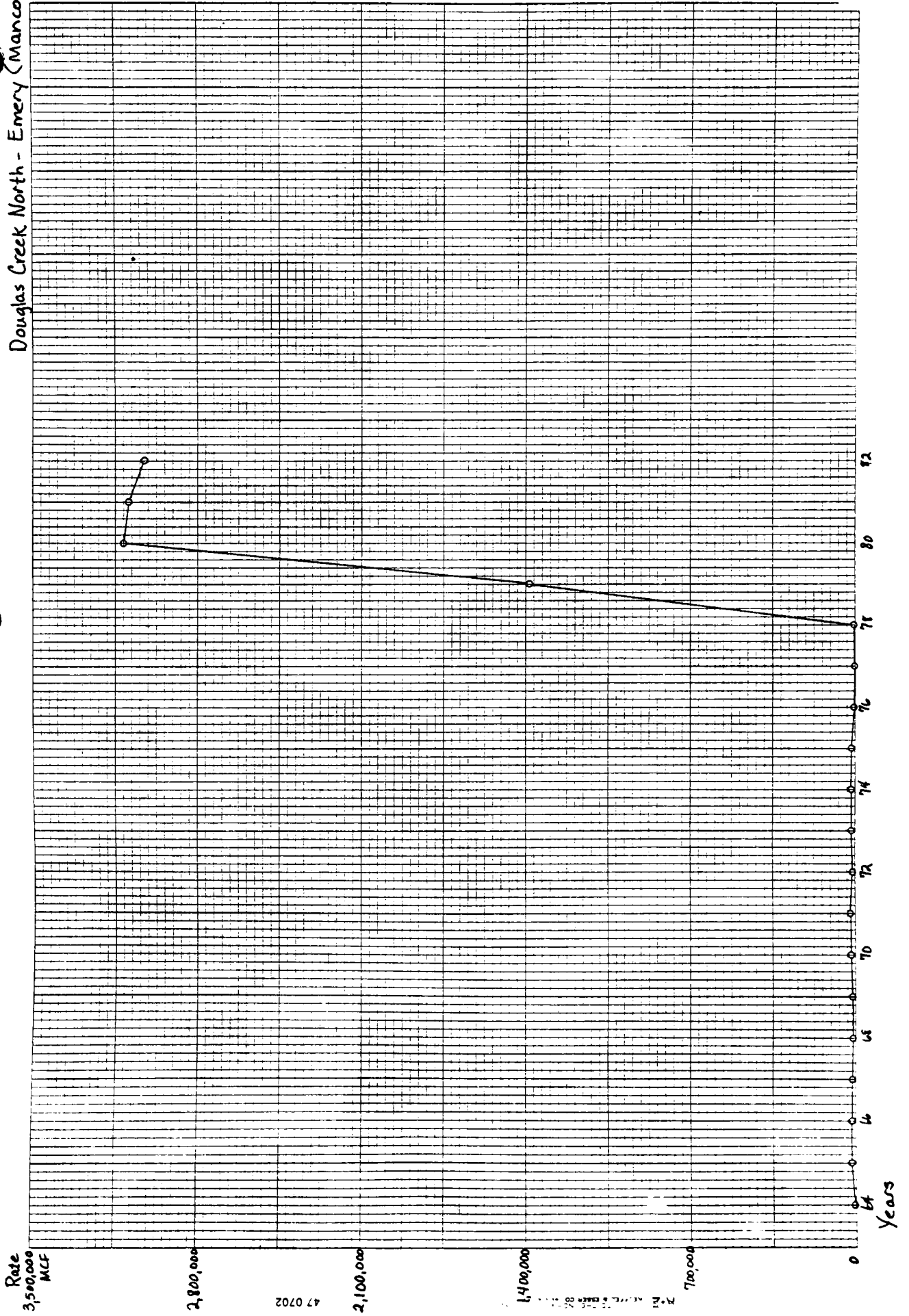


47-0702

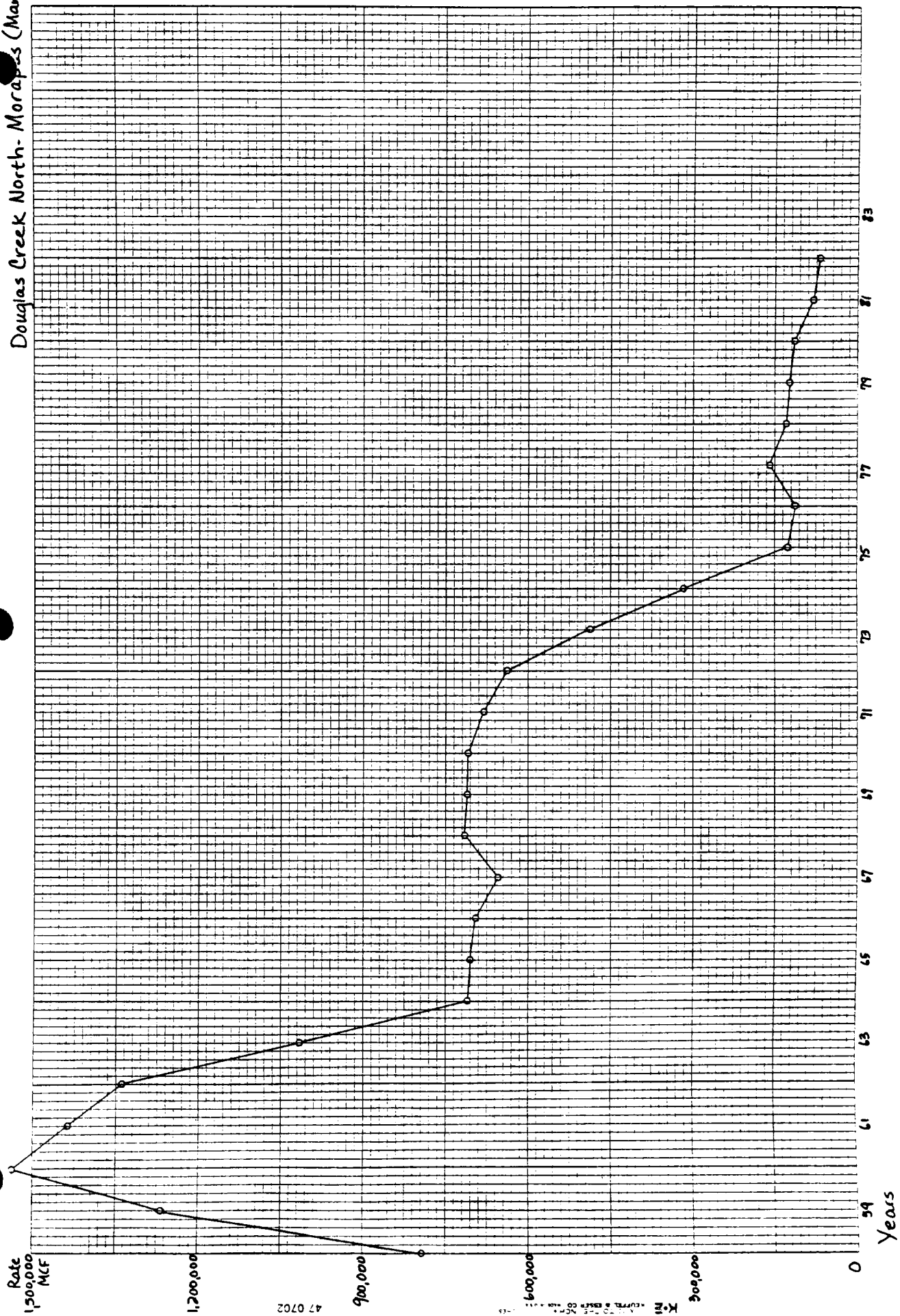
U.S. GEOLOGICAL SURVEY

Years

Douglas Creek North - Emery (Mancoos)



Douglas Creek North-Morapass (Manas)



Douglas Creek North-Morrison

Rate
1,000
MCF

800

600

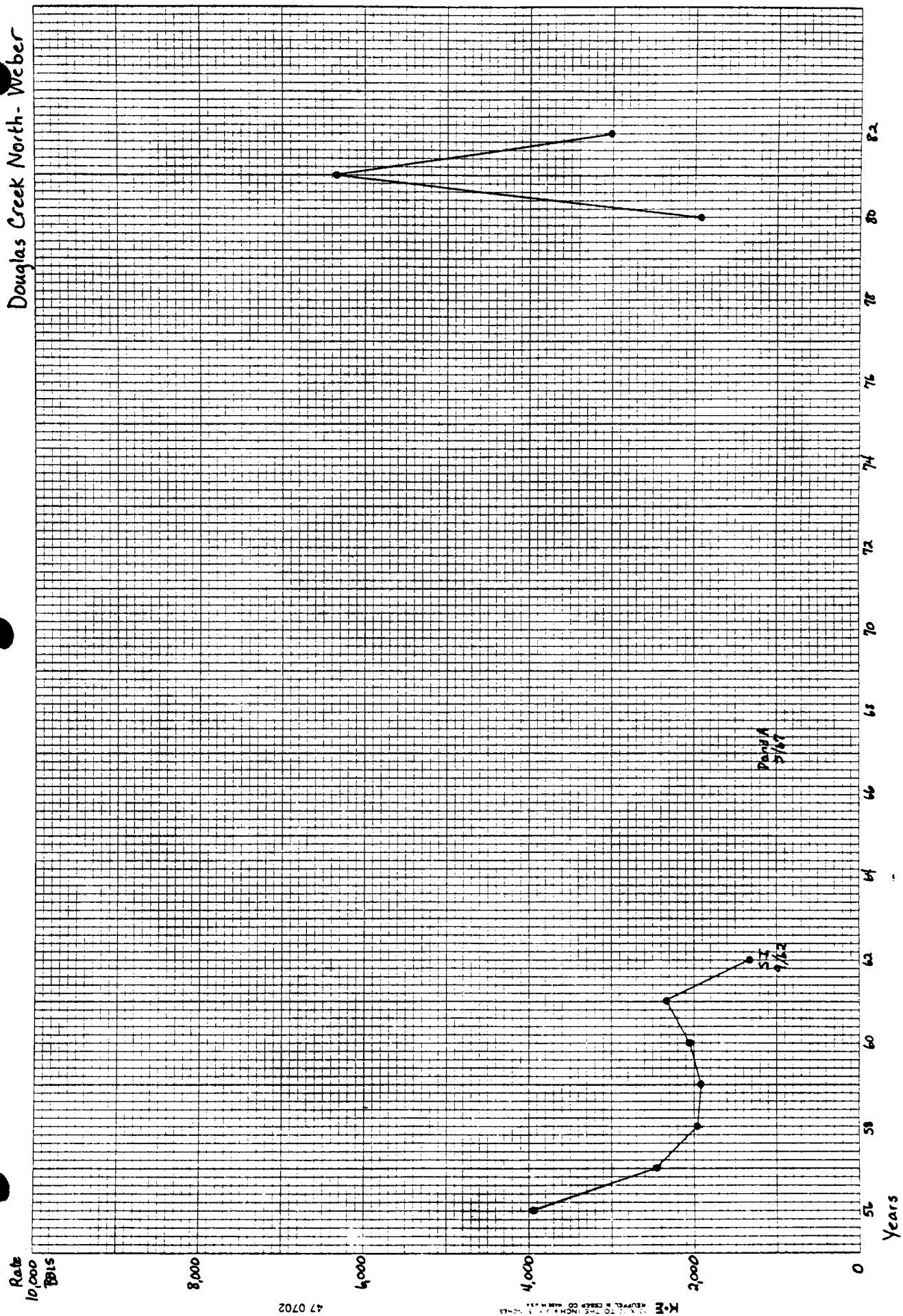
400

200

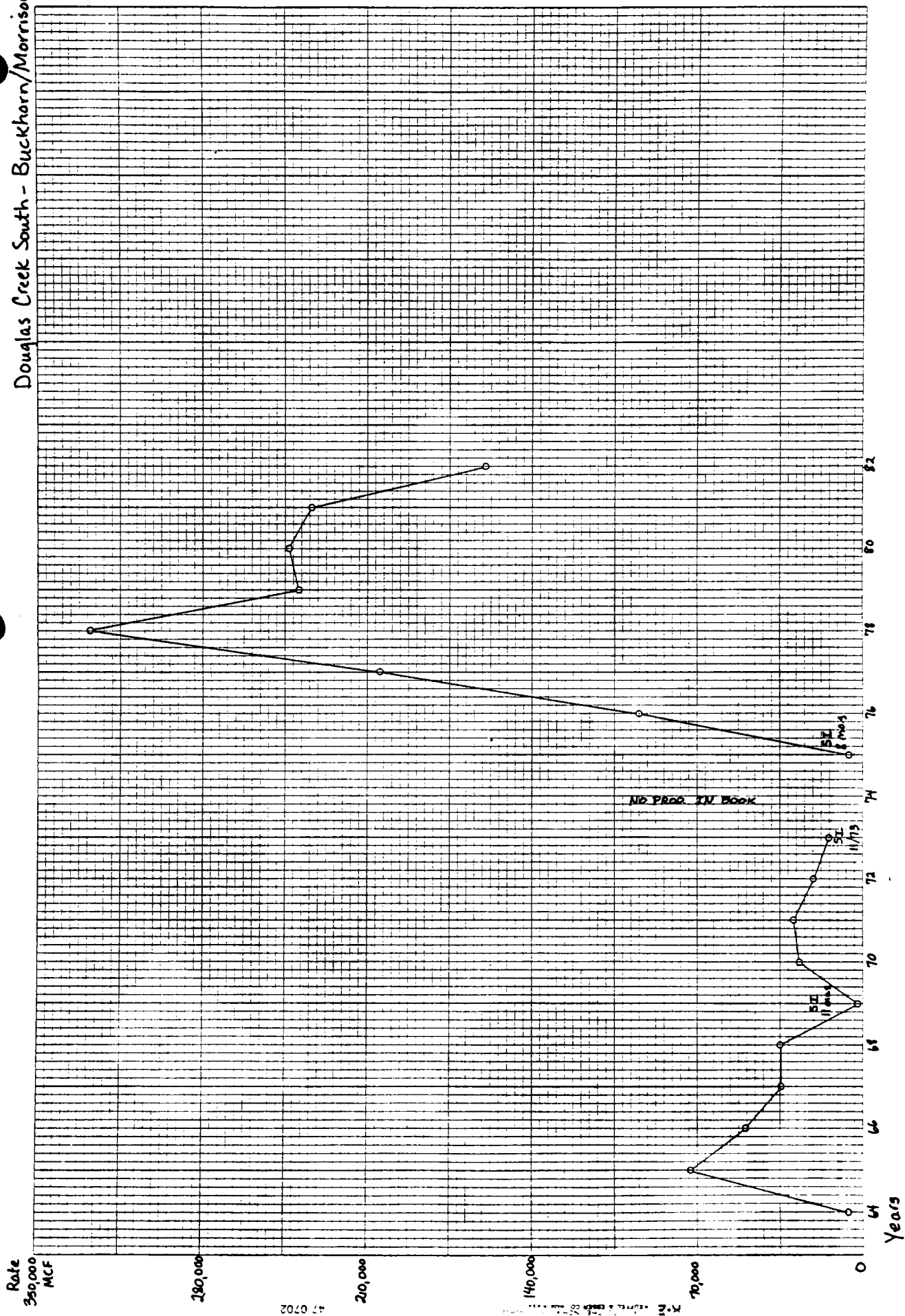
0

82
Years

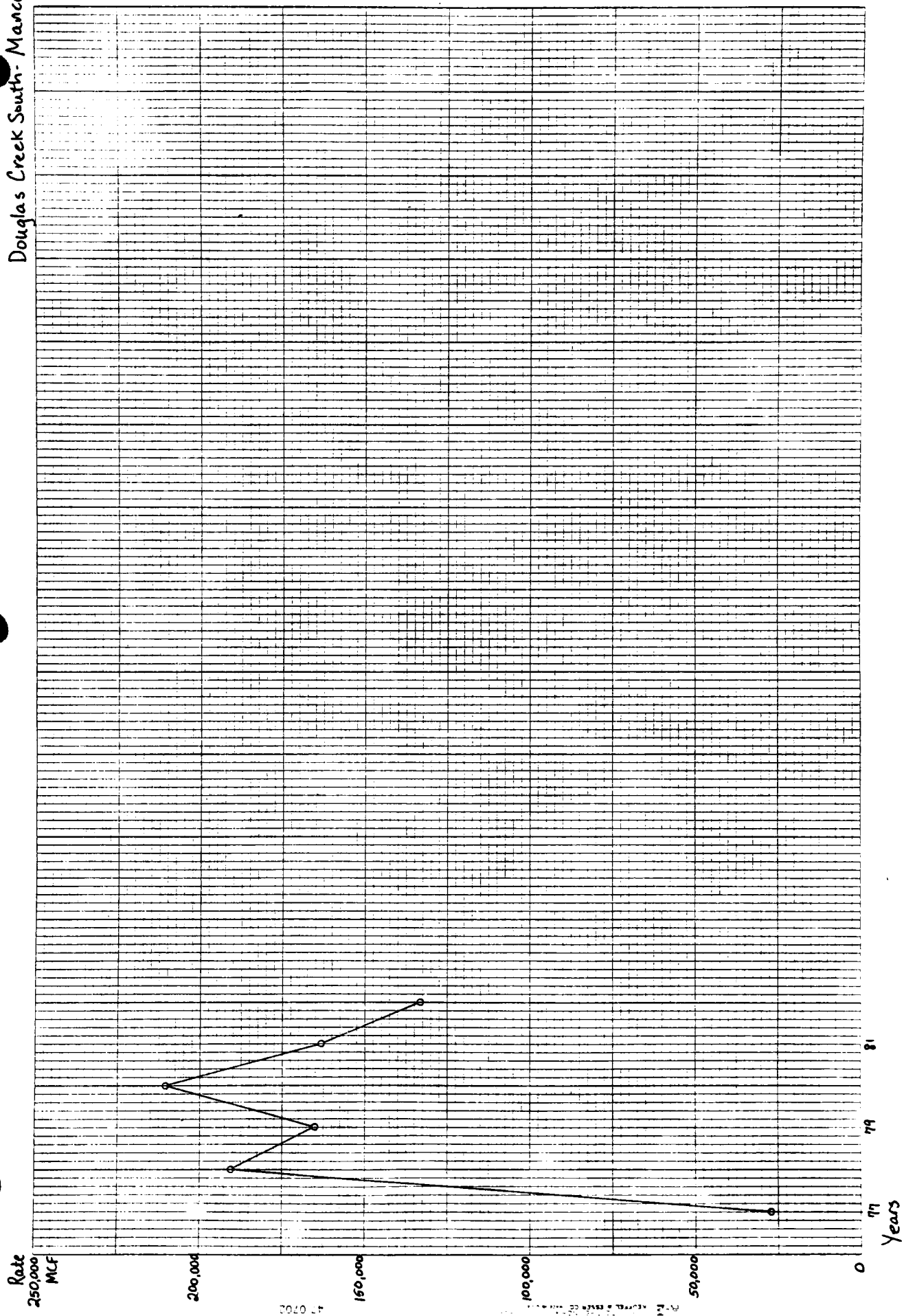
Rate
10,000
BBS



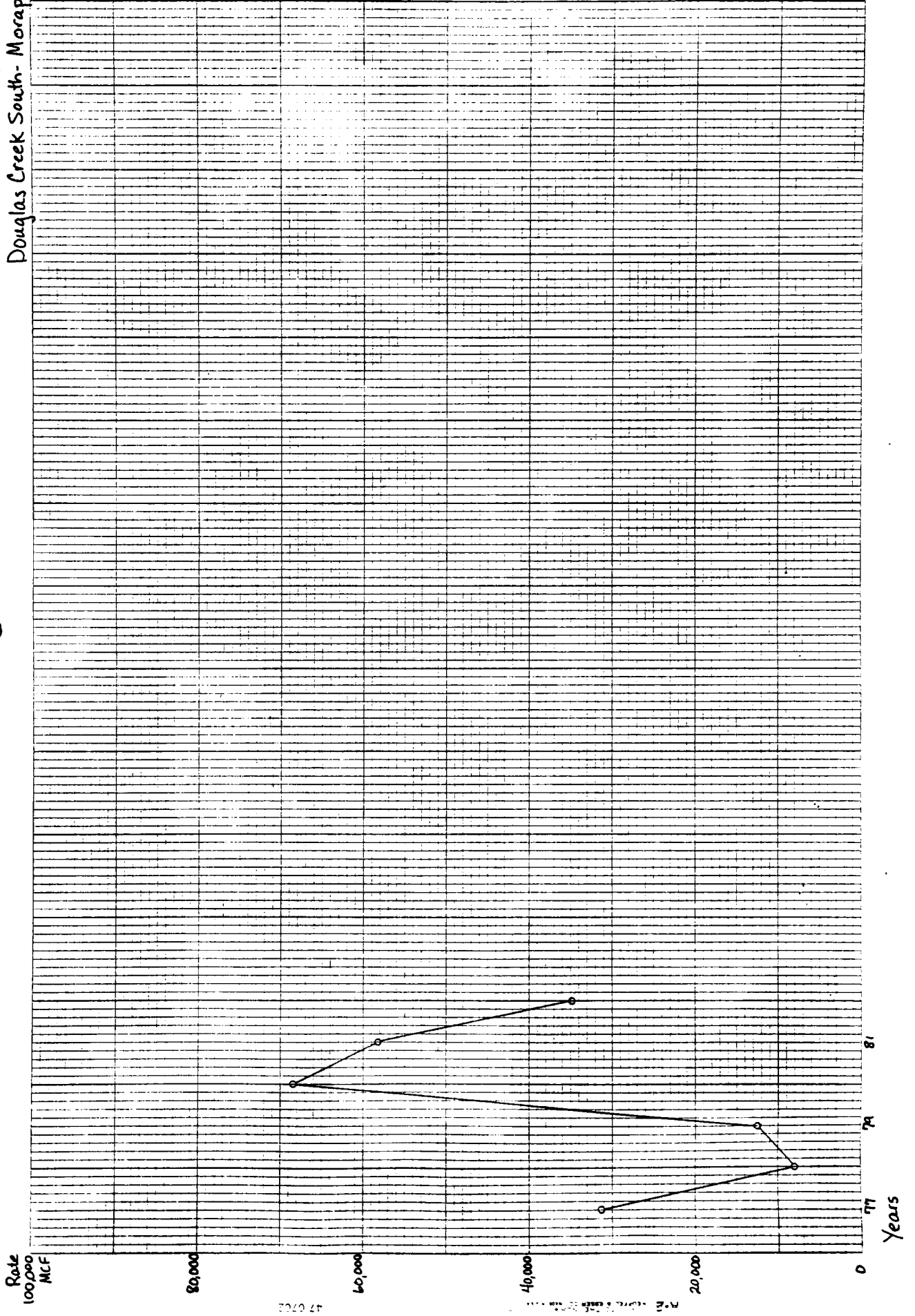
Douglas Creek South - Buckhorn/Morrison



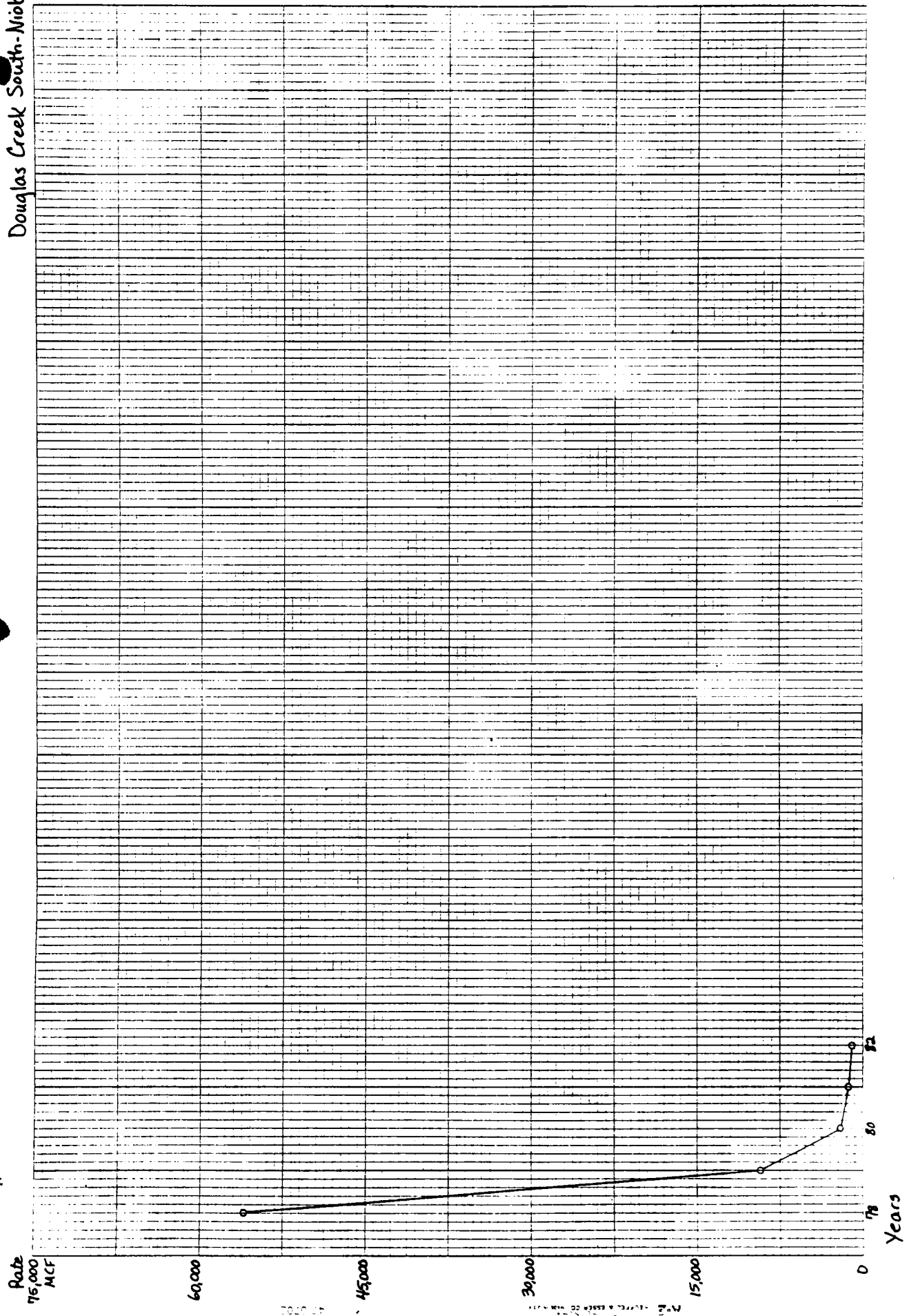
Douglas Creek South - Mancos



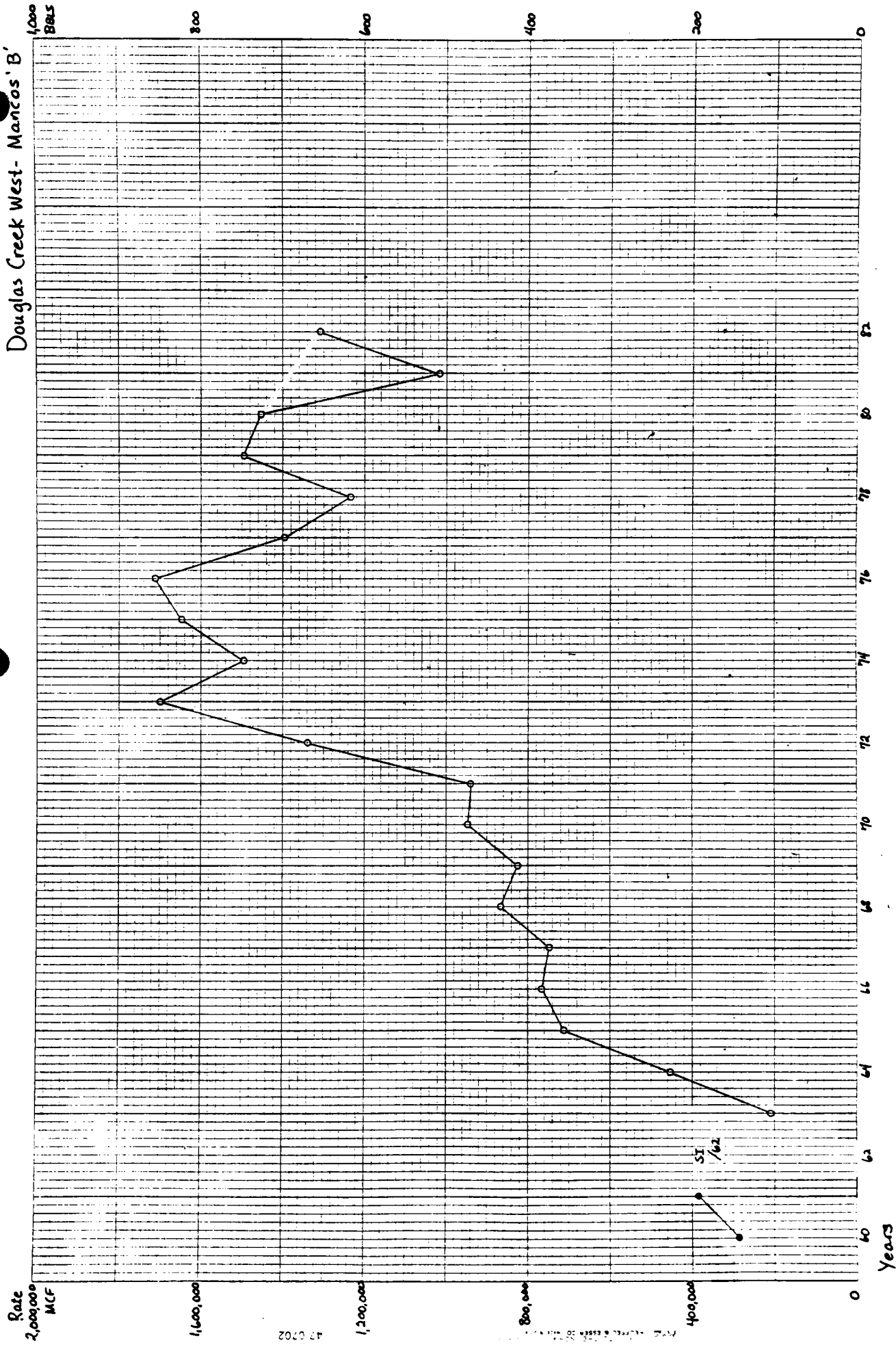
Douglas Creek South- Morapas

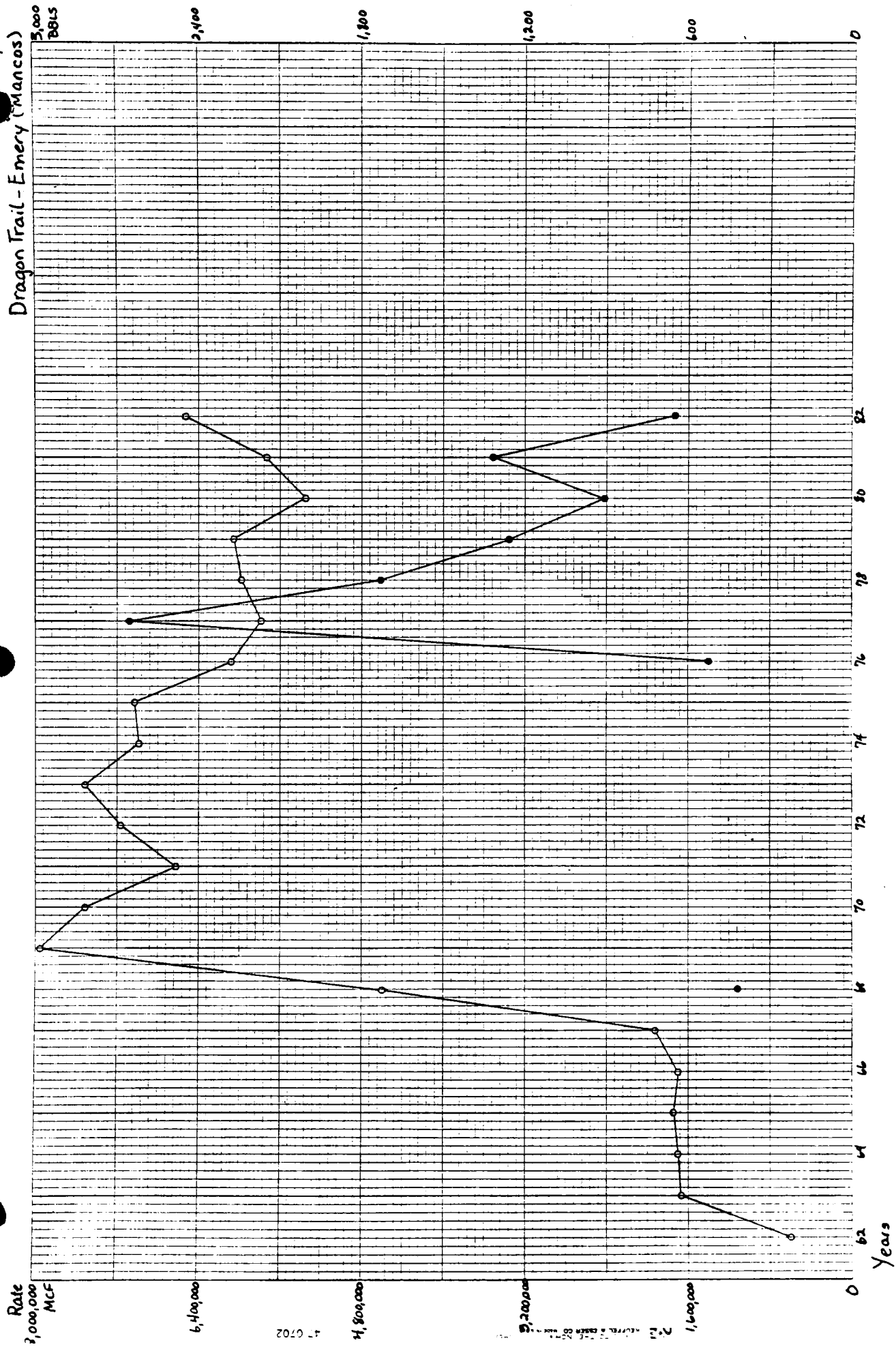


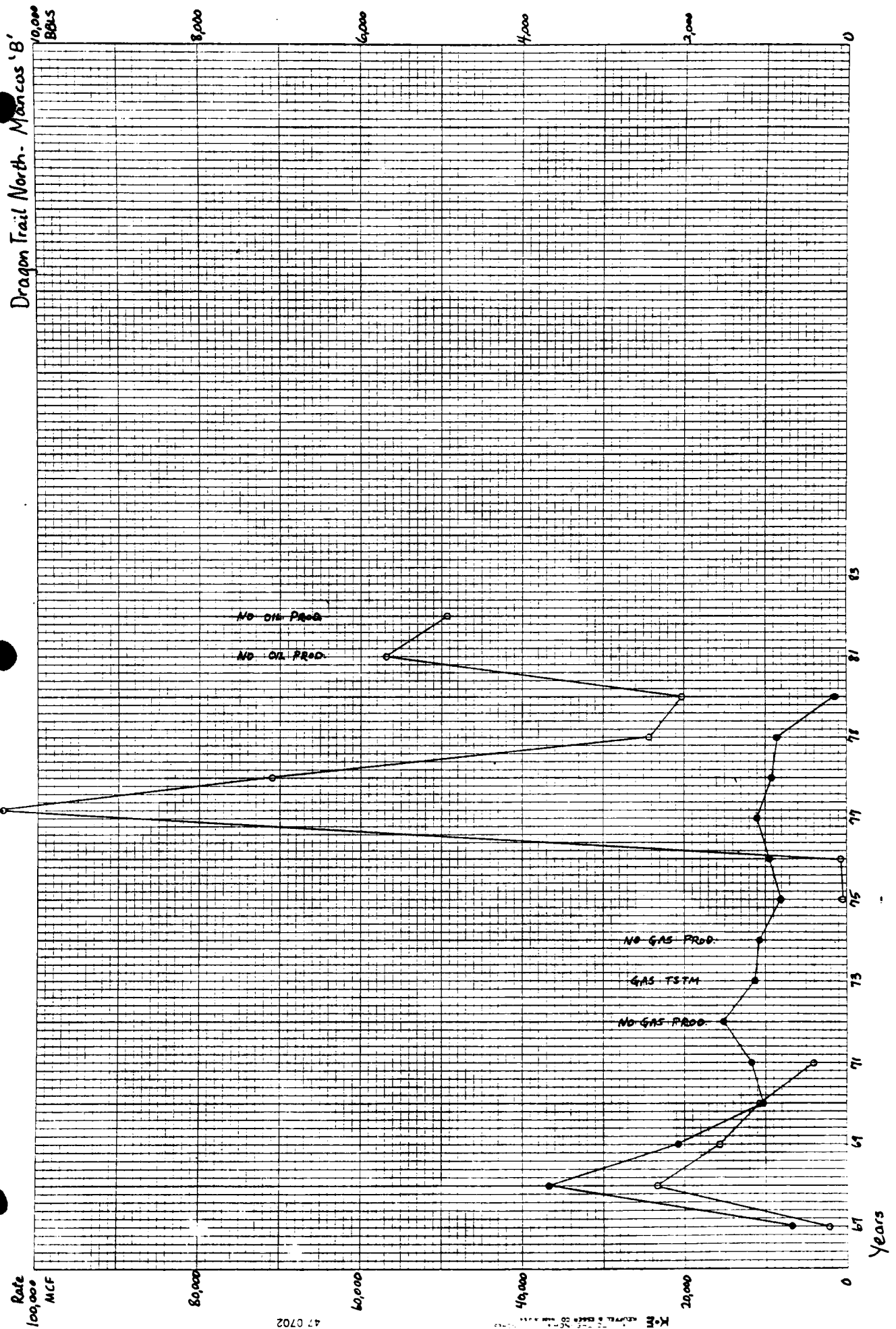
Douglas Creek South-Niobrara



Douglas Creek West - Mancos 'B'







Duck Creek - Wasatch

Rate
1,000
BB's

800

600

400

200

0

47 0702

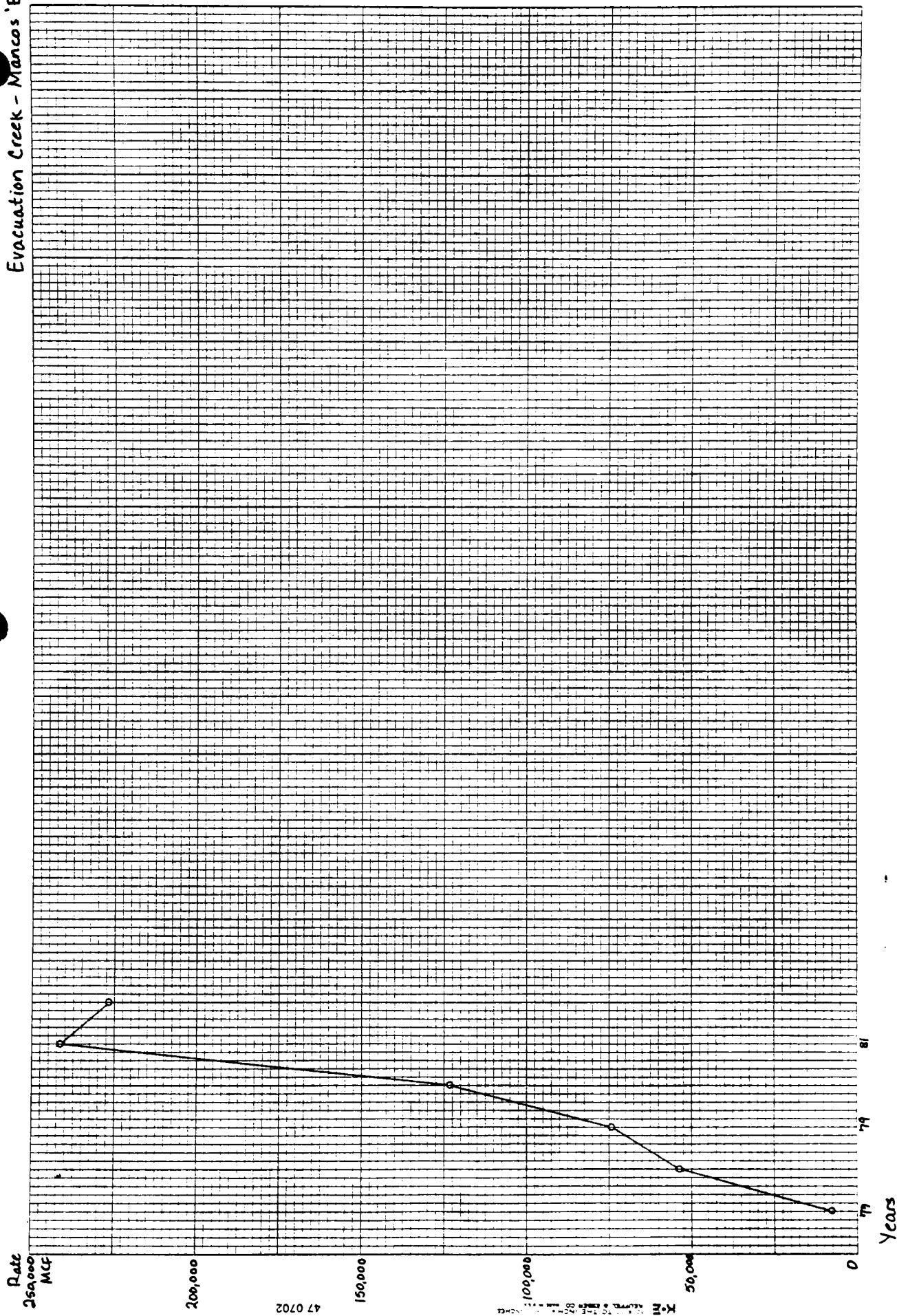
Rate of Fire to the MCM
Rate of Fire to the MCM

200
ONE IN
TEST

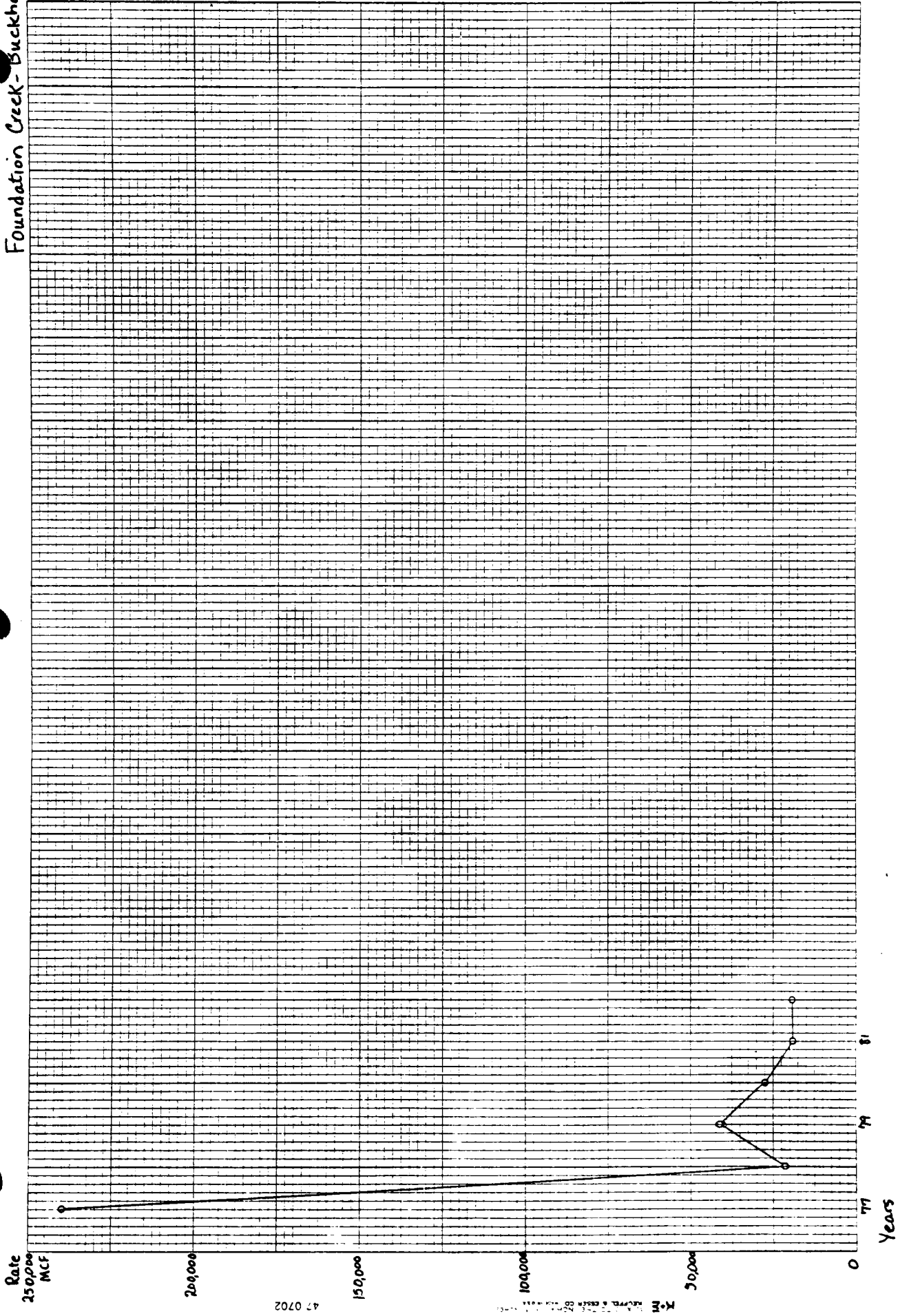
82

Years

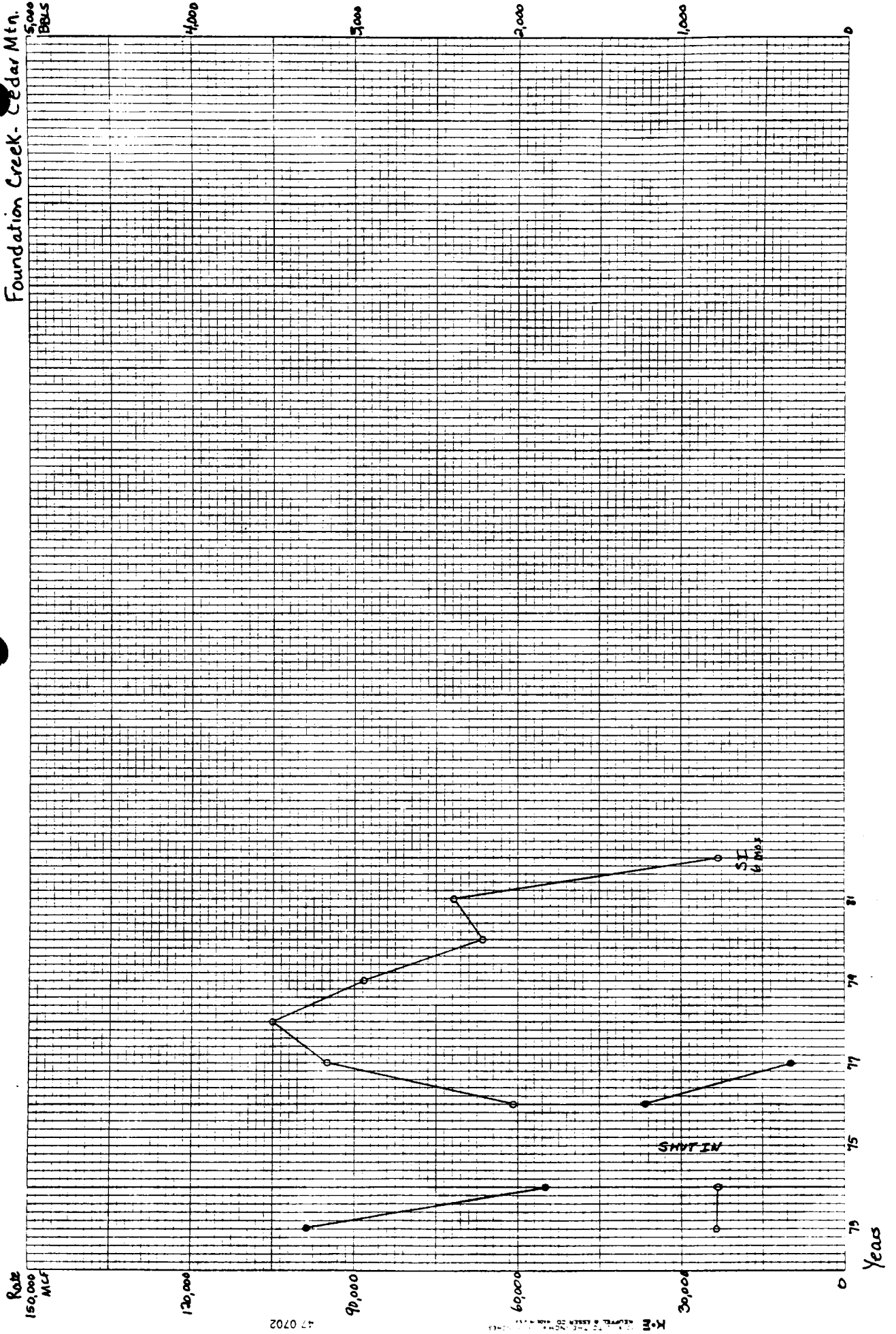
Evacuation Creek - Mancos 'B'



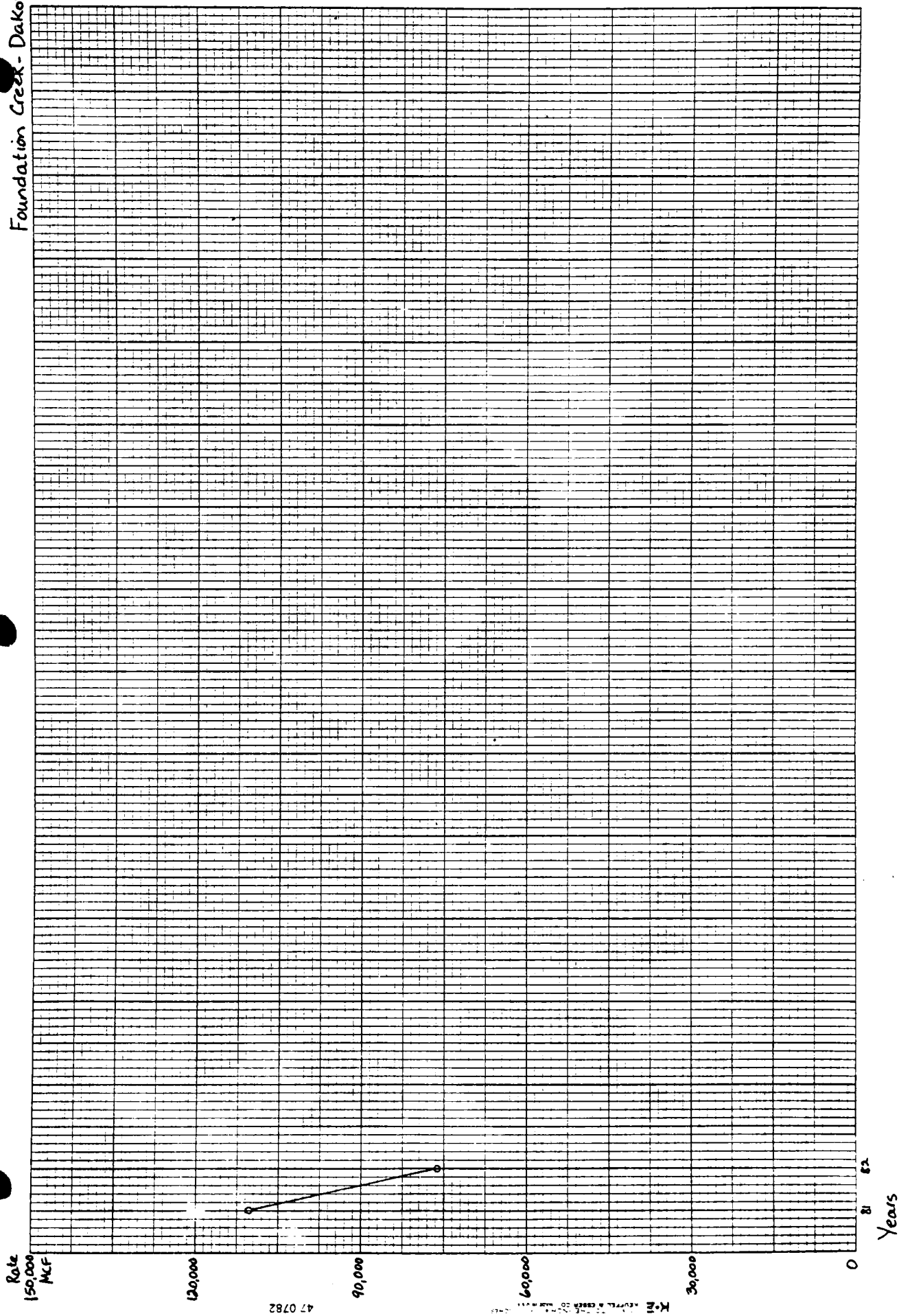
Foundation Creek - Buckhorn



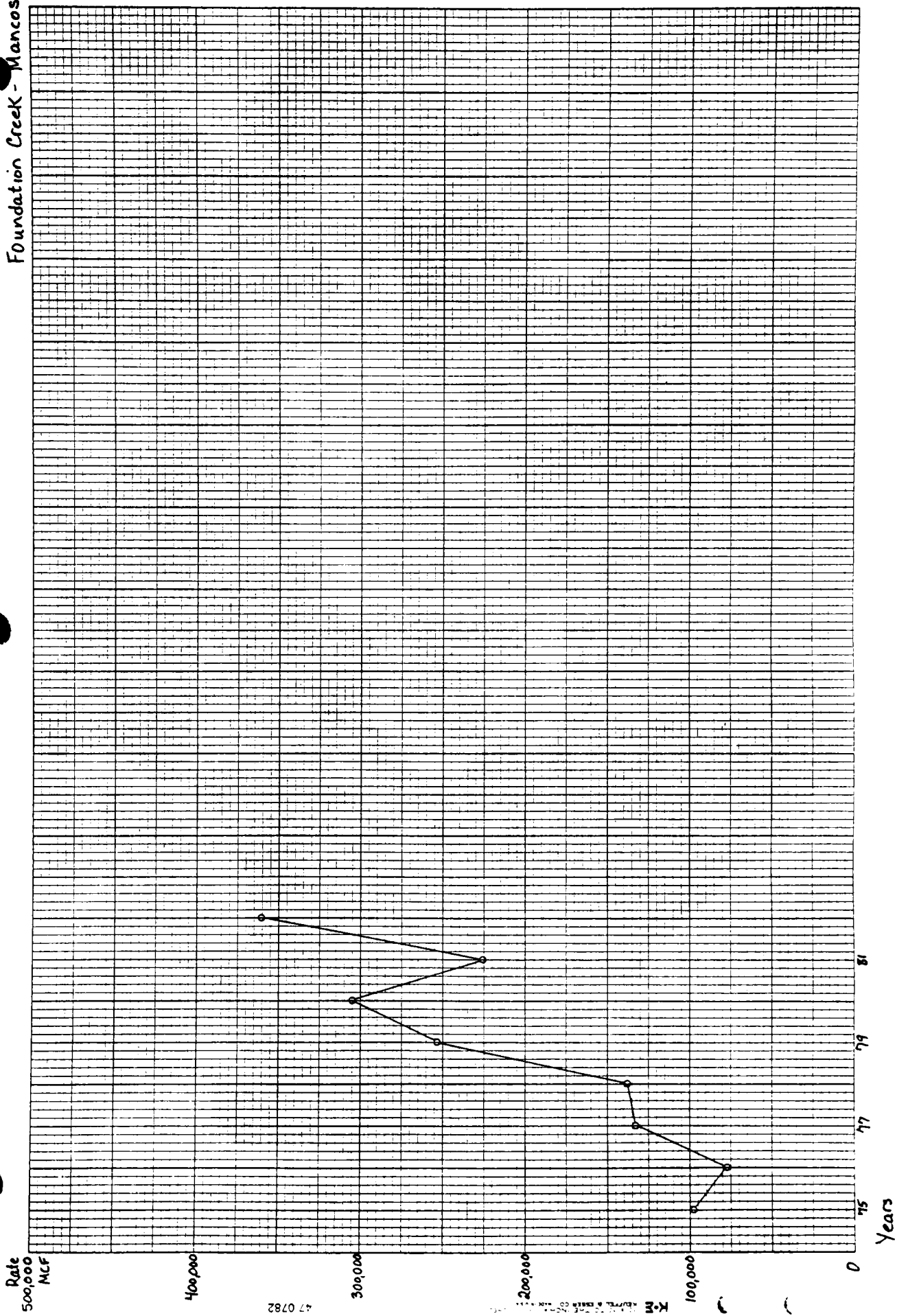
Foundation Creek - Cedar Mtn.



Foundation Creek - Dakota



Foundation Creek - Mancos



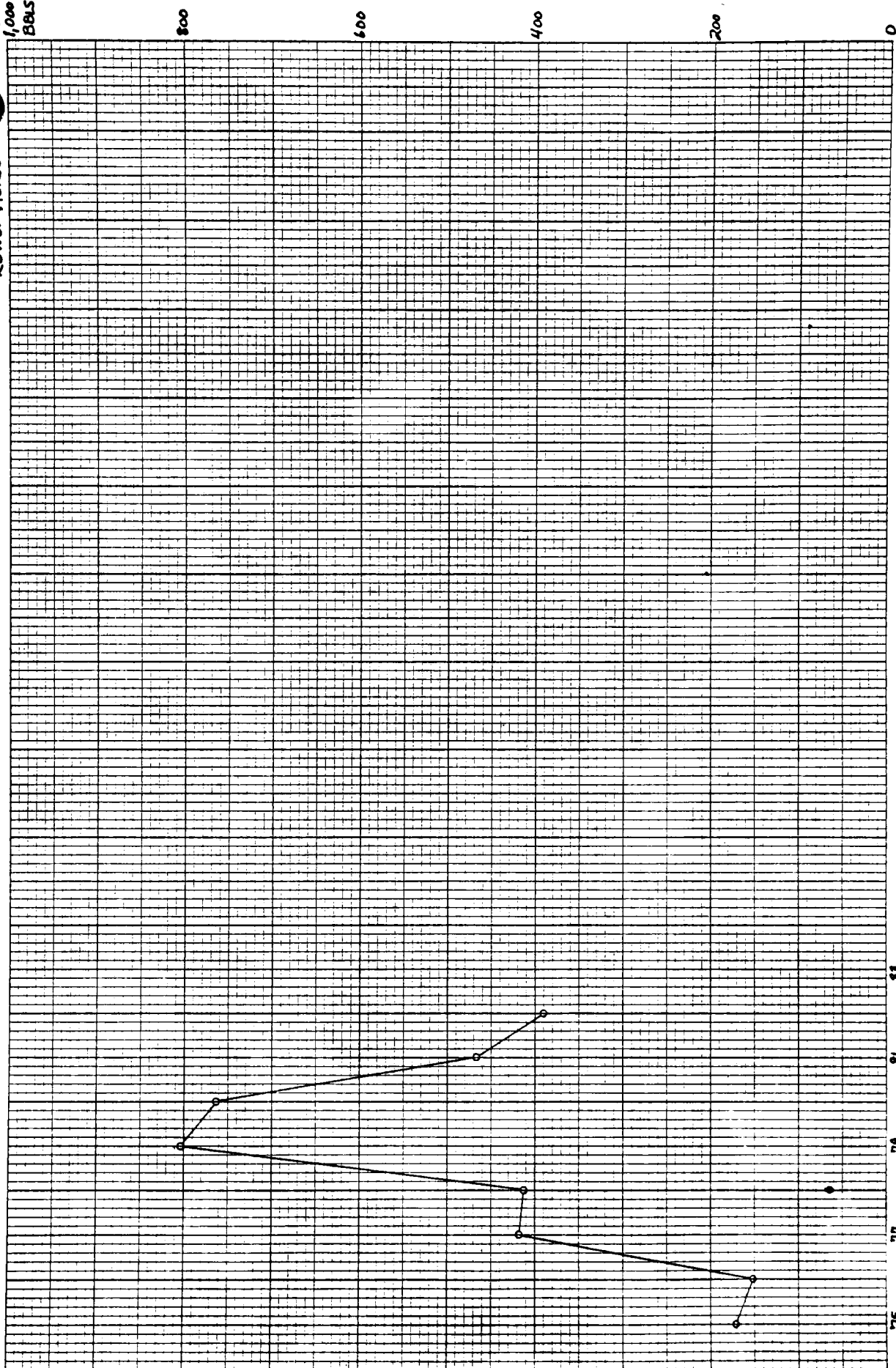
Lower Horse Dr. Dakota

1,000
BBL'S

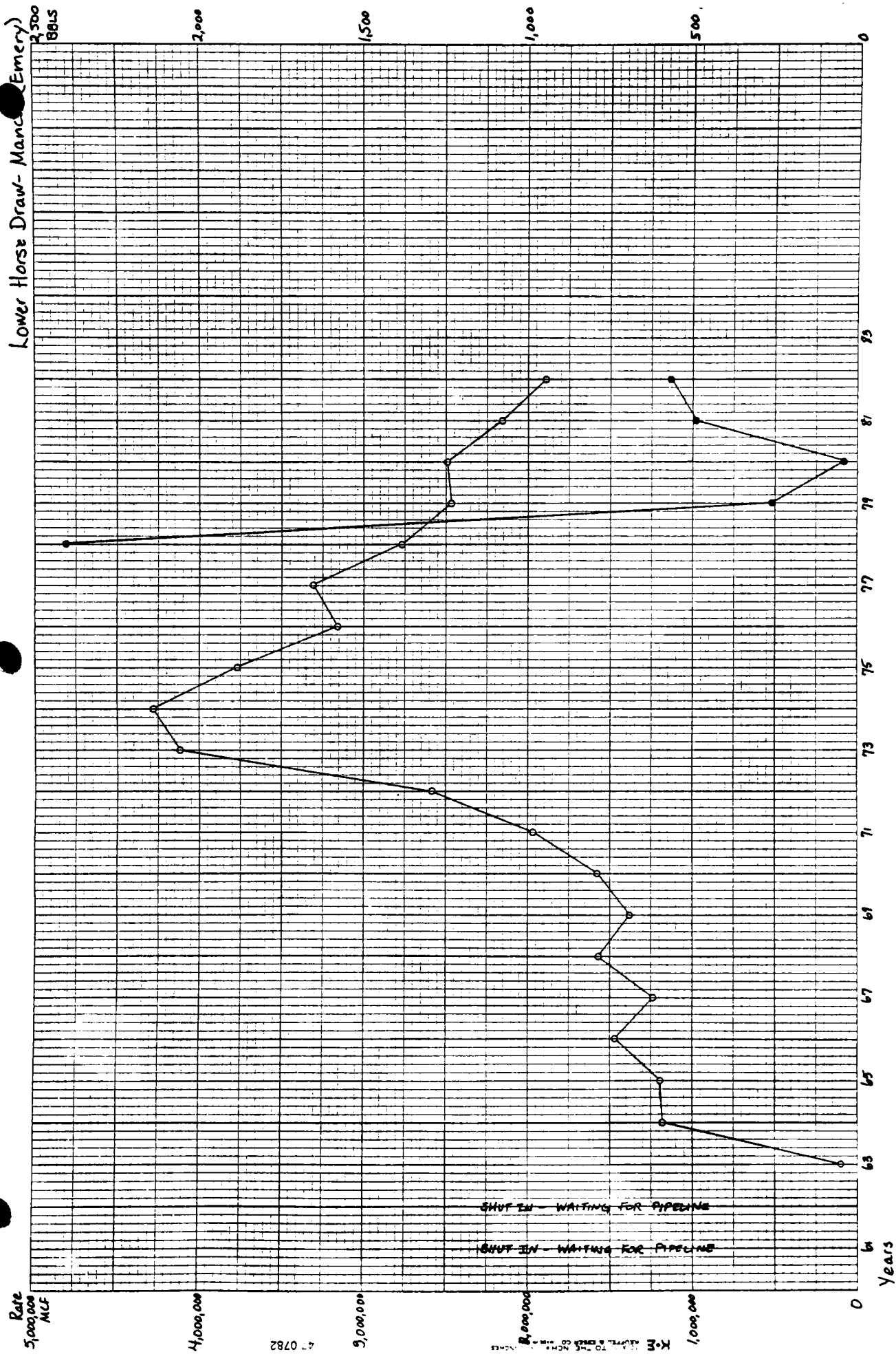
Rate
500,000
MUS

47 0782

KM
KUMAR & SONS CO. INC.
NEW YORK, N.Y.



Years



McHatlon - Niobrara

Rate
5,000
BBLs

4,000

3,000

2,000

1,000

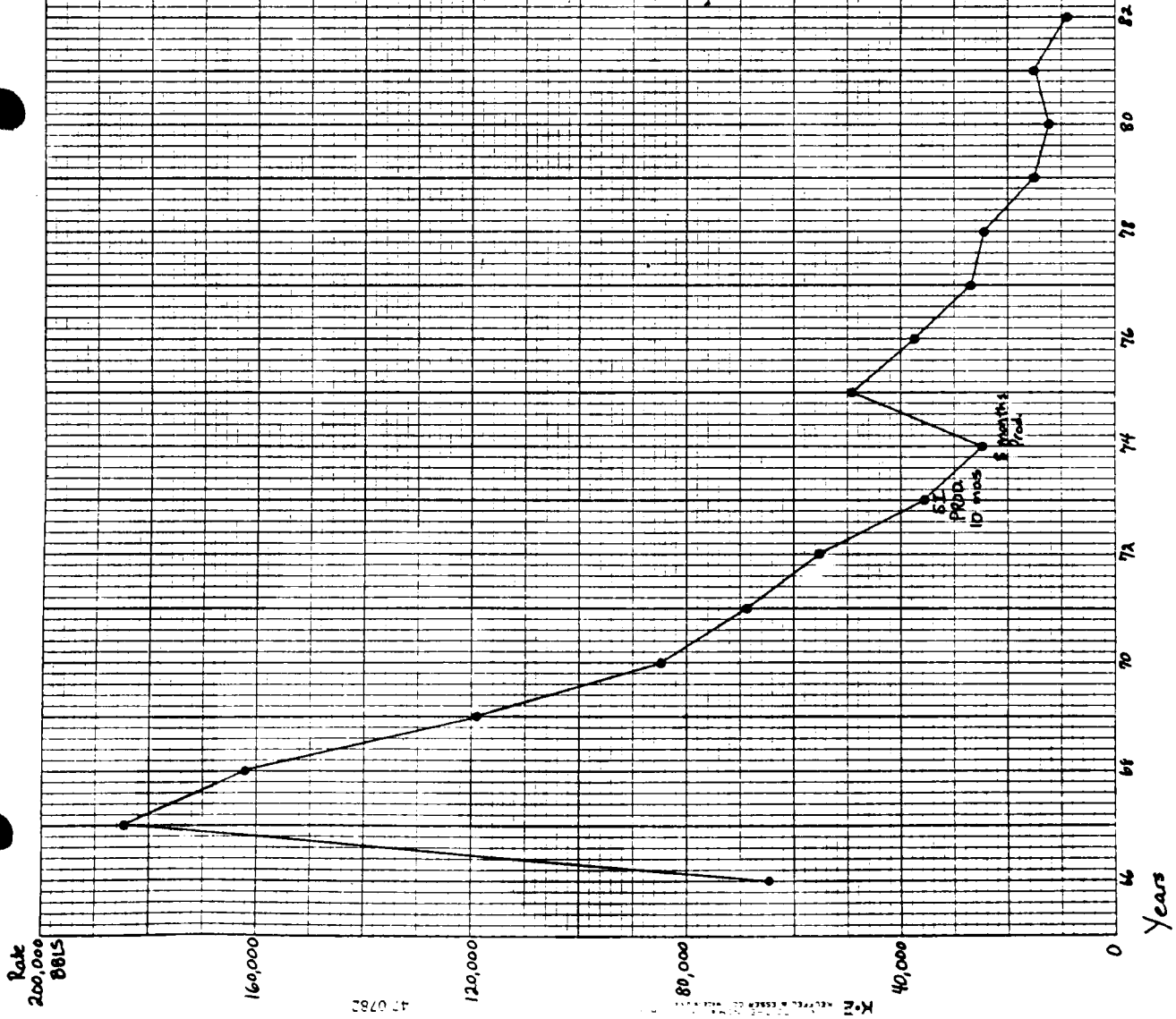
0

82
Years

47 0782

K&E SURVEY & DESIGN CO. 100 THE NORTH PLAINS BOULEVARD

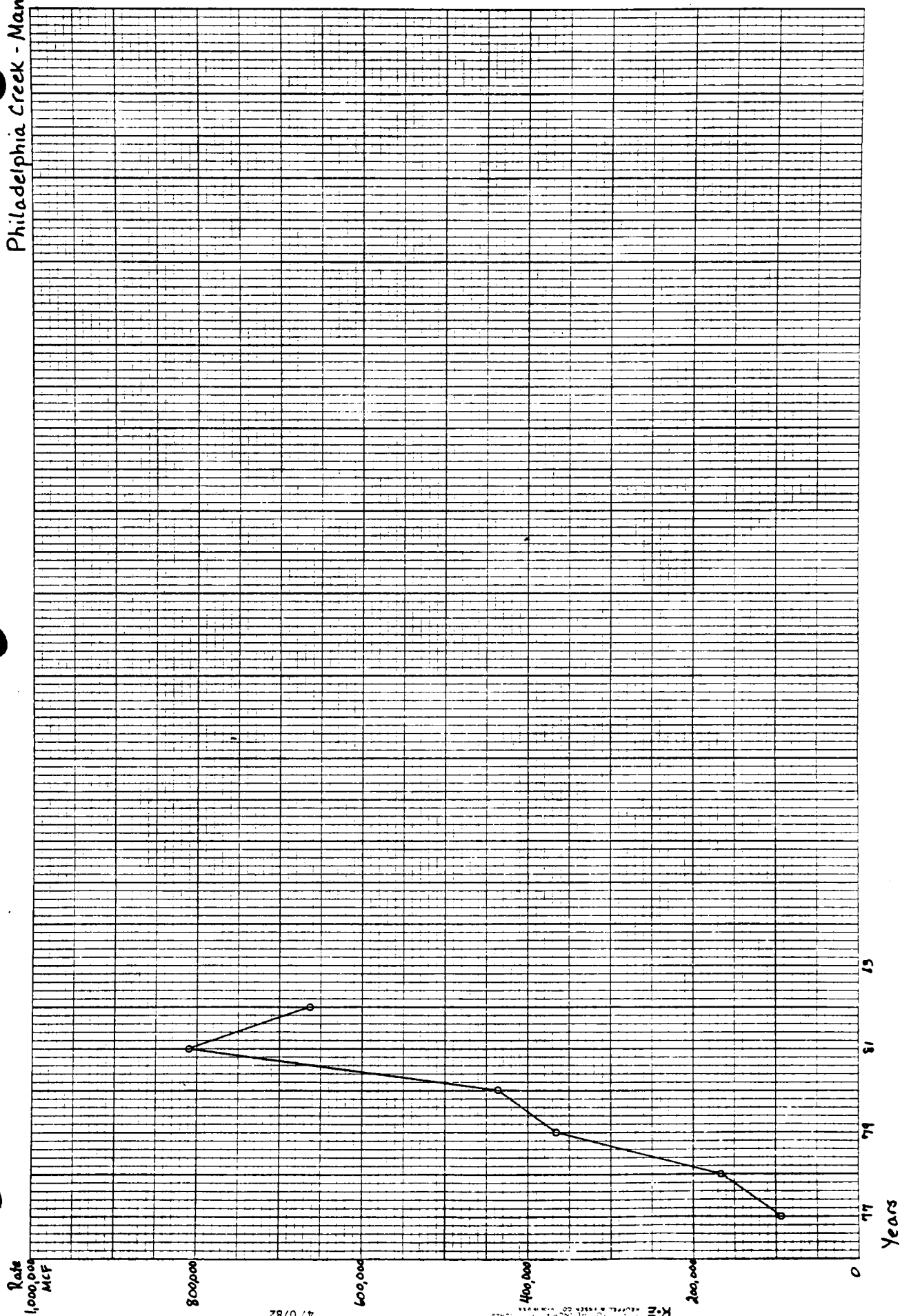
Nine Mile - Dakota



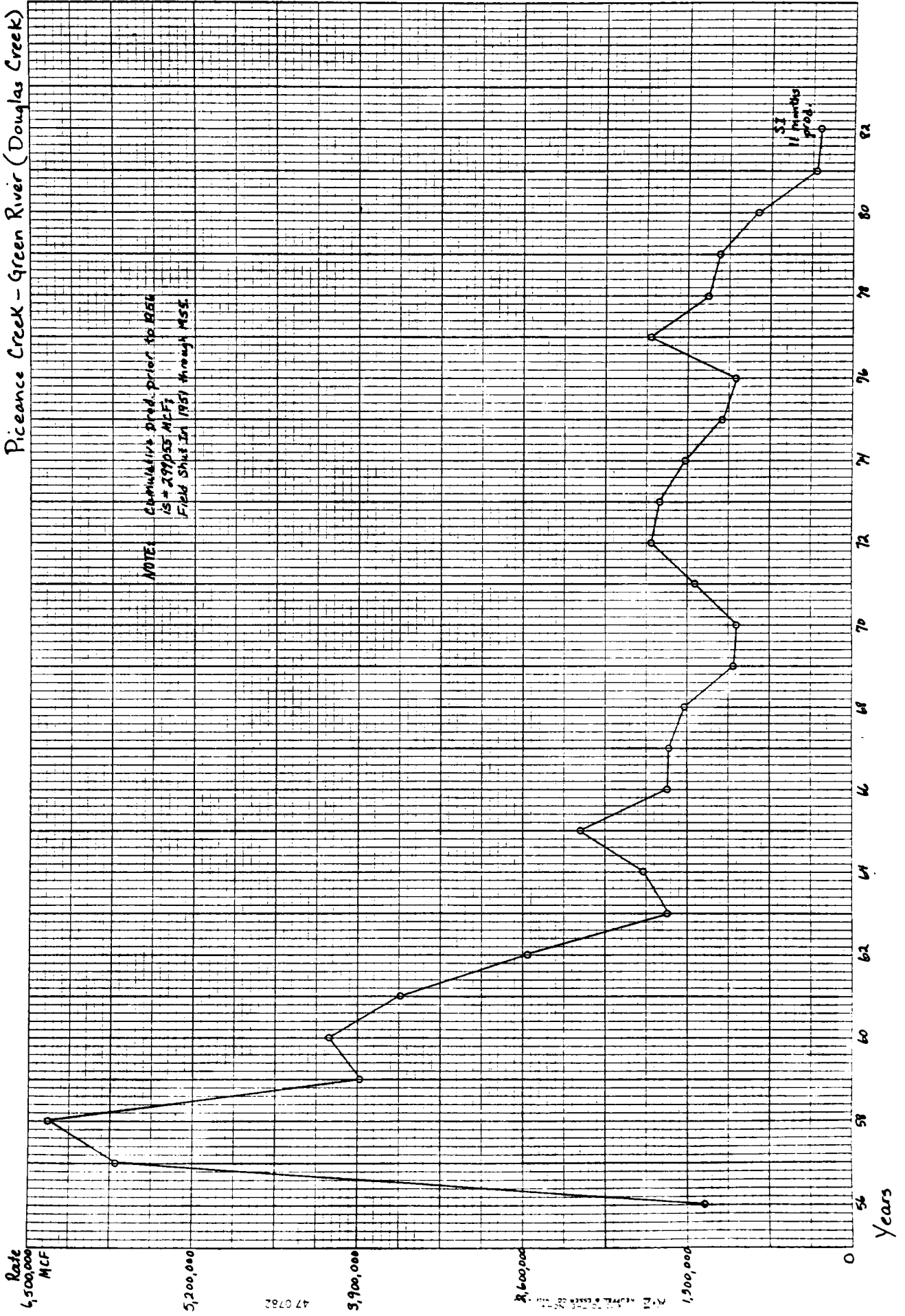
Rate
200,000
160,000
120,000
80,000
40,000
0

Years

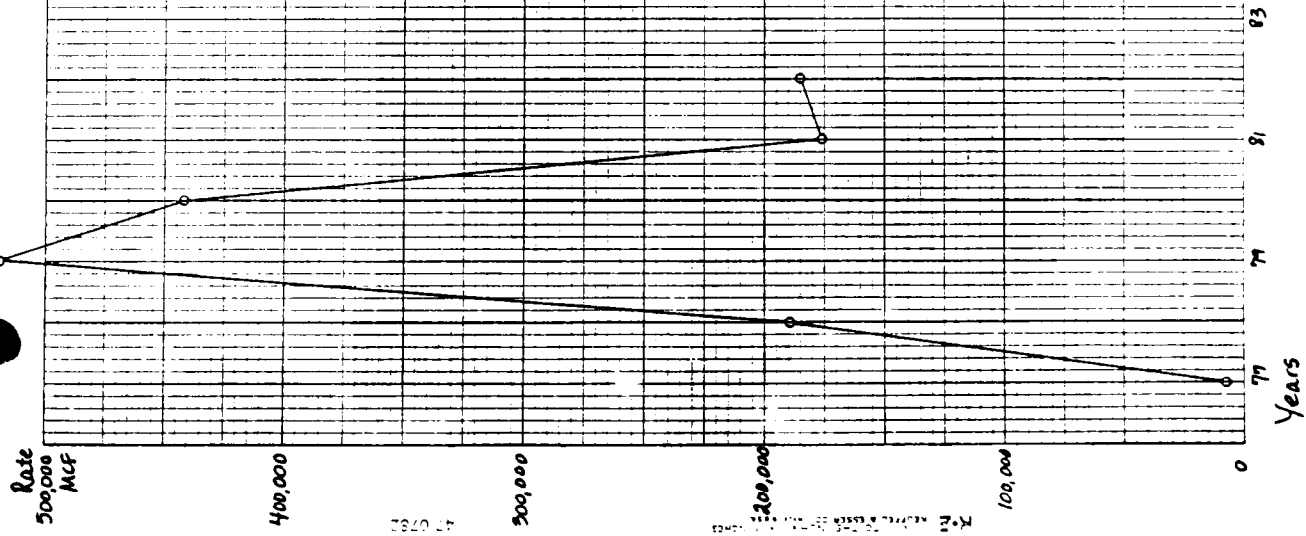
Philadelphia Creek - Mancos



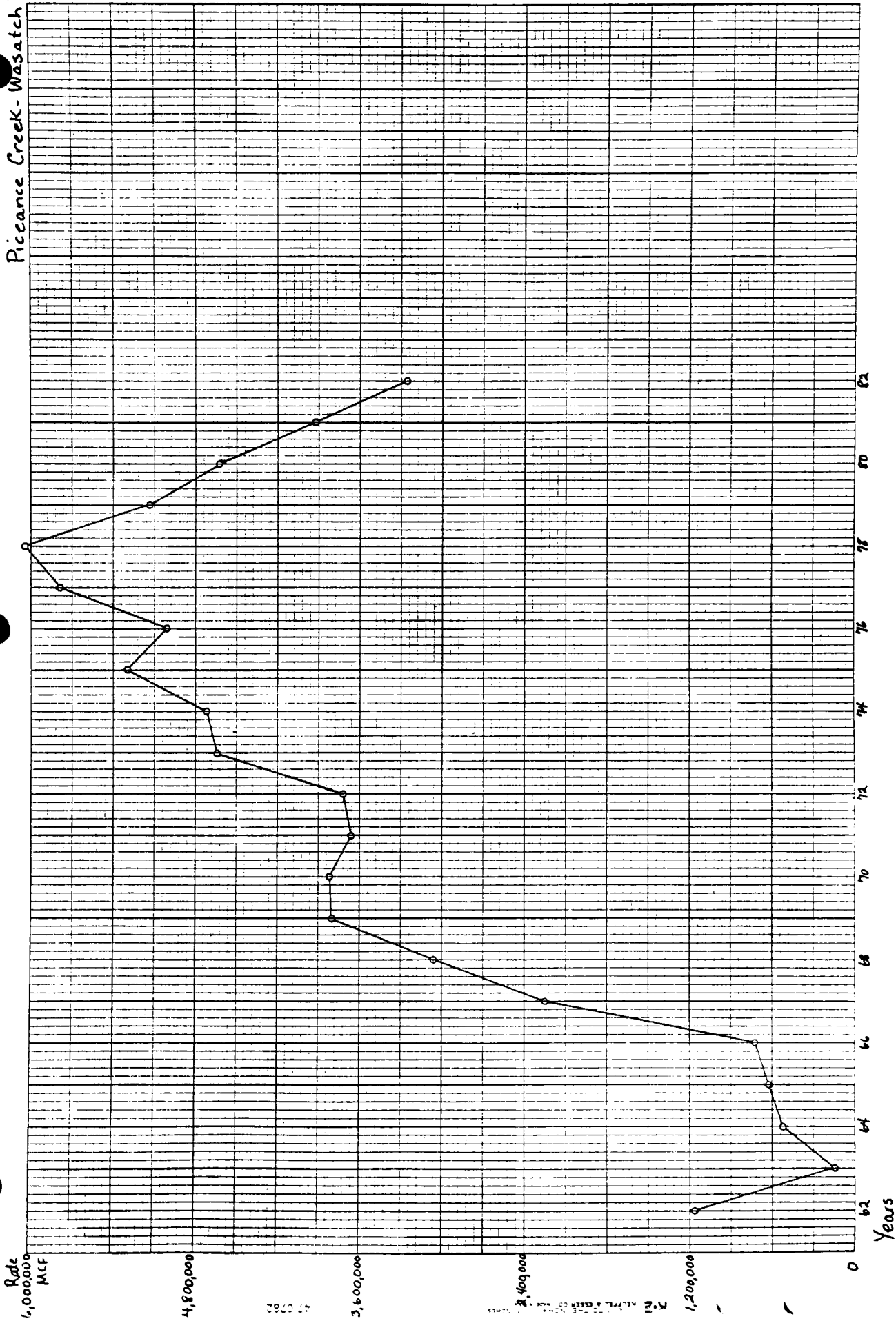
Piceance Creek - Green River (Douglas Creek)



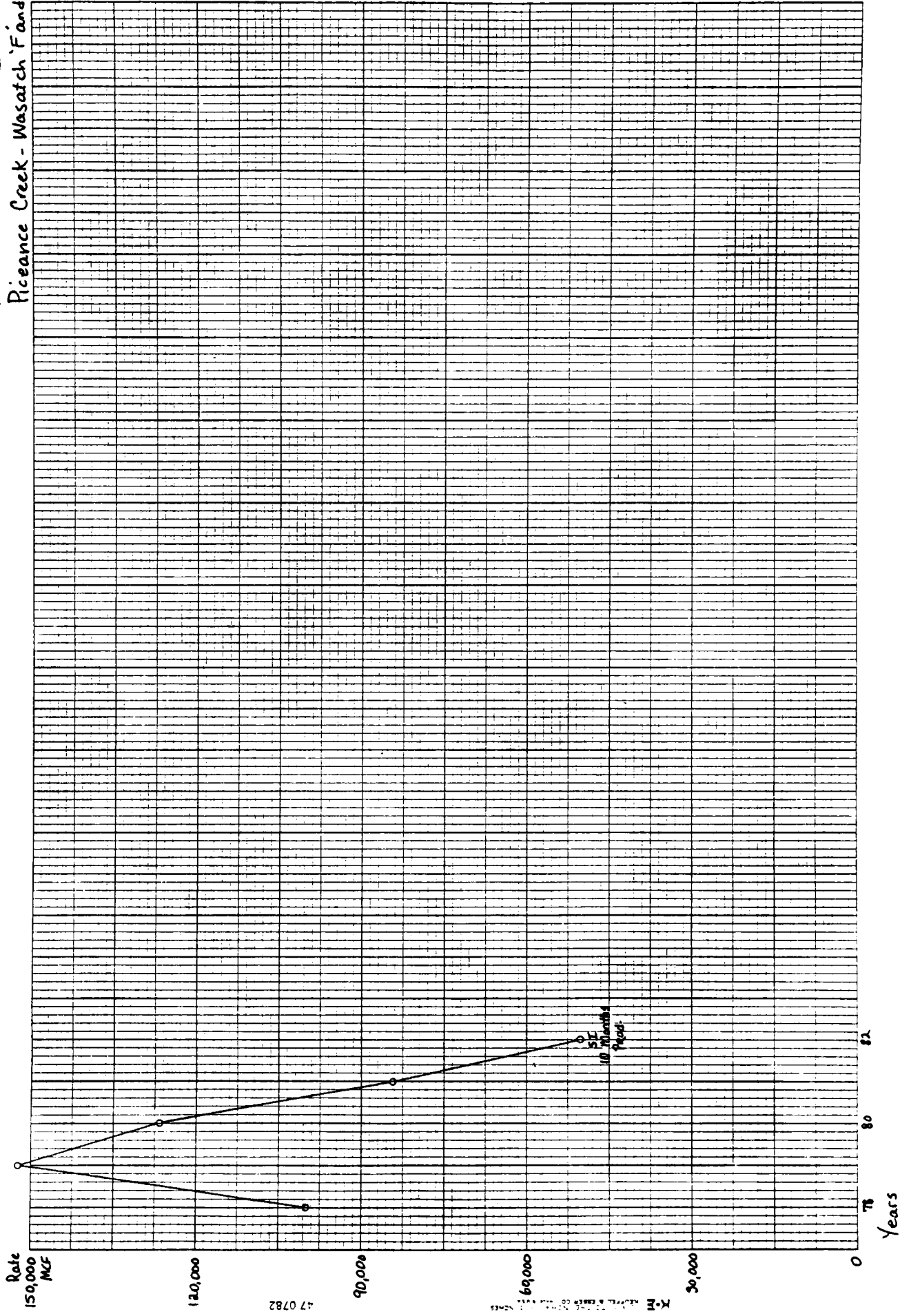
Piceance Creek Mesa Verde



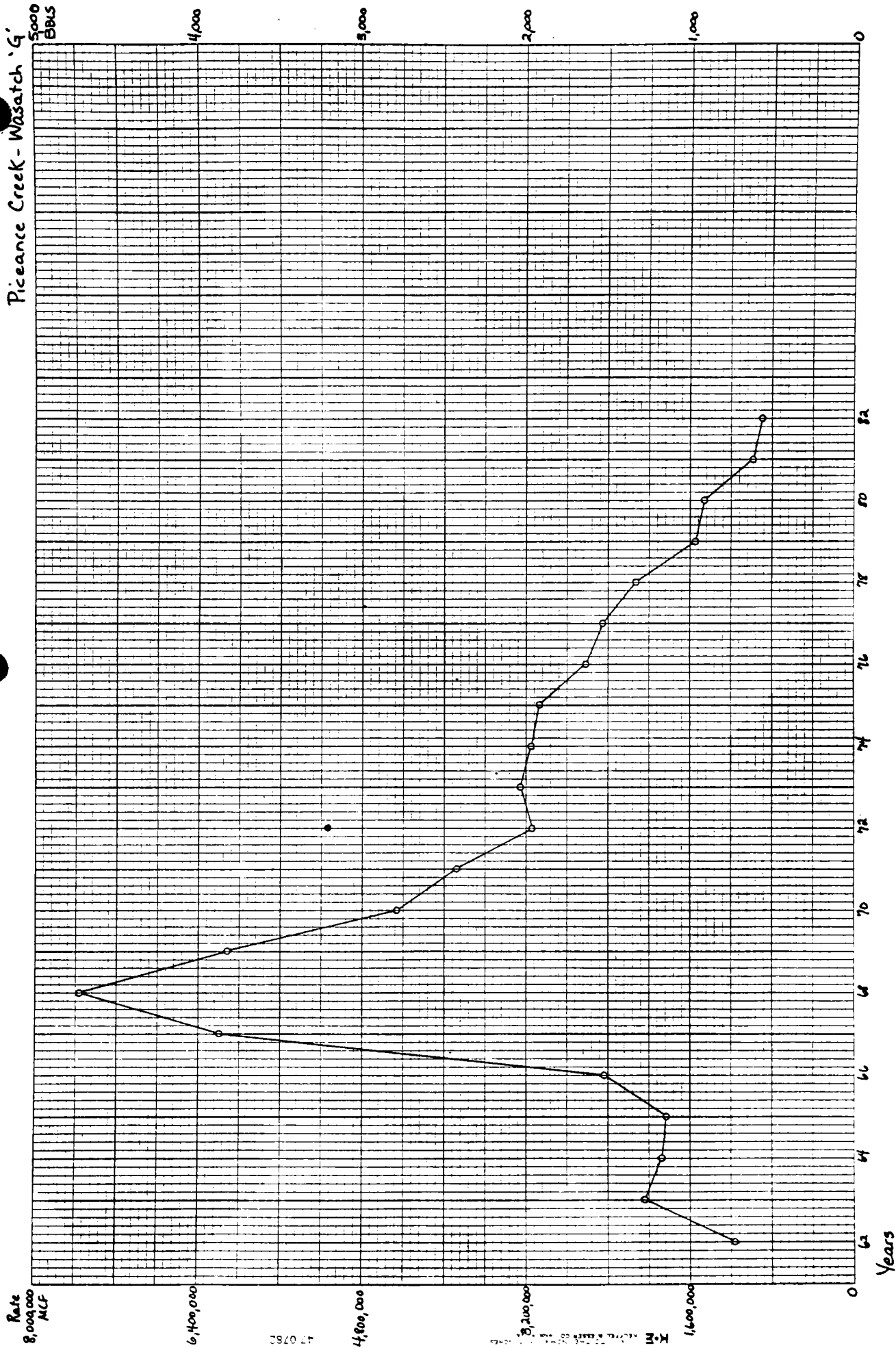
Piceance Creek-Wasatch 'A'



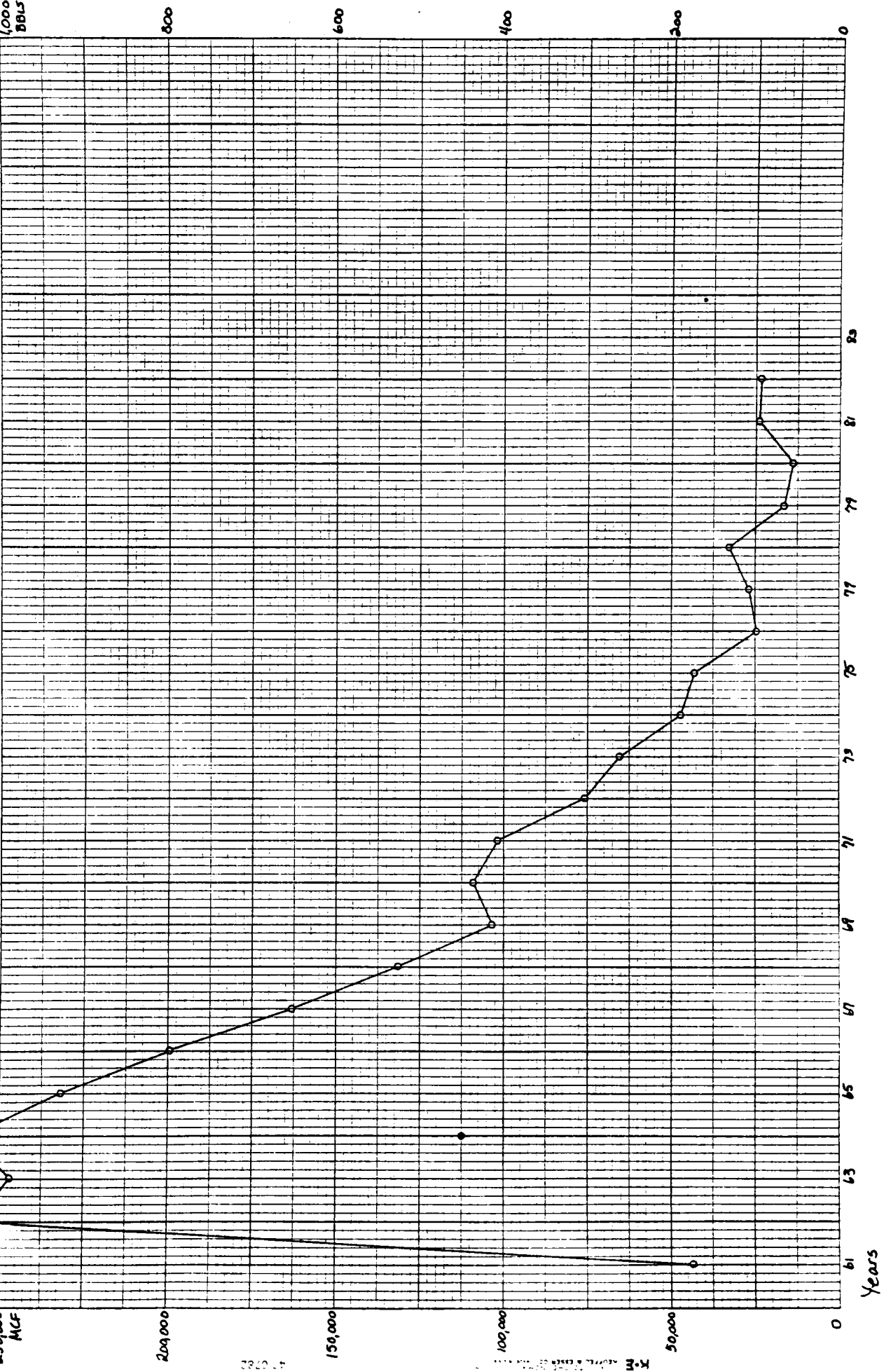
Piceance Creek - Wasatch 'F' and 'G'

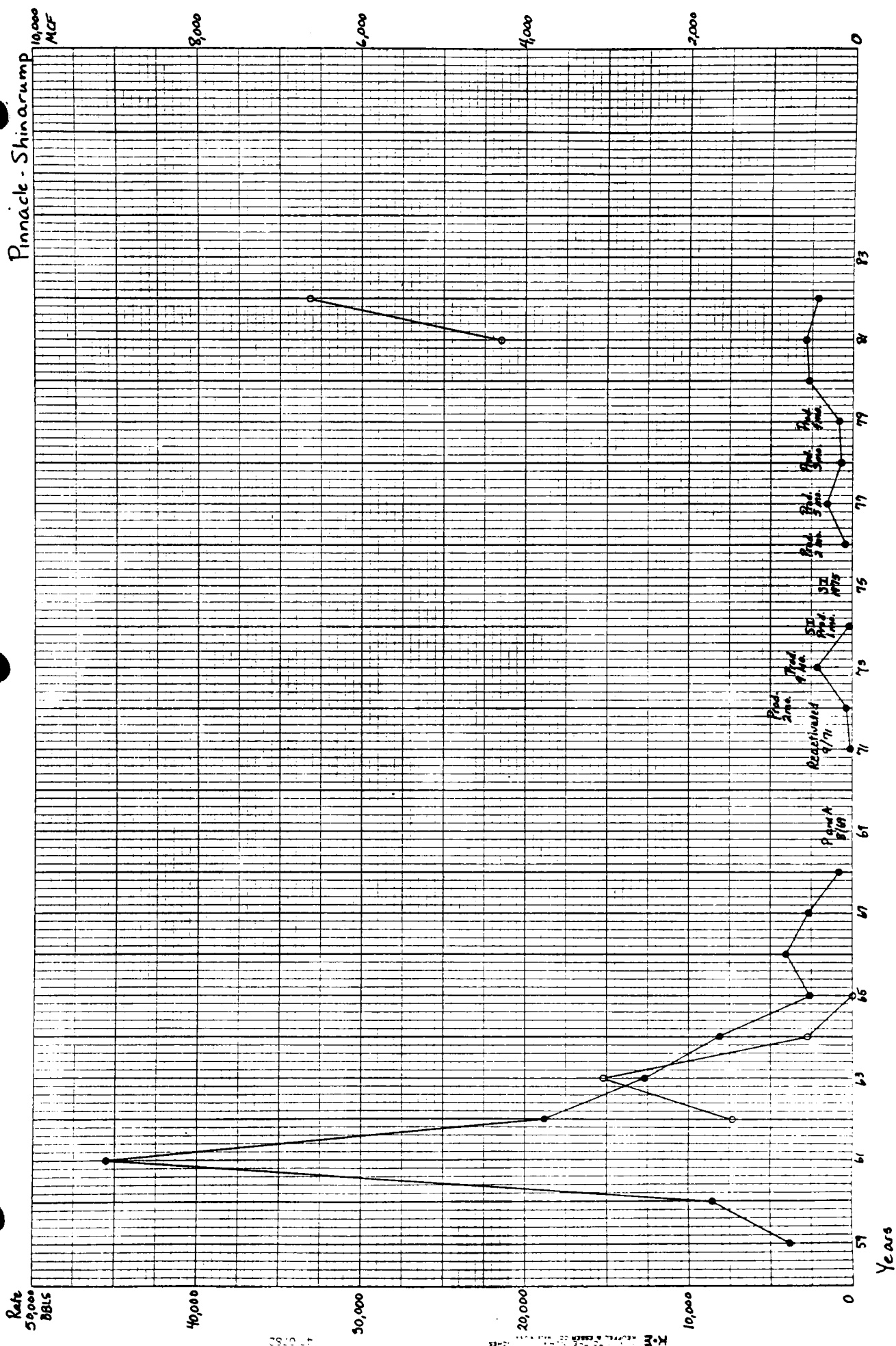


Piceance Creek - Wasatch 'G'

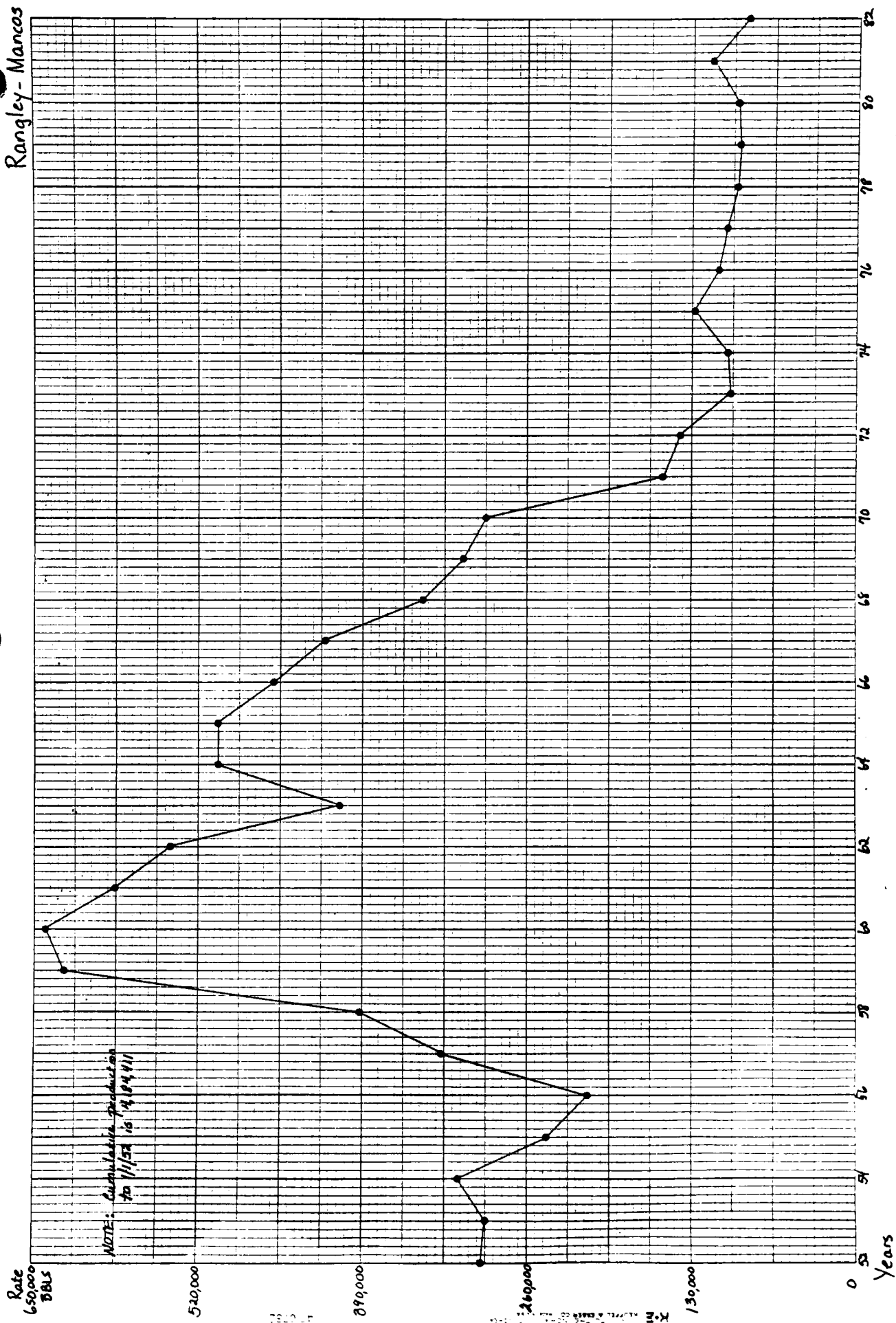


Piceance Creek South - Douglas Creek

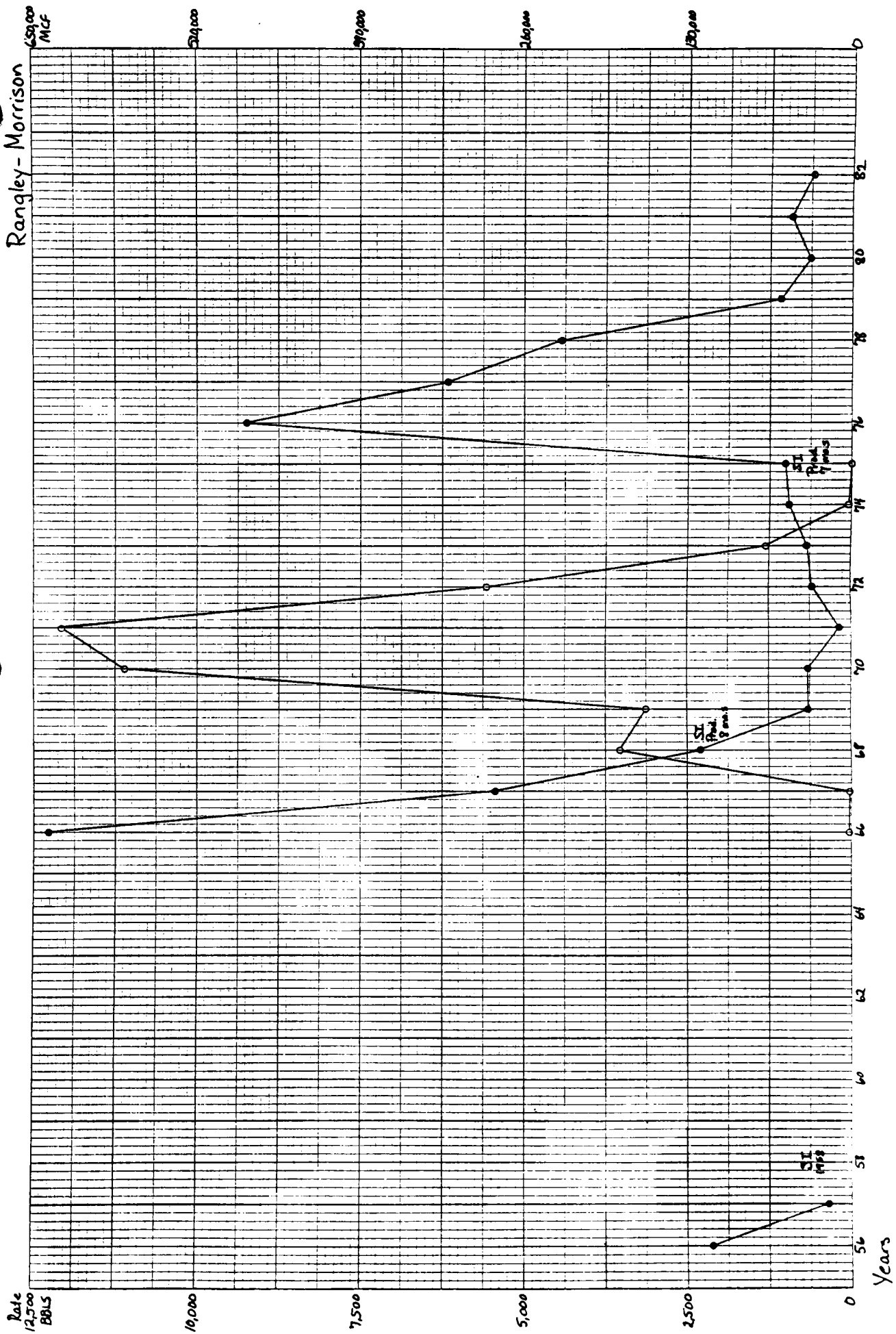


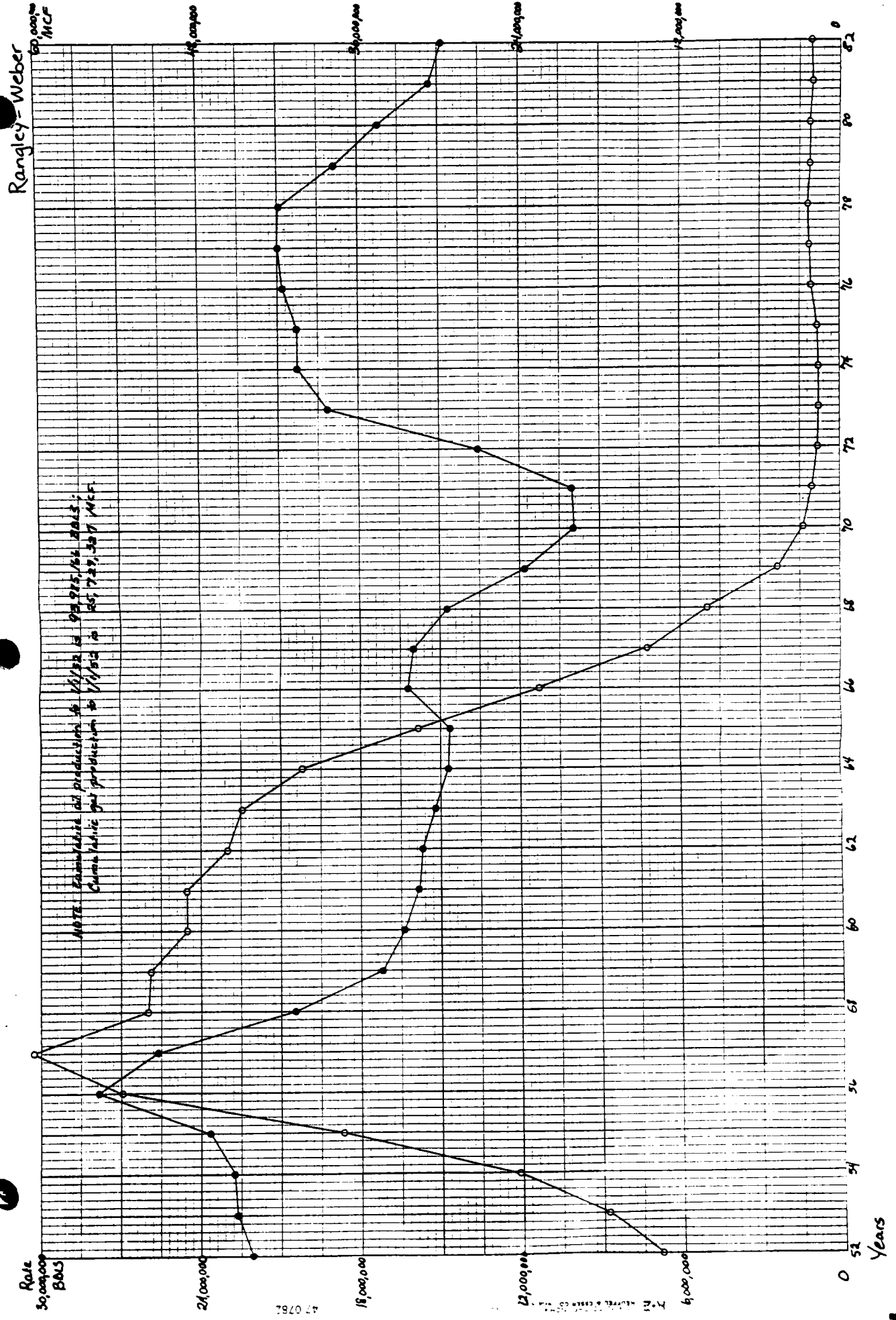


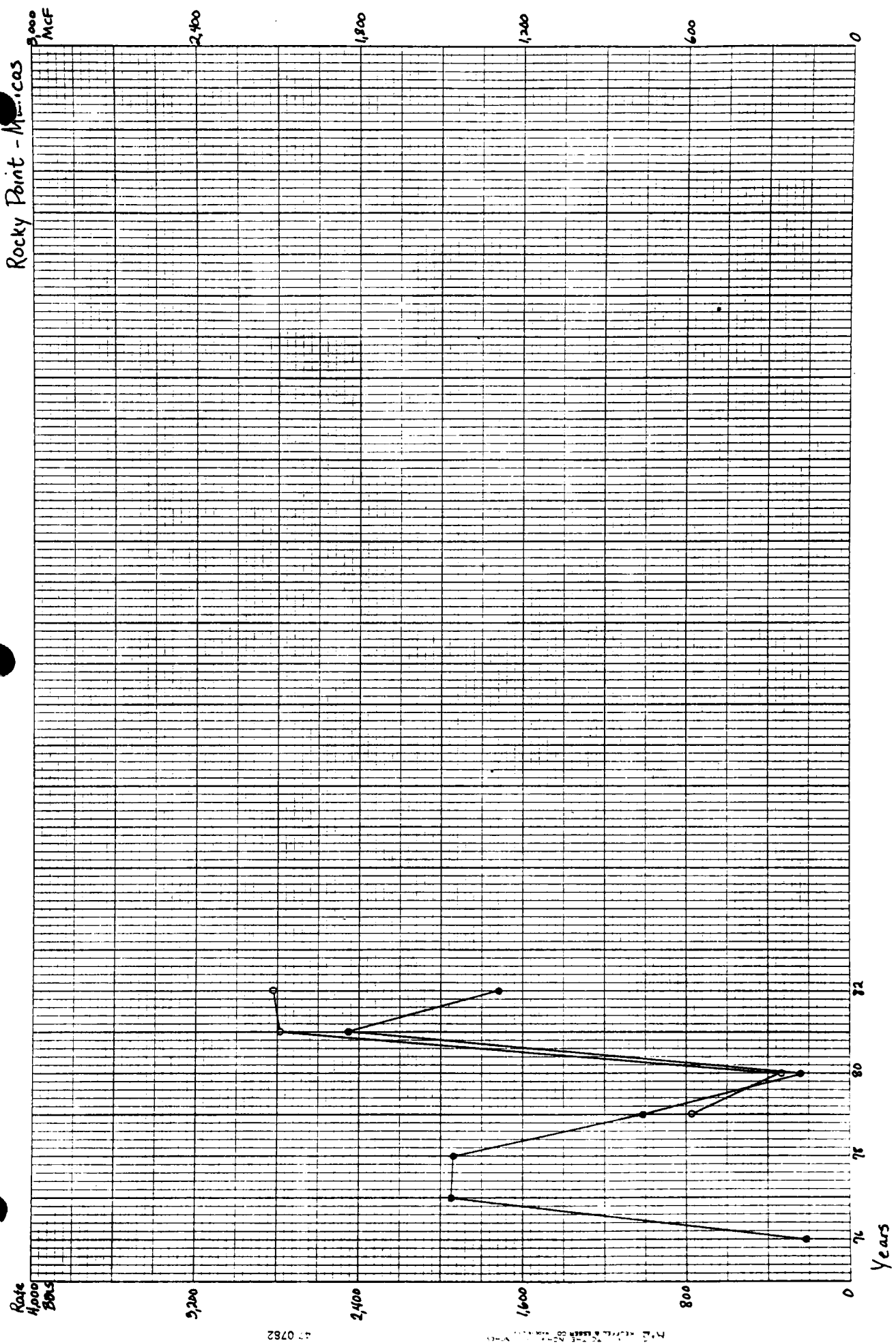
Rangley-Mancos



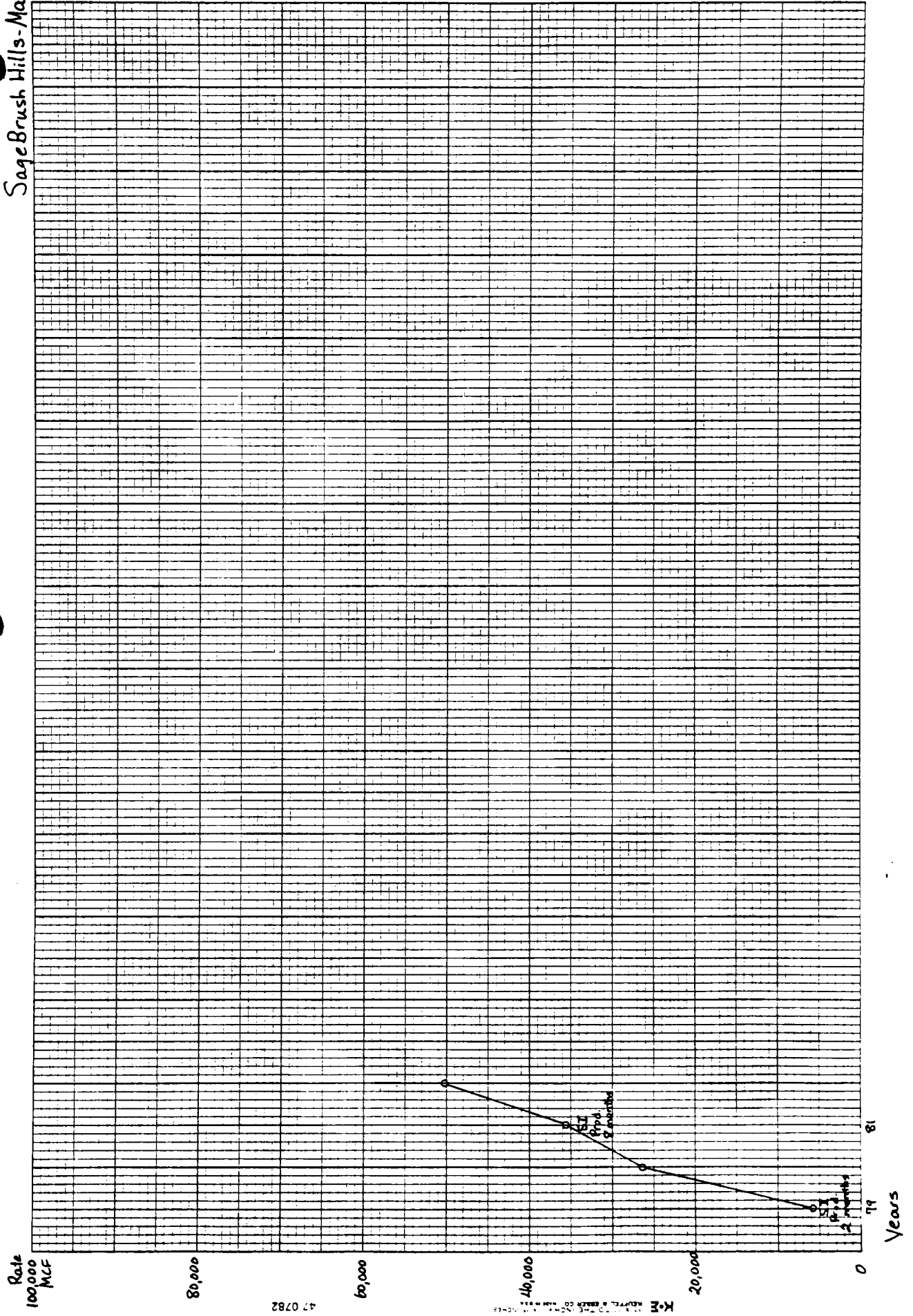
NOTE: Cumulative production to 11/53 is 1,000,000 bbl.

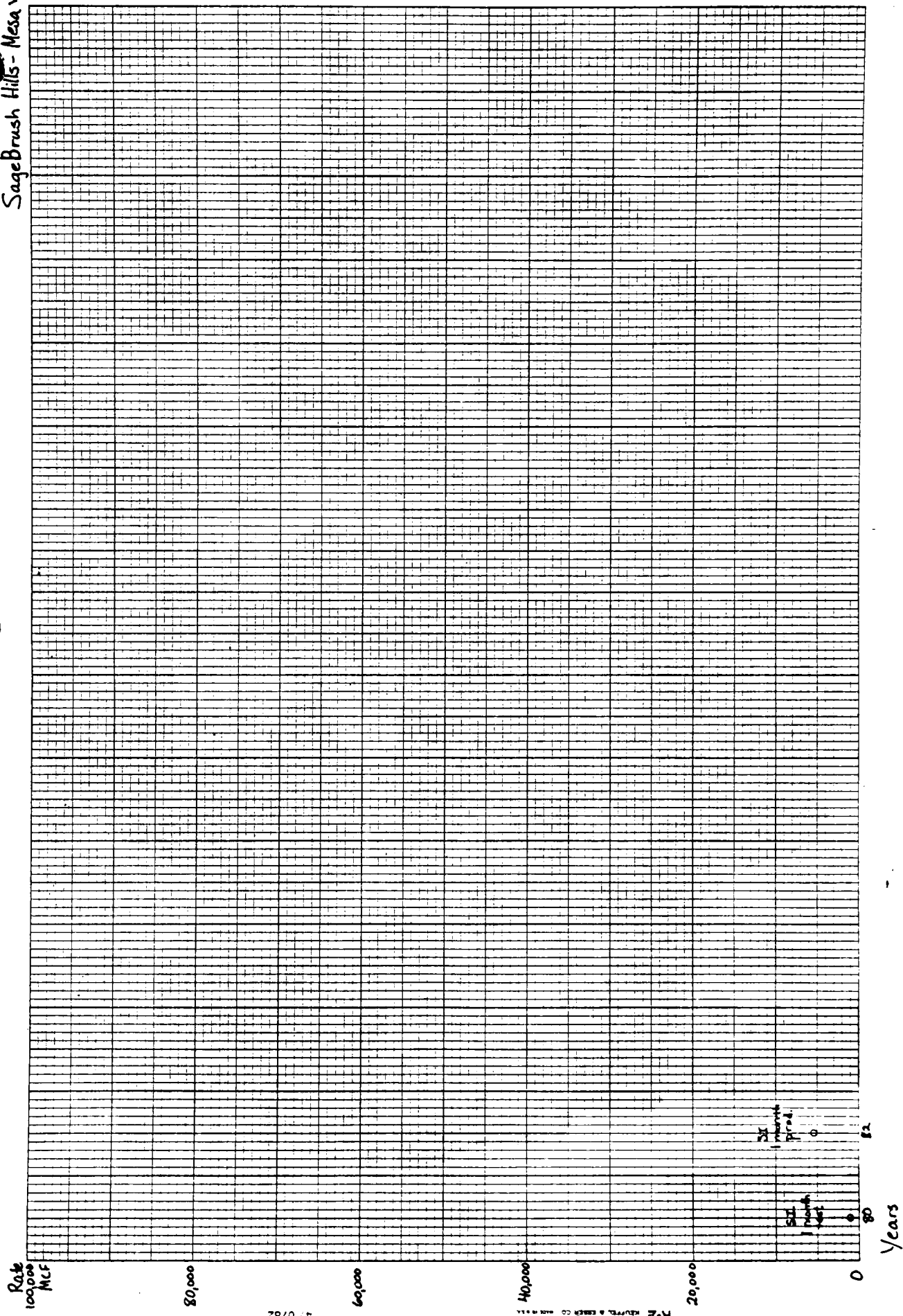






SageBrush Hills-Mancos





Rate
25,000
NCF

20,000

15,000

10,000

5,000

0

47 0782

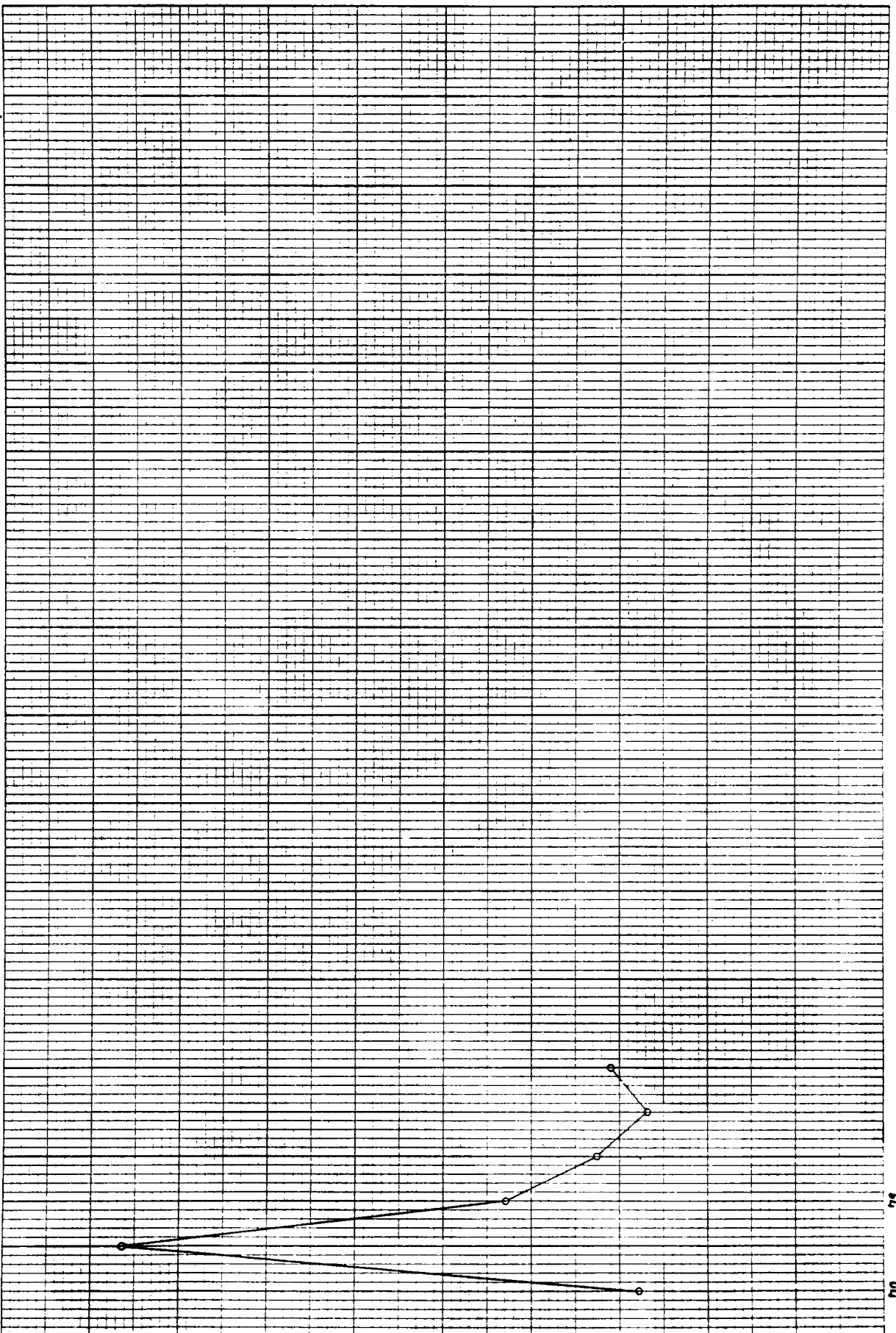
K₂ reduced to 1/2 of the original value

74

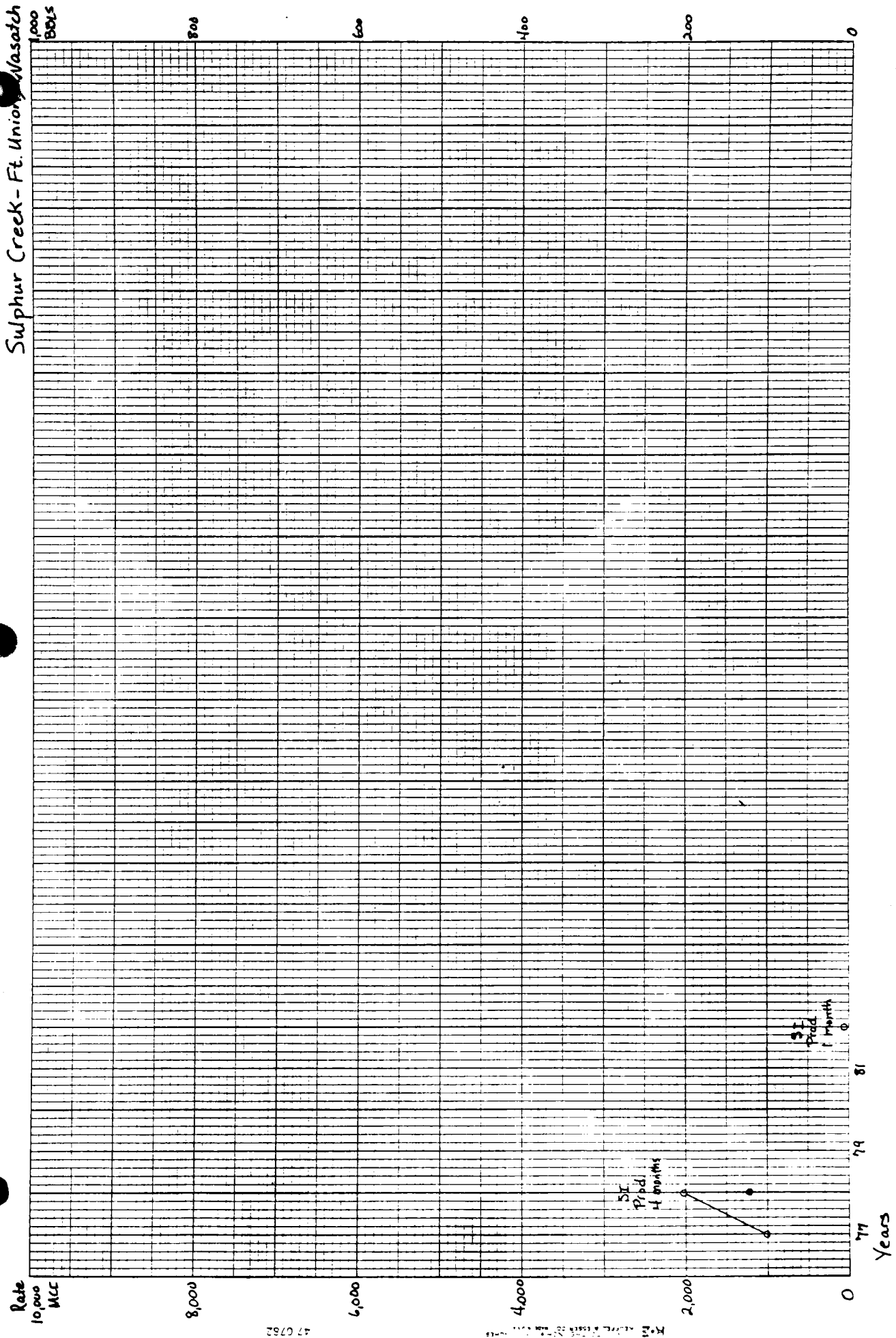
75

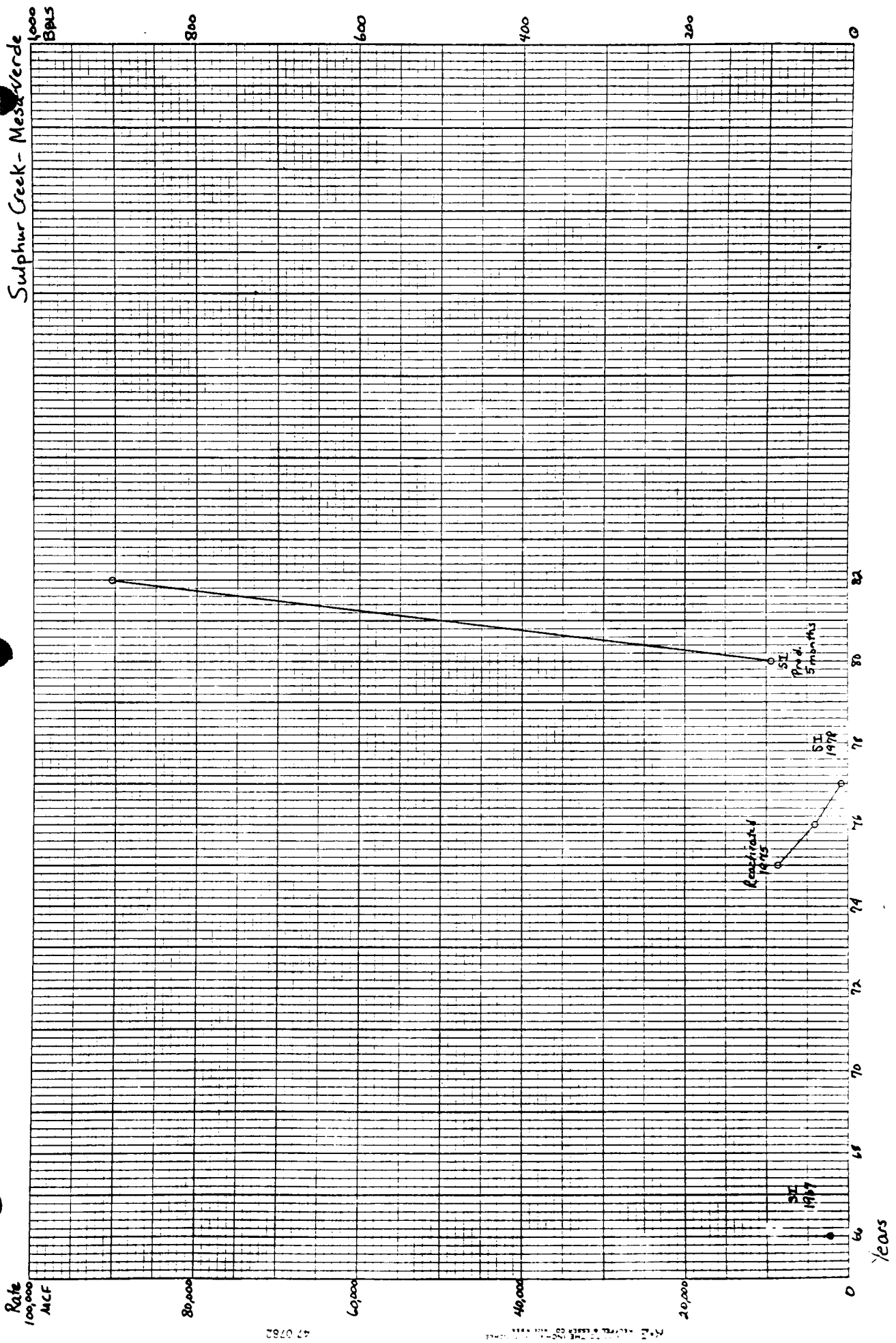
Years

Soldier Canyon - Dakota

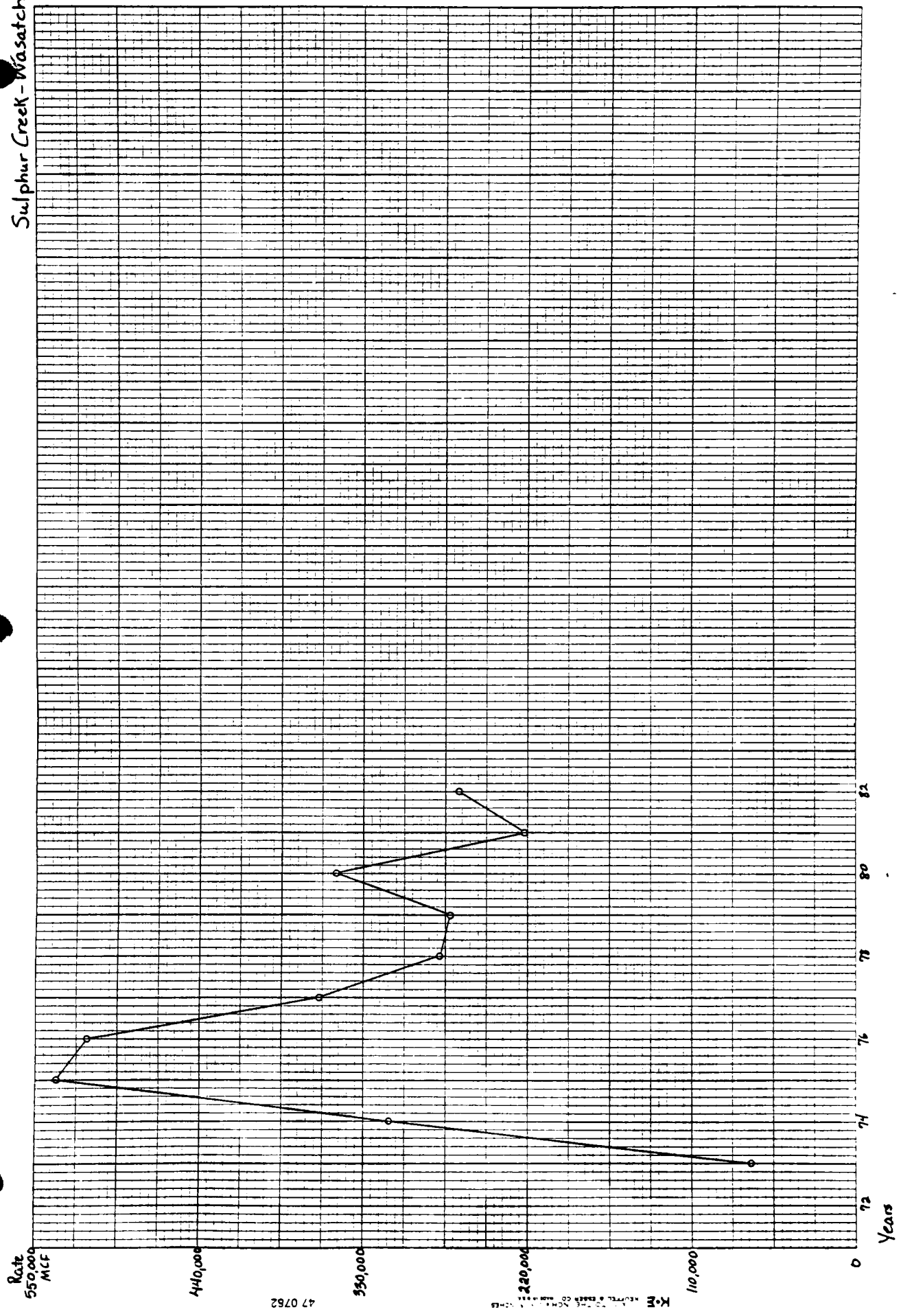


Sulphur Creek - Ft. Union, Wasatch

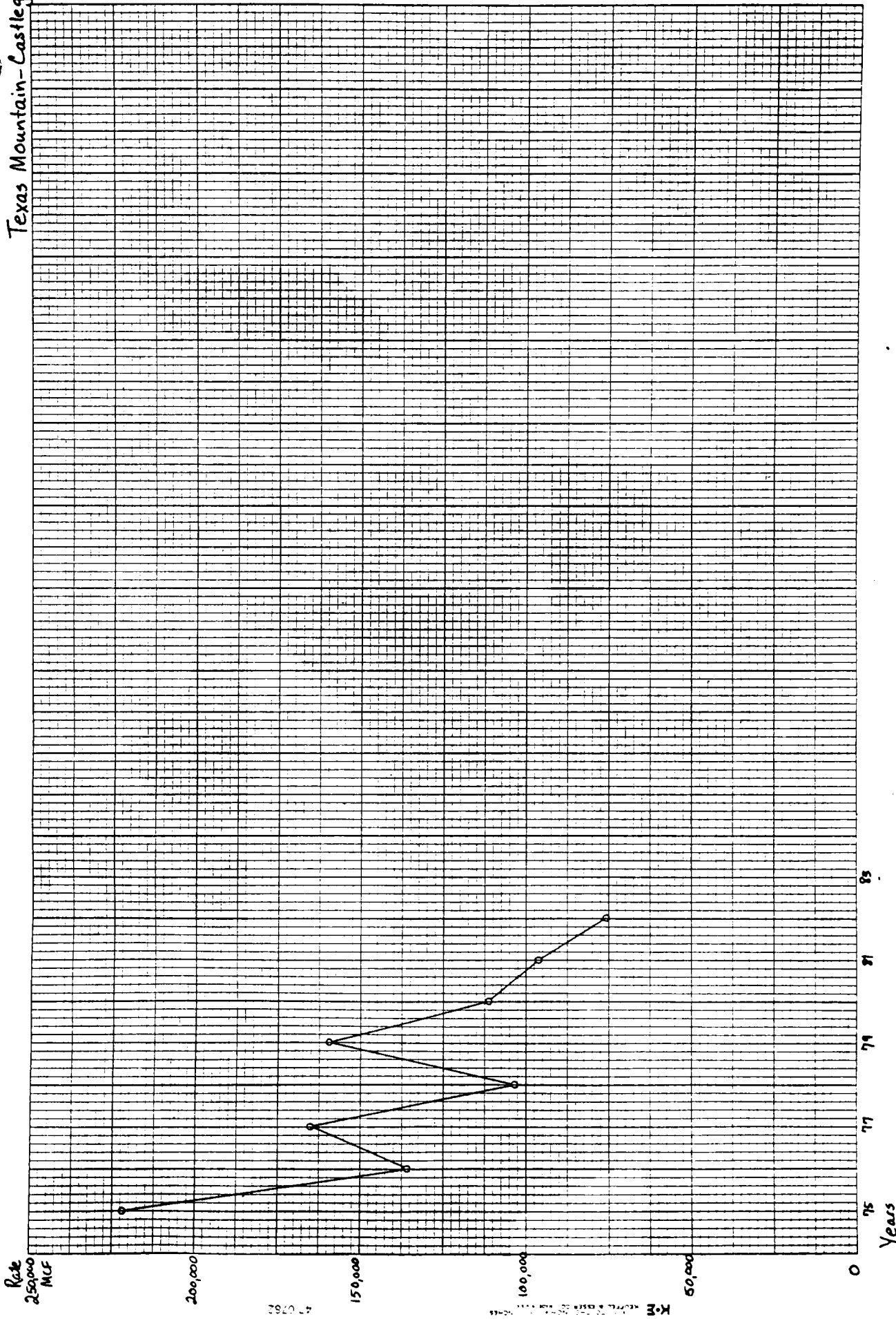




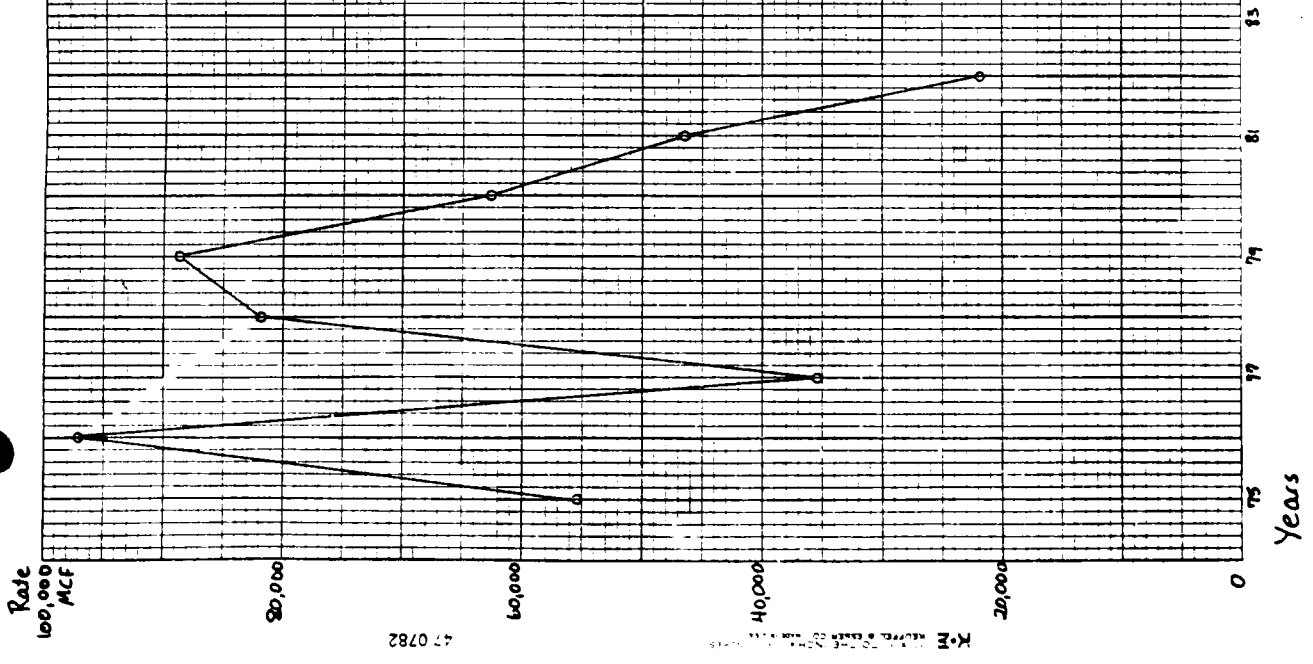
Sulphur Creek - Wasatch



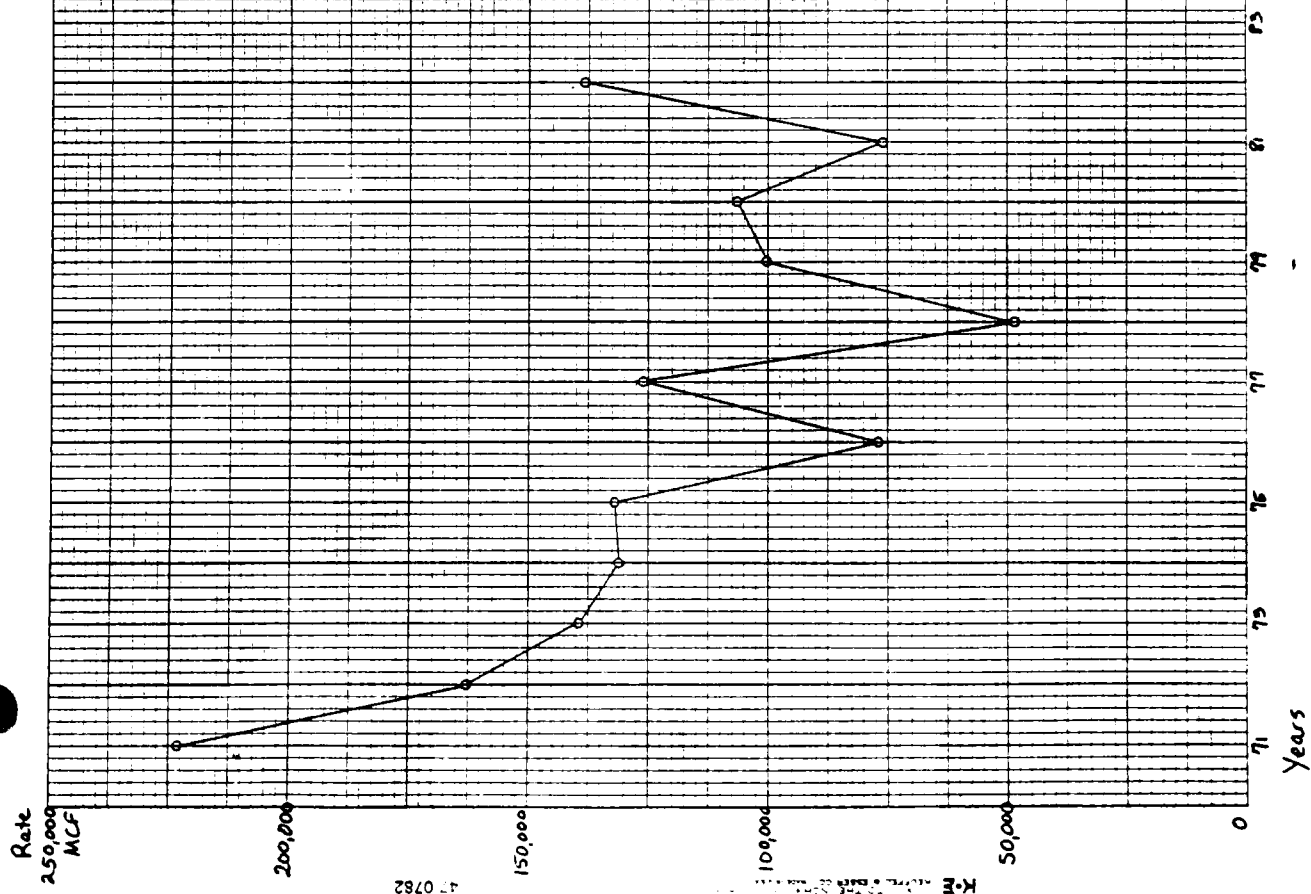
Texas Mountain-Castlegate



Texas Mountain-Castlegate-Manus

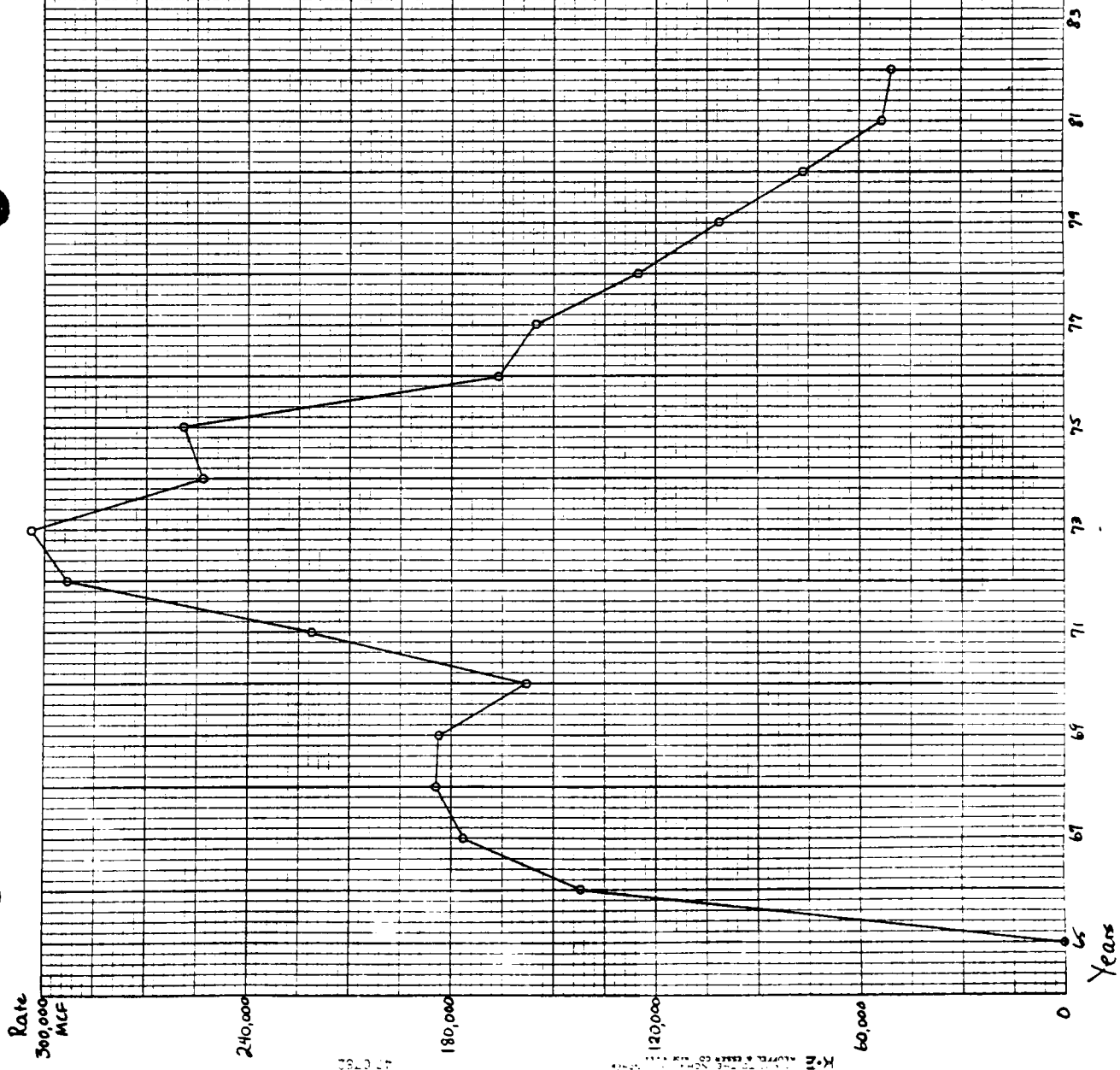


Texas Mountain - Dakota



Texas Mountain - Mancos 'A'

DRY



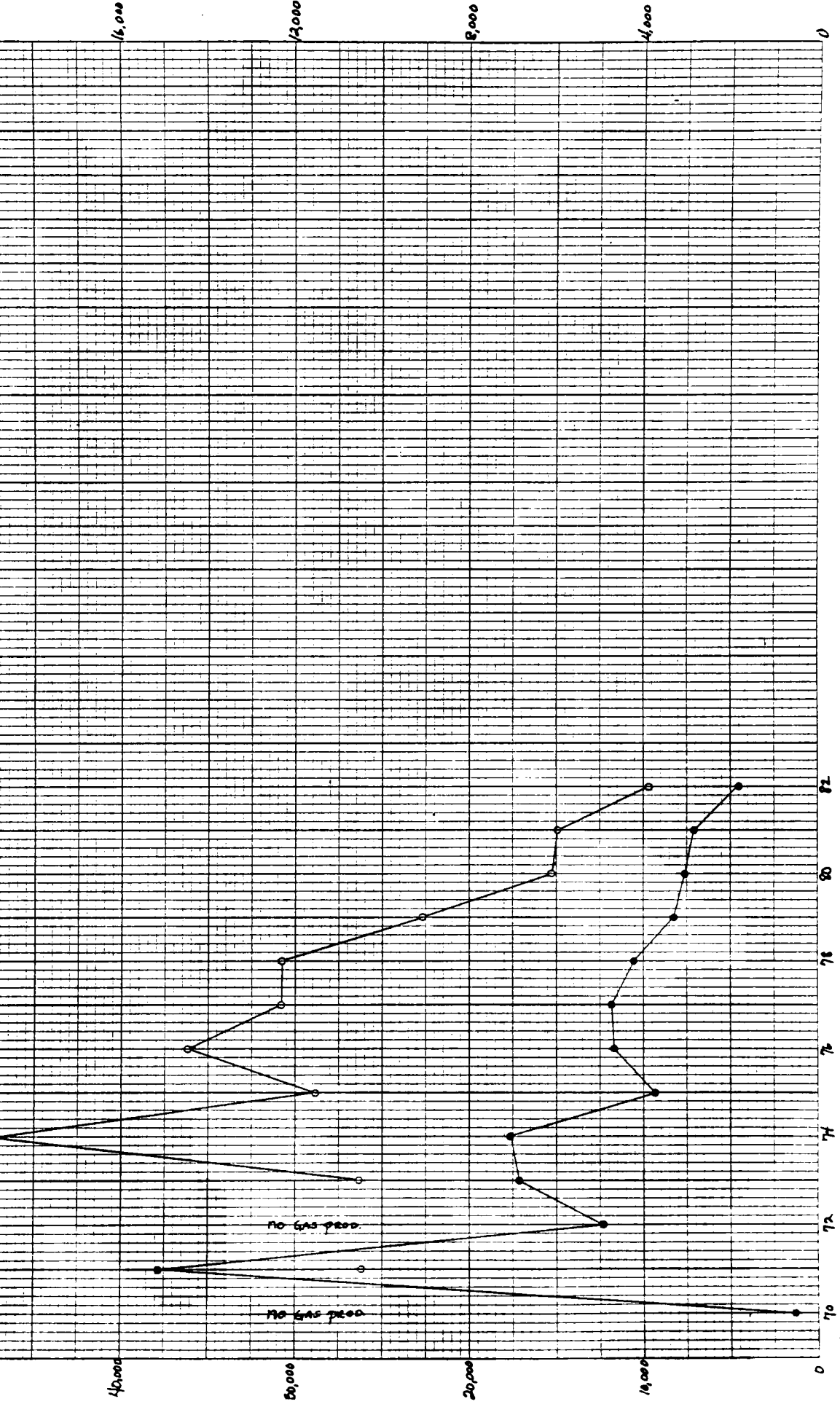
Wet

Texas Mountain - Man

Rate

20,000
BBLs

50,000
MCF

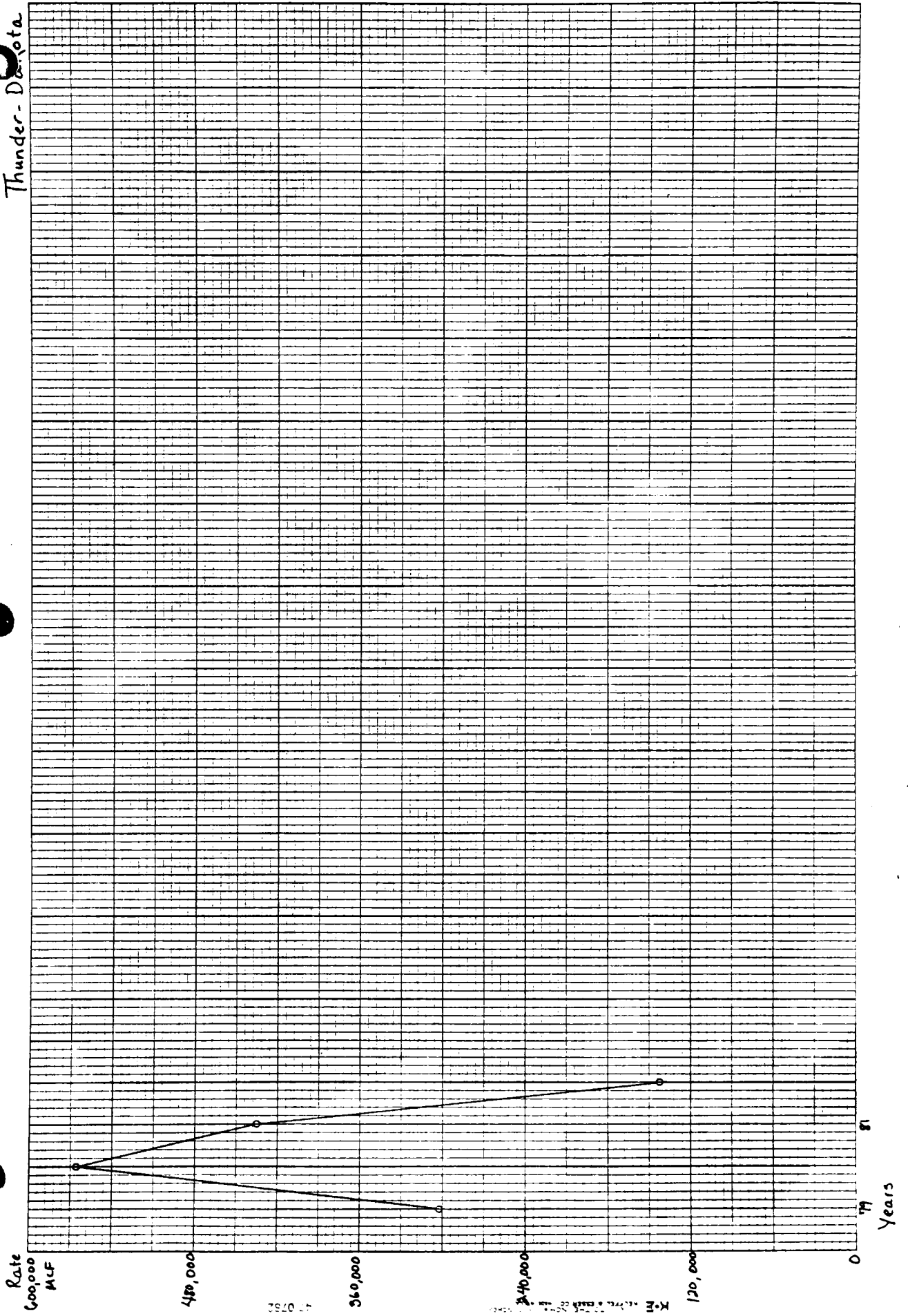


No Gas prod.

No Gas prod.

Years

Thunder-Danota



Rate
400,000
MLF

320,000

240,000

160,000

80,000

0

0

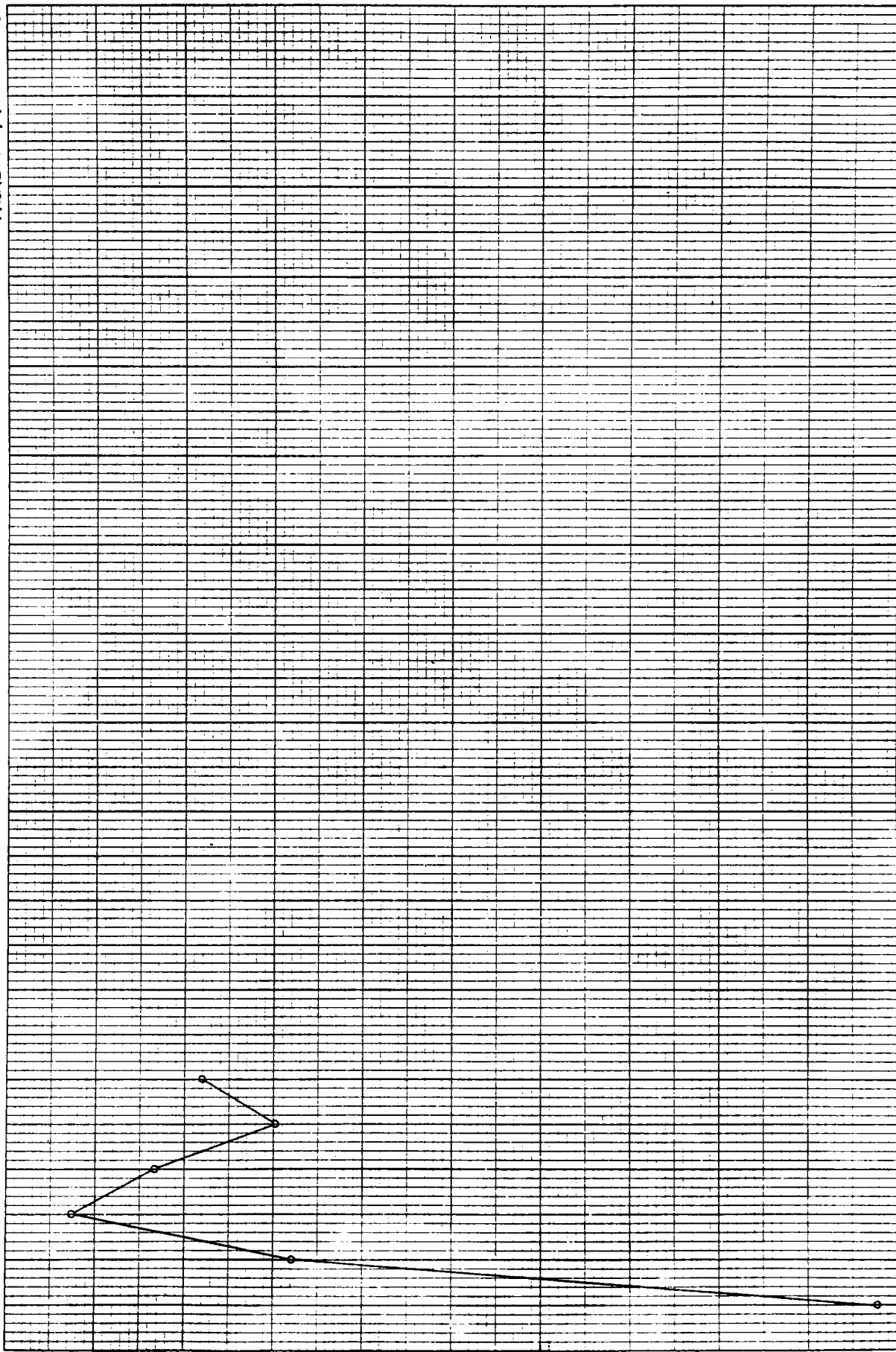
7

14

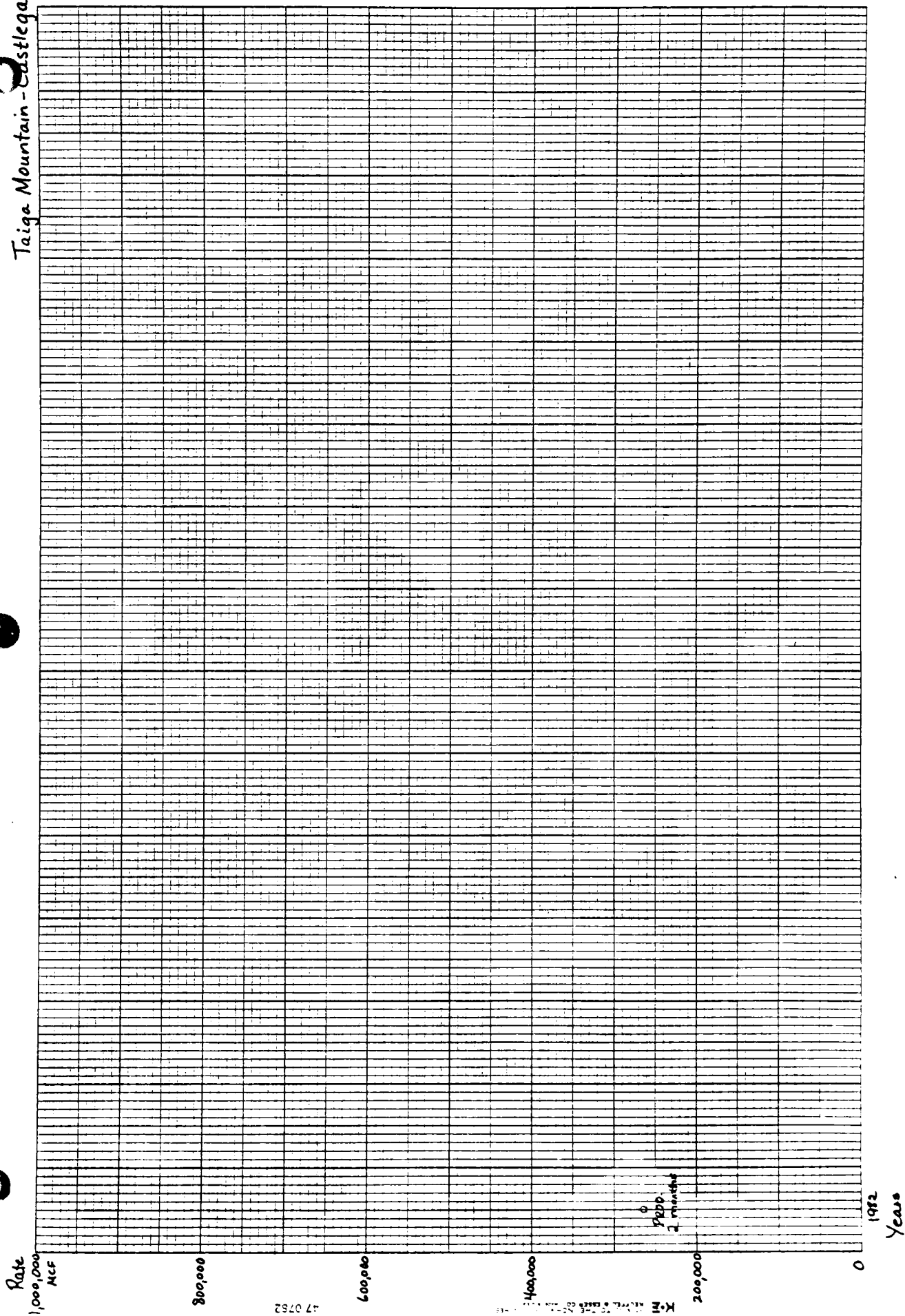
21

Years

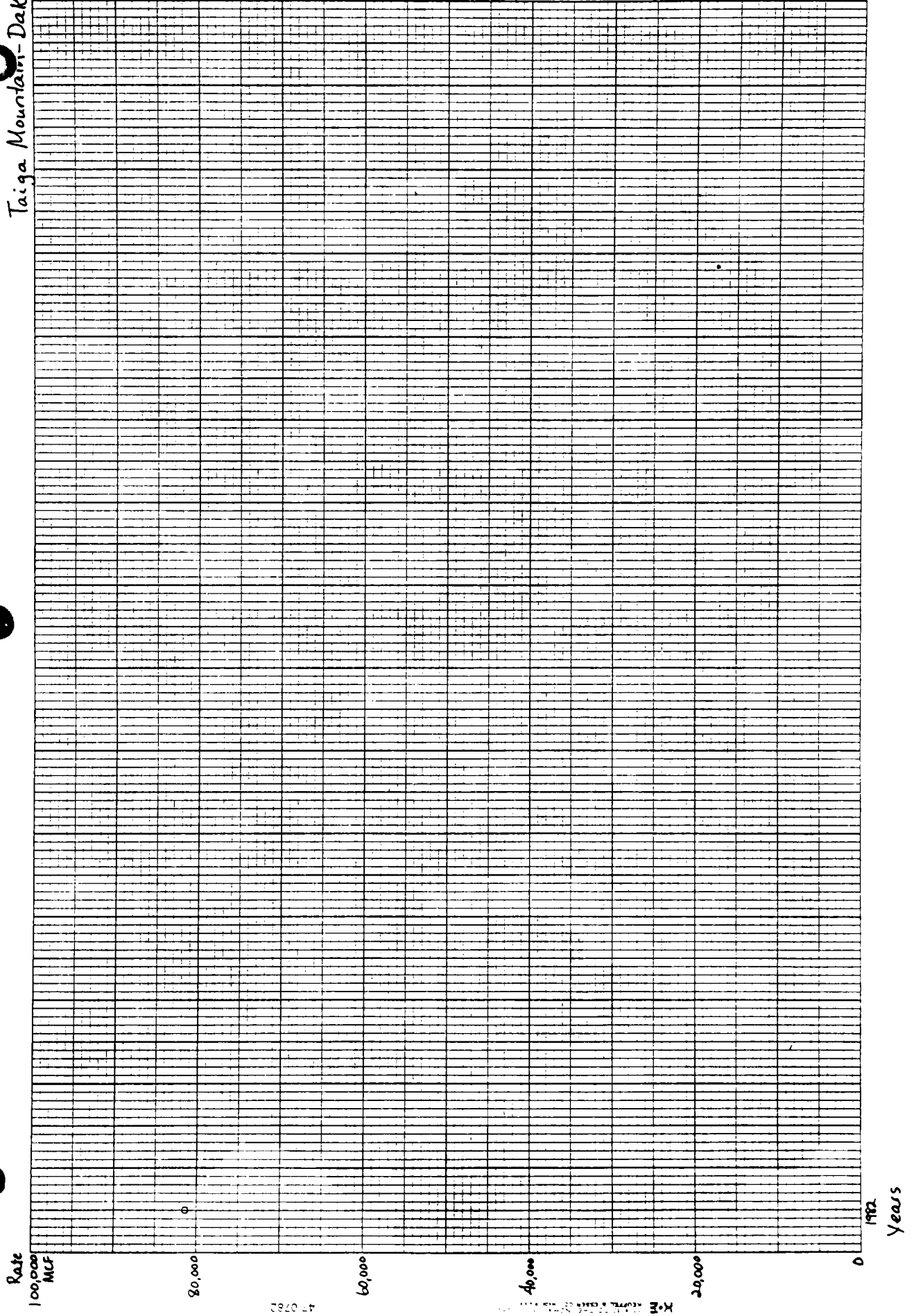
Thunder-Mancos 'B'



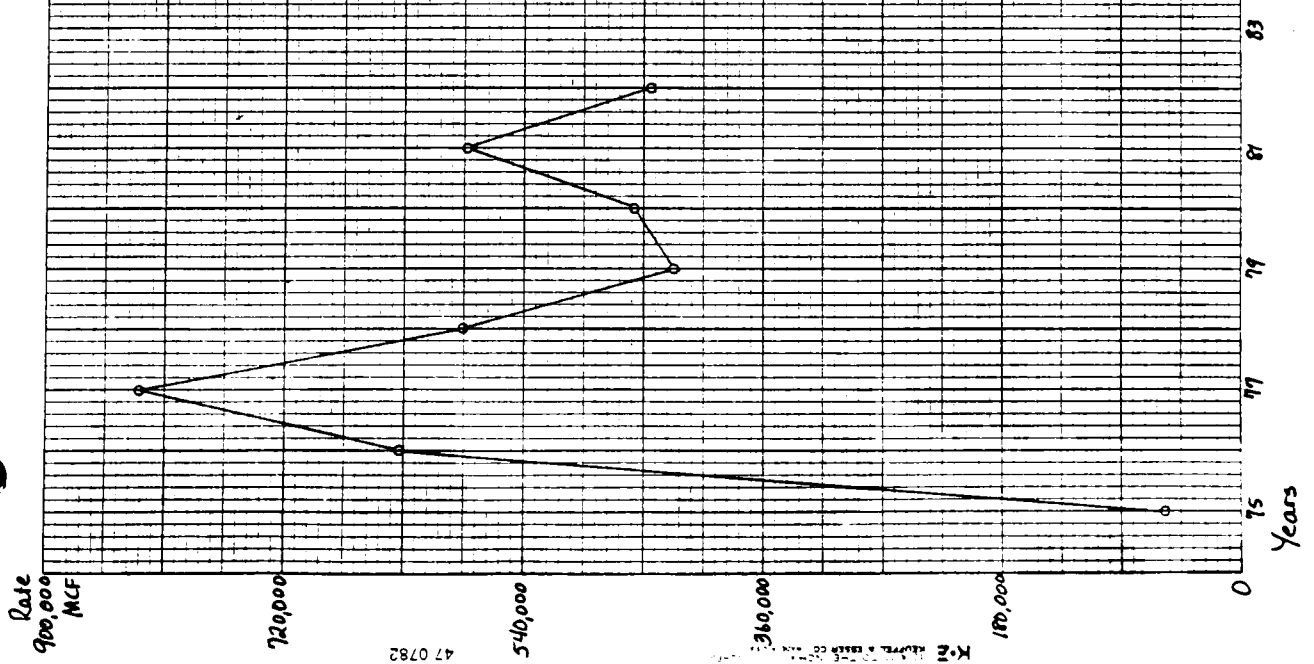
Taiga Mountain - Castle Gate



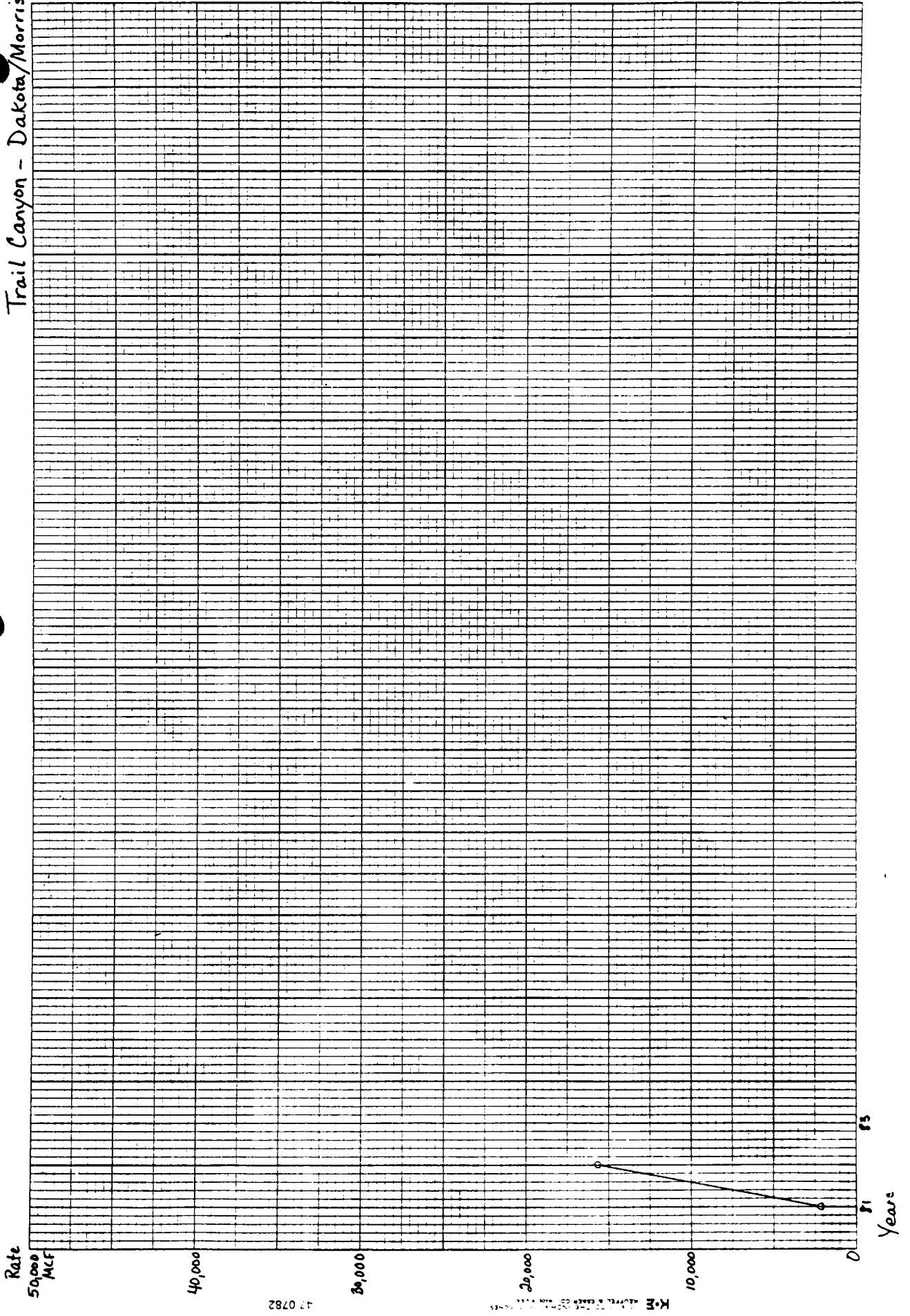
Taiga Mountain-Dakota

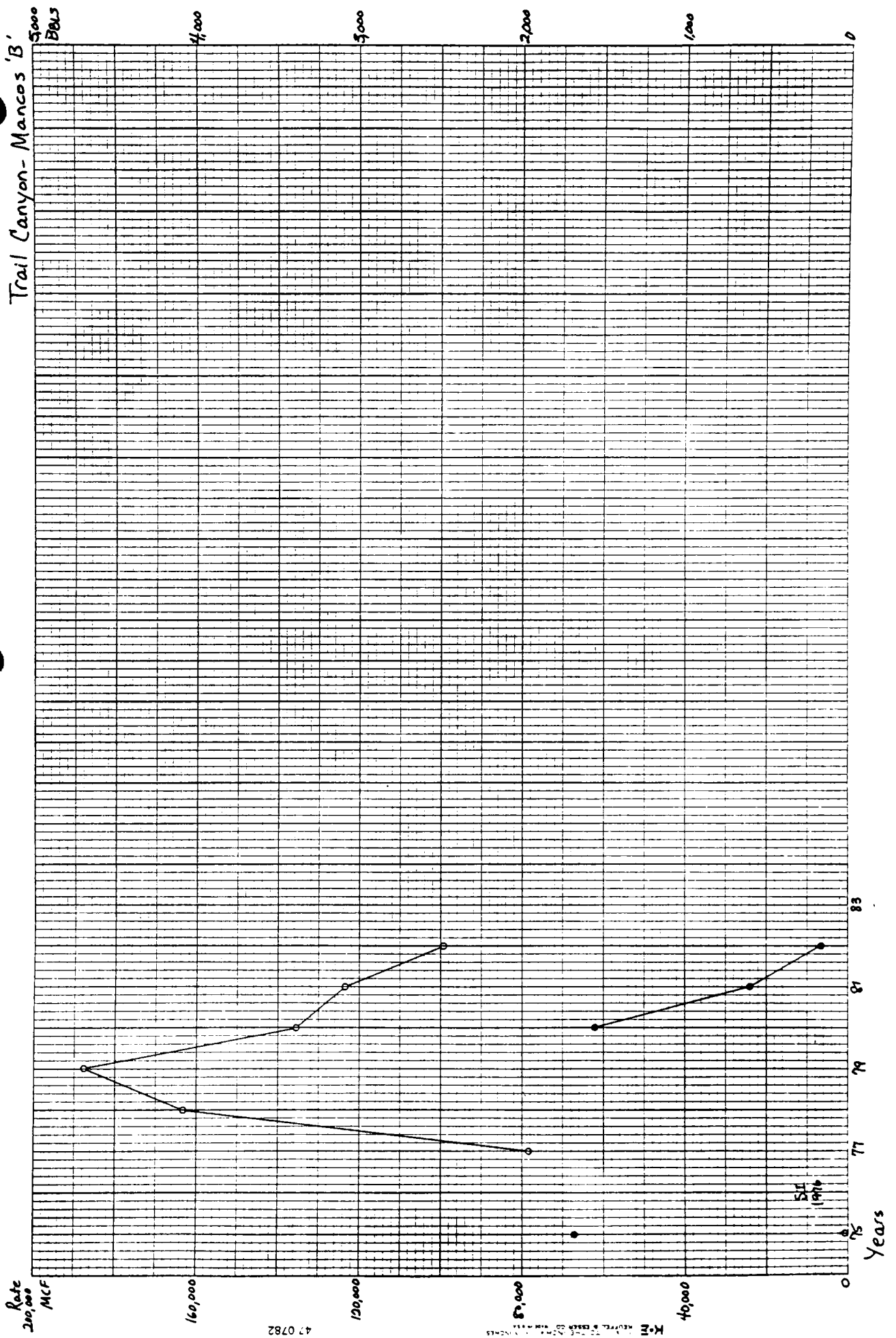


Trail Canyon - Dakota



Rate
50,000
MCF

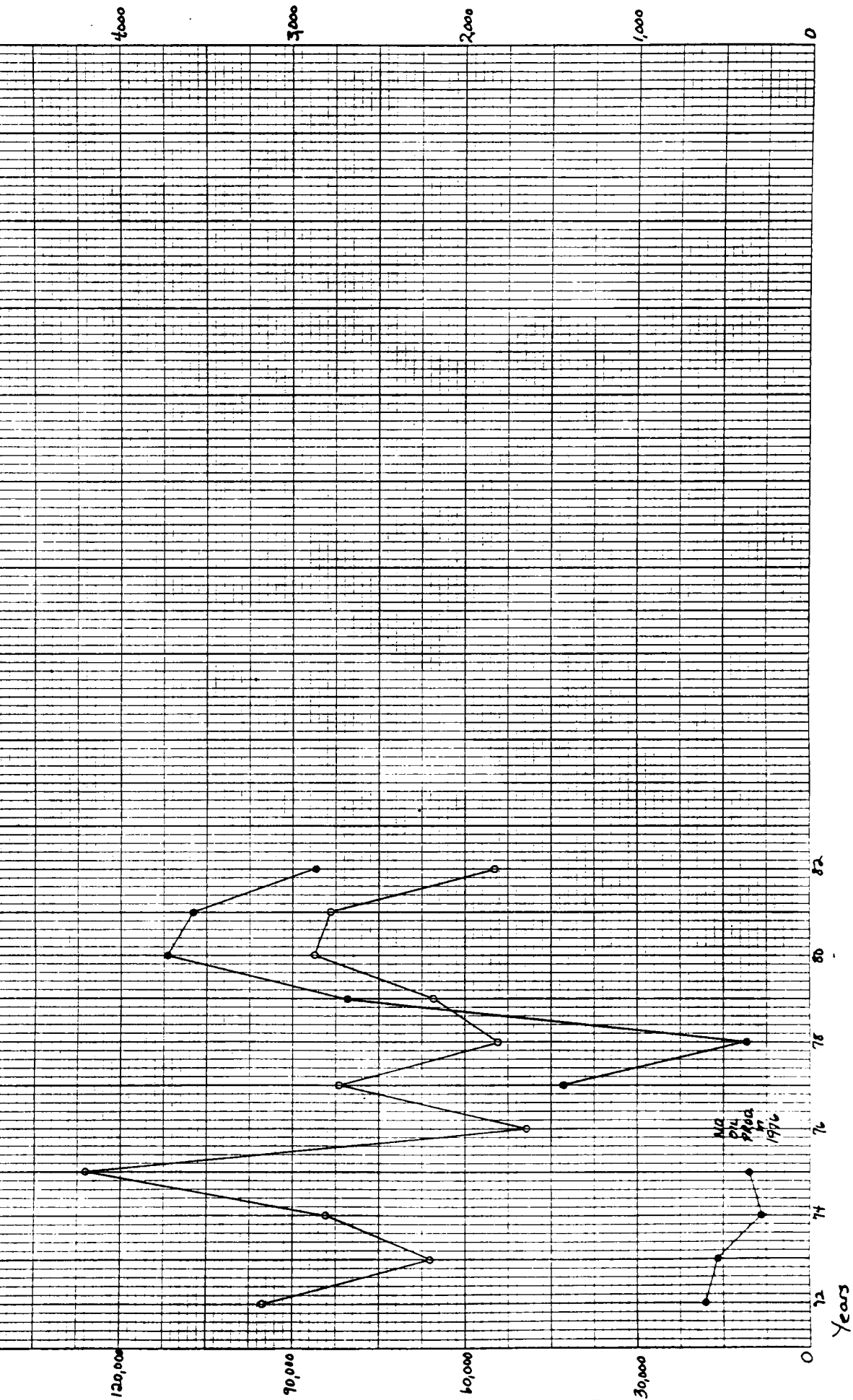




White River - Mesa Verde

1985

Rate
150,000
MCF

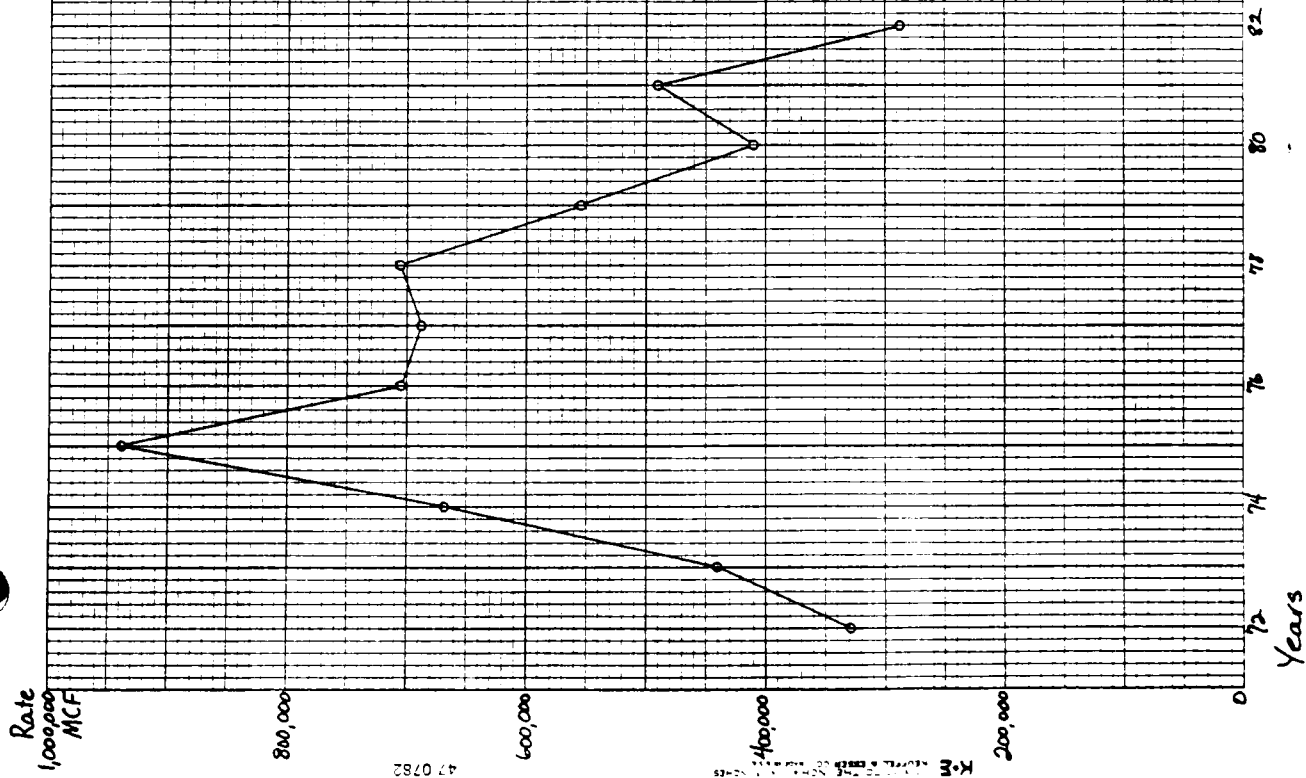


Years

Rate
1,000,000
MCF

47 0782

K-E
NEUTRAL TO BOLD
COINTEGRATION
12-85

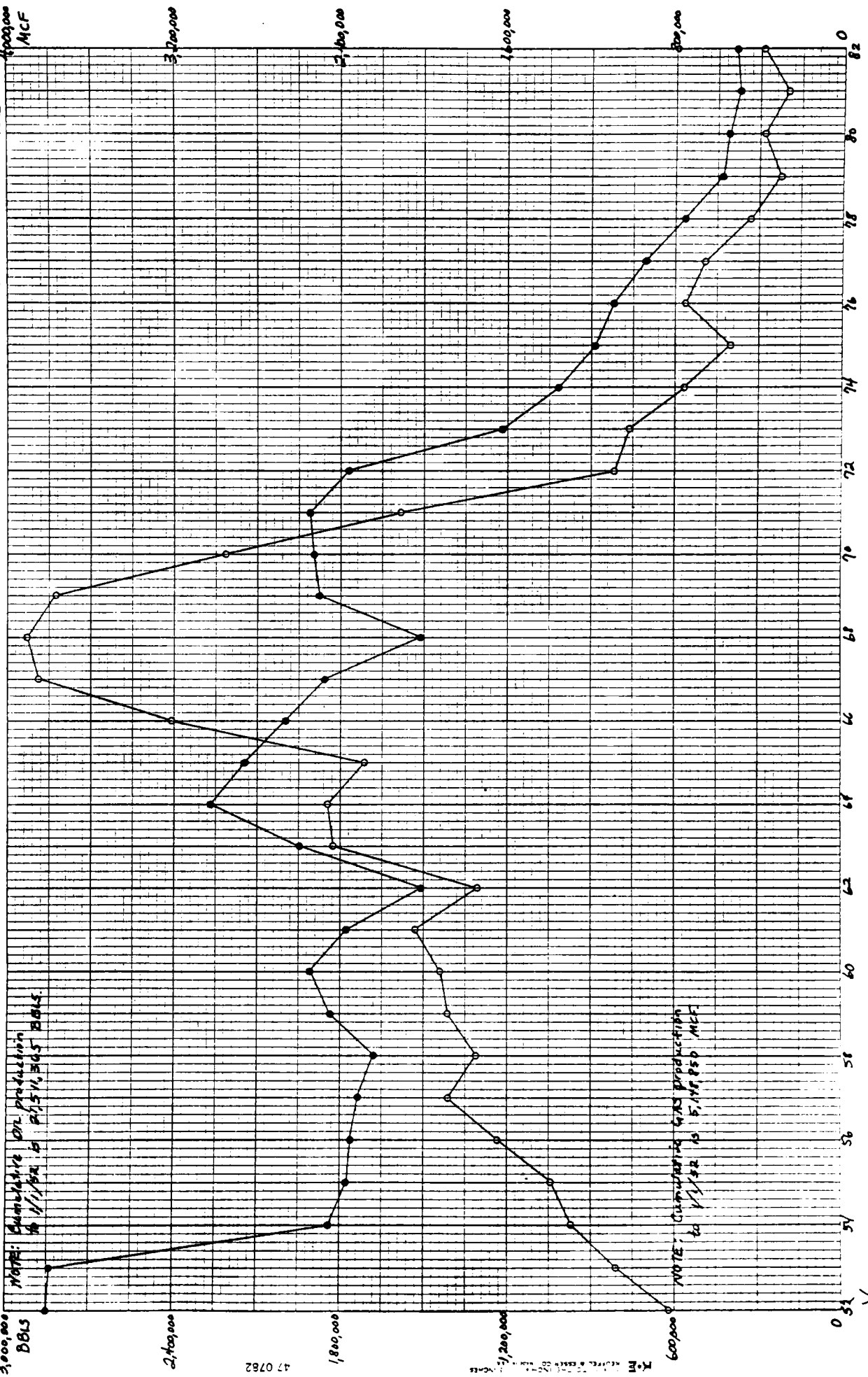


White River - Wasatch

Rate
BBLs

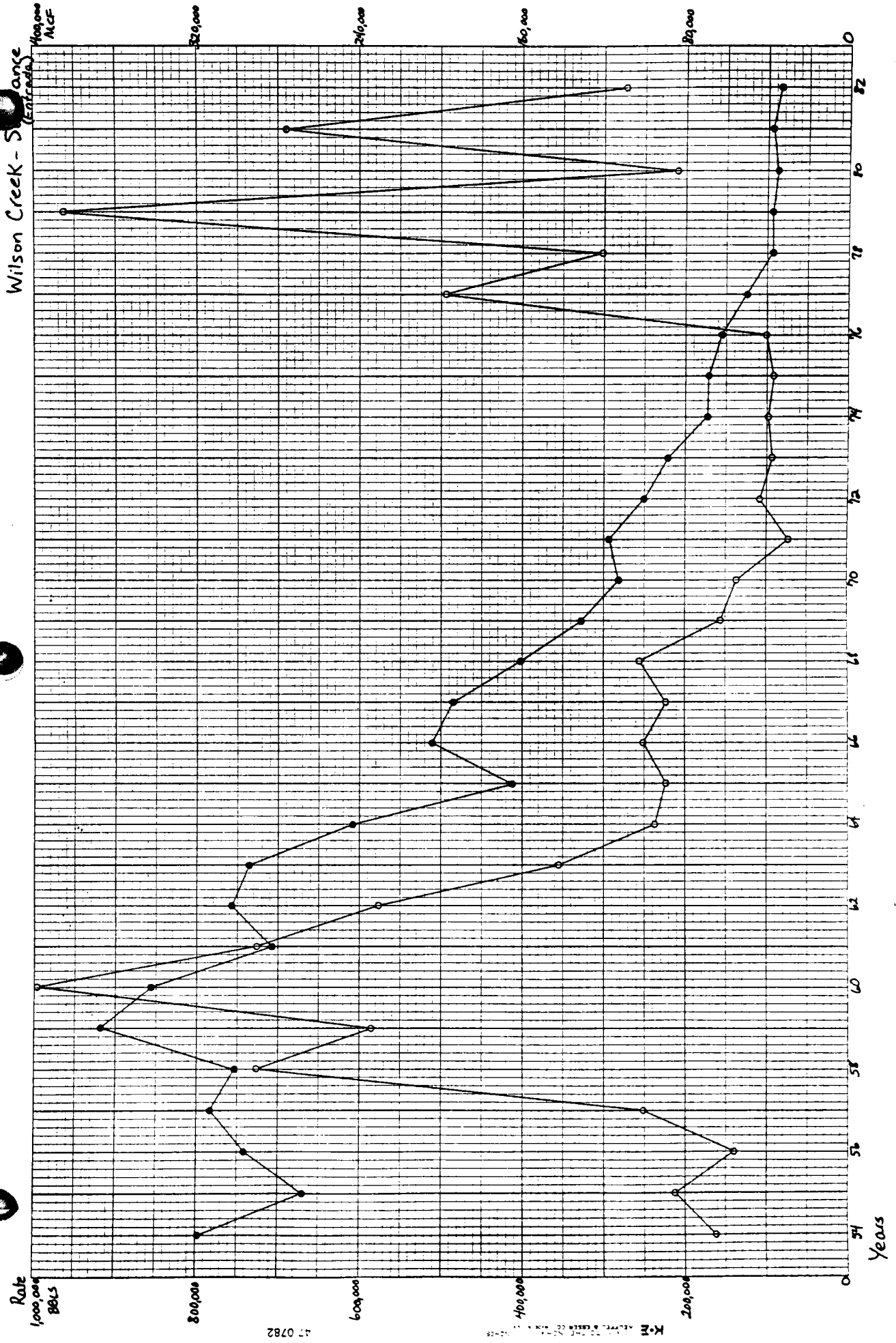
NOTE: Cumulative Oil production
to 11/82 is 2,511,365 BBLs.

Wilson Creek-McDon



NOTE: Cumulative GAS production
to 11/82 is 5,145,825 MCF.

Years



Other Publications

INFORMATION SERIES 10--Oil and Gas fields of Colorado: Statistical Data through 1981.
MAP SERIES 22--Oil and Gas fields map of Colorado, 1983, (1:500,000).
OPEN-FILE REPORT 84-3: Estimated Oil and Gas Reserves for Washington County, Colorado;
OPEN-FILE REPORT 84-4: Estimated Oil and Gas Reserves for Rio Blanco County, Colorado;
OPEN-FILE REPORT 84-5: Estimated Oil and Gas Reserves for Adams County, Colorado;
OPEN-FILE REPORT 84-6: Estimated Oil and Gas Reserves for Weld County, Colorado;
OPEN-FILE REPORT 84-7: Estimated Oil and Gas Reserves for Arapahoe County, Colorado;
OPEN-FILE REPORT 84-8: Estimated Oil and Gas Reserves for Baca County, Colorado;
OPEN-FILE REPORT 84-9: Estimated Oil and Gas Reserves for Cheyenne County, Colorado;
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