

OPEN FILE 84-12

ESTIMATED OIL AND GAS RESERVES FOR MOFFAT COUNTY, COLORADO

Compiled by
A. H. Scanlon

Funded by the Department of Local Affairs--
Division of Commerce and Development



Colorado Geological Survey
Department of Natural Resources
State of Colorado
Denver, Colorado
1984

OPEN FILE 84-12

ESTIMATED OIL AND GAS RESERVES FOR MOFFAT COUNTY, COLORADO

Compiled by
A. H. Scanlon

DOI: <https://doi.org/10.58783/cgs.of8412.ajll7524>

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
1984

Acknowledgments

I would like to thank the staff of the Colorado Oil & Gas Conservation Commission (C.O.G.C.C.) who provided considerable assistance during the course of this compilation, and the staff of the Colorado Geological Survey, who assisted in the manuscript preparation.

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.

This project was completed by the staff of the Colorado Geological Survey as part of a grant from the Department of Local Affairs - Division of Commerce and Development.

A. H. Scanlon
Senior Geologist

Contents

	<u>Page</u>
Introduction	1
Method of Approach	3
Oil Reserve Calculations	3
Gas Reserve Calculations	4
Results	4
Reference List	9

Tables

Table I	Summary of Secondary Recovery Projects by Injected fluids in Moffat County	3
Table II	Reserve Data for Moffat County	6

Figures

Fig 1.	County Location Map	2
Appendix I-	Field-Horizon Historical Production Decline Curves for Moffat County	10

ESTIMATED OIL AND GAS RESERVES FOR MOFFAT COUNTY, COLORADO

Introduction

This report is the tenth* 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 Moffat County, located in the northwestern corner of Colorado, partially with the Sand Wash Basin. Moffat County covers 4,761 square miles. In this county, oil and/or gas are produced from, in descending order of age, the Wasatch Sandstone, Ft. Union Sandstone, Lance Sandstone, Lewis Shale, Mesaverde Sandstone, Niobrara Limestone, Frontier Sandstone, Mancos Shale, Dakota Sandstone, Morrison Sandstone, Curtis Sandstone, Entrada Sandstone, Sundance Sandstone, Nugget Sandstone, Shinarump Conglomerate and Weber Sandstone.

There are 28 fields considered active producers as of September 30, 1983. Of these, 11 are classified as oil fields (based on cumulative gas-oil ratio (GOR) of <15:1), and 17 are classified as gas fields (based on cumulative GOR >15:1).

Three of the 28 oil fields are currently undergoing secondary recovery by injected fluids. These projects are listed in Table I, which includes the amount of injected fluid for 1982 and the cumulative amount injected through 1982.

* Refer to:

- 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 84-6: Estimated Oil and Gas Reserves for Adams County, Colorado;
- OPEN-FILE REPORT 84-7: Estimated Oil and Gas Reserves for Weld County, Colorado;
- OPEN-FILE REPORT 84-8: Estimated Oil and Gas Reserves for Arapahoe County, Colorado;
- OPEN-FILE REPORT 84-9: Estimated Oil and Gas Reserves for Baca County, Colorado.
- OPEN-FILE REPORT 84-10: Estimated Oil and Gas Reserves for Cheyenne County, Colorado.
- OPEN-FILE REPORT 84-11: Estimated Oil and Gas Reserves for Garfield County, Colorado; and
- OPEN-FILE REPORT 84-12: Estimated Oil and Gas Reserves for La Plata County, Colorado.

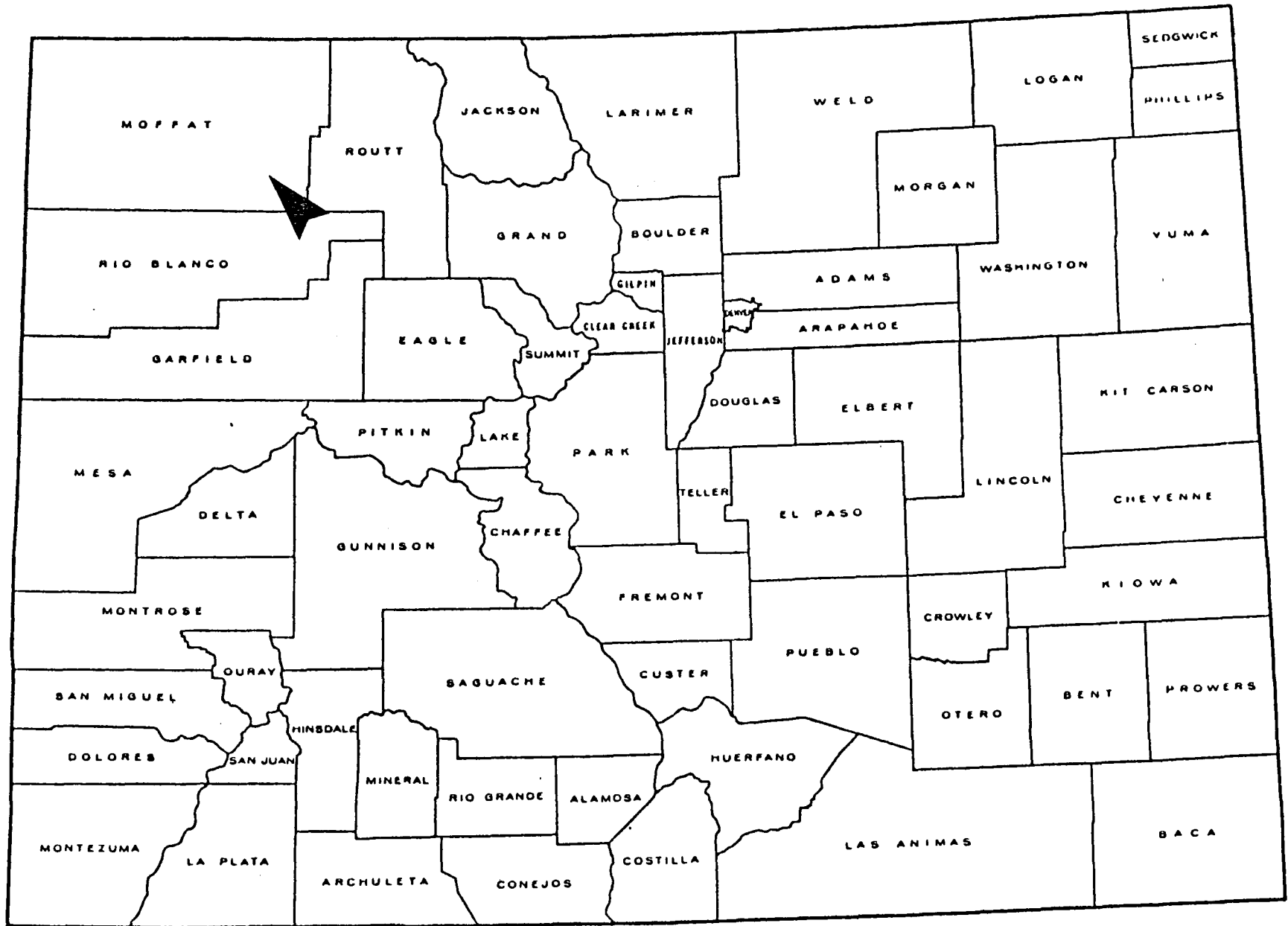


Figure 1. County Location Map

TABLE I

Summary of Secondary Recovery Projects
by Injected Fluids
for Moffat County

Field Name/ Horizon	Operator	Initial Inj. Date	Injected Water (bbls) 1982	Cumulative through 1982
Danforth Hills/ Morrison	Texaco	3-16-62	1,882,840	5,090,730
Danforth Hills/ Sundance	Texaco	6-13-63		16,724,440
Moffat-Dakota	Texaco	11-29-63	66,954	5,209,932
Powder Wash/ Wasatch	Mountain Fuel Supply	5-29-68	410	1,491,707

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 42 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. All production decline curves are plotted as rate (annual production in barrels of oil or MCF of gas) versus time (in years). The rate scale was adjusted to accommodate each field-horizon.

Oil Reserve Calculations

There are 21 oil field-horizons. Production histories have allowed for decline rates to be calculated for 20 of these. The remaining field-horizon, Maudlin gulch-Weber, has been shut-in for 17 of the past 18 years, therefore, no reserve calculations could be made. For the previously mentioned 20 fields, decline rates were determined based on actual past production and recorded, see Table II. These decline rates were then applied to the equation:

$$R_r = \frac{q_1 - q_f}{-\ln(1-dy)}$$

where: R_r = remaining reserves
 q_1 = 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. These values are listed in Table II.

Note: the final economic production rate used was one barrel of oil per day per well, for one year; therefore 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.

No adjustments were necessary for the three fields undergoing water injection. They have all had a substantial amount of time to level off since injection began, therefore not affecting the current decline rates calculated.

Gas Reserve Calculations

There are 21 gas field-horizons. Production histories have allowed for decline rates to be calculated for 19 of these. The remaining 2 field-horizons have not produced for a long enough time (less than 3 years) to determine a reliable decline rate. Decline rates were determined for the previously mentioned 19 field-horizons (see Table II) 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 the associated oil production, where this production was significant, the same method to determine estimated oil reserves was used, as discussed in the previous section. Whether oil production was considered significant or not was determined by the author. In all cases, if oil production indicated any kind of trend, reserves were calculated. A few cases arose where oil production, though a trend was indicated, did not exceed the economic limit (as discussed previously) of one barrel of oil per day per year, and therefore no reserve estimate was calculated, or an economic limit of zero was used.

Results

The following figures are for those field-horizons for which reserves could be calculated. Estimated oil reserves for Moffat County totaled 6,258,073 barrels. Estimated gas reserves for Moffat County totaled 221,910,846 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.

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 or demand.

In nine to ten years, roughly half of the estimated oil reserves in Moffat County will have been produced. Roughly one half of the estimated gas reserves for the next 20-year period are expected to be produced in seven to eight years.

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 (6.85 percent per year for oil and 6.3 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 (11,994 Bbls. of oil and 120,178 MCF of gas) additional reserves of 158,739 Bbls. of oil and 1,388,457 MCF of gas were obtained. This gives total county reserves (Class I and II) of 6,416,812 Bbls. of oil and 223,299,303 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 I
OPEN FILE 84-12
RESERVE DATA FOR MOFFAT COUNTY

FIELD NAME/ PRODUCING HORIZON LOCATION	DATE OF DISCOVERY	TYPE OF DRIVE	Dy	CUMULATIVE PRODUCTION 12/31/82		ESTIMATED RESERVES		ULTIMATE RECOVERABLE		REMARKS
				OIL (Bb1s.) ()Condensate (Bb1s.)	GAS (MCF)	OIL (Bb1s.)	GAS (MCF)	OIL (Bb1s.) ()Condensate (Bb1s.)	GAS (MCF)	
1. Big Hole/ Lewis	10N-94W 1973	Depletion	13.0 -o 7.1 -g	(22,721)	3,247,189	(8,559)	3,455,467	(31,280)	6,702,656	Econ.Limit= 3 wells.
2. Big Gulch/Mesa- verde-Frontier	7N-93W 1964		14.2 -g	(4,182)	3,055,670		178,198	(4,182)	3,233,868	
3. Black Mountain/ Lewis	10N-90W 1981			187 (9)	47,940					N.P.
4. Blue Gravel/ Lewis	9N-91W 1969	W. D. & Gas Exp.	8.4 -g	(767)	3,533,977		2,129,901	(767)	5,663,878	
5. Buck Peak/ Mancos	6N-90W 1957		14.2 -o 12.7 -g	1,643,231	1,865,521	99,540	66,843	1,742,771	1,932,364	
6. Buck Peak/ Niobrara	6N-90W 1972		8.4 -o 9.8 -g	1,947,742	2,244,737	939,686	1,900,767	2,887,428	4,145,504	
7. Craig Dome/ Frontier	6N-91W 1932			(466)	1,505,389					SI 1982,1983
8. Craig North/ Lewis	8N-90W 1967	Gas Exp.	10.8 -o 6.3 -g	3,779 (21,145)	11,624,520	12,451	12,133,559	16,230 (21,145)	23,758,079	
9. Danforth Hills/ Morrison	5N-95W 1954		5.8 -o 9.1 -g	1,058,453	145,173	109,941	20,458	1,168,394	165,631	
10. Danforth Hills/ Shinarump	5N-95W 1979		31.2 -o 31.2 -g	42,282	6,760	22,029	3,889	64,311	10,649	
11. Danforth Hills/ Sundance	5N-95W 1958		13.6 -o 15.0 -g	1,711,555	37,150	95,996	2,249	1,807,551	39,399	
12. Danforth Hills/ Weber	5N-95W 1960		7.1 -o 25.0 -g	408,366	8,575	354,993	1,902	763,359	10,477	
13. Danforth Hills North/Morrison	5N-95W 1958		3.9 -o 4.2 -g	375,629	116,983	130,088	24,139	505,717	141,122	
14. Elk Springs/ Weber	5N-98W 1926		10.9 -o	541,179	13,030	61,788		602,967	+13,030	
15. Great Divide/ Middle Lewis	9N-93W 1978	Gas Exp. & W. D.	24.2 -o 6.7 -g	(13,705)	1,903,823	(4,674)	3,577,067	(18,379)	5,480,890	
16. Hiawatha/ Entrada-Nugget	12N- 100W 1926		14.0 -g		1,603,643		3,252,345		4,855,988	
17. Hiawatha/ Fort Union	12N- 100W 1926		10.0 -o 4.5 -g	76,560 (91,102)	18,047,141	20,064	9,689,212	96,624 (91,102)	27,736,353	
18. Hiawatha/ Wasatch	12N- 100W 1926		3.5 -o 2.4 -g	3,543,960 (59,135)	94,903,539	554,661	22,302,515	4,089,621 (59,135)	117,206,054	Econ.Limit= 4 wells
19. Hiawatha West/Fort Union- Lewis-Lance-Mesa- verde-Wasatch	12N-100 & 101W 1958		5.4 -o 5.1 -g	11,022 (199,706)	131,942,856	58,779	41,067,895	69,801 (199,706)	41,067,895	
20. Horse Gulch/ Shinarump	5N-91W 1980		41.5 -o	11,184		5,383		16,567		
21. Iles/Curtis	4N-92W 1963		5.5 -o	63,271		20,240		83,511		

Used Actual 1983
Prod. thru 9/83
rather than 1982
Prod.

OPEN FILE 84-12
MOFFAT COUNTY

FIELD NAME/ PRODUCING HORIZON	LOCATION	DATE OF DISCOVERY	TYPE OF DRIVE	Dy	CUMULATIVE PRODUCTION 12/31/82			ESTIMATED RESERVES			ULTIMATE RECOVERABLE			REMARKS
					OIL (Bb1s.) ()Condensate (Bb1s.)	GAS	MCF	OIL (Bb1s.)	GAS	(MCF)	OIL (Bb1s.) ()Condensate (Bb1s.)	GAS	(MCF)	
22. Iles/ Morrison	4N-92W	1924		12.4 -o	1,335,001	55,186		1,246			1,336,247	+55,186	Econ.Limit= 0 wells.	
23. Iles/ Sundance	4N-92W	1954		3.5 -o 18.7 -g	16,897,438	1,989,510		1,299,233	26,018		18,196,671	2,015,528	Econ.Limit= 2 wells.	
24. Irish Creek/ Mesaverde	12N-99W	1981				21,301							N.P.	
25. Lay Creek/ Lower Mesaverde	8N-92&93W	1972			(25)	5,862,354			1,588,026		(25)	7,450,380		
26. Maudlin Gulch/ Dakota	4N-95W	1966	W. D.	10.4 -o 8.4 -g	4,332,728	908,561		276,438	152,217		4,609,166	1,060,778		
27. Maudlin Gulch/ Morrison-Sundance	4N-95W	1947	W. D.	5.9 -o 6.7 -g	2,511,920	353,712		403,028	8,757		2,914,948	362,469		
28. Maudlin Gulch/ Weber	4N-95W	1957			11,753								N.P. oil Prod. '57-'62, 1983 - Gas, Prod. '63-'64.	
29. Moffat/Shinarump-Dakota-Sundance	5N-91W	1924		4.5 -o 5.9 -g	8,359,787	82,886		163,149	4,468		8,522,936	87,354		
30. Moffat/ Niobrara	5N-91W	1962		4.1 -o	96,390	14,031		25,320			121,710	+14,031		
31. Pole Gulch/ Lewis	12N-92W	1966		8.7 -o 11.1 -g	4,494 (1,385)	6,618,424		417	697,539		4,911 (1,385)	7,315,963		
32. Powder Wash/ Fort Union	11&12N - 97W	1931		7.5 -o 6.2 -g	855,089 (814,573)	109,275,286		1,261,070	86,277,863		2,116,159 (814,573)	195,553,149	Econ.Limit= 16 wells.	
33. Powder Wash/ Wasatch	11&12N-97W	1931		8.8 -o 8.5 -g	4,505,145 (409,566)	83,770,820		149,715	9,937,196		4,654,860 (+409,566)	93,708,016	Econ.Limit= 4 wells.	
34. Shell Creek/ Nugget	11N-100W	1977		12.5 -g	(110)	2,994,521			2,223,653		(+110)	5,218,174		
35. Sugar Loaf/ Ft. Union	12N-101W	1953			517 (2,143)	277,259								
36. Sugar Loaf/ Mesaverde	12N-101W	1954		6.8 -o 5.1 -g	2,928 (248,694)	61,707,153		25,020	19,239,973		27,948 (248,694)	80,947,126	Econ.Limit= 3 wells.	
37. Temple Canyon/ Shinarump	4N-95W	1964		15.9 -o	177,723	19		45,453			223,176	+19		
38. Thornberg (Marapos)/Weber	3N-91W	1955			753,686	6,420,032			153,254		+753,686	6,573,286		
39. Waddle Creek/ Niobrara	4N-90W	1964		4.8 -g 9.8 -o 9.4 -g	424,127	22,662		101,085	111,482		525,212	134,144		
40. Westside Can- al/Lance-Lewis	12N-92W	1967		36.0 -g	210	3,230,830			862,980		+210	4,093,810		
41. Winter Valley/ Dakota	4N-98W	1960		16.6 -g	274,405	12,781,989			805,010		+274,405	13,586,999	Used 1983 Prod. thru 9/83 for 'a'.	
42. Winter Valley/ Weber	4N-98W	1979		24.0 -o 11.0 -g	31,345	6,407		8,027	16,004		39,372	22,411		
COUNTY TOTAL OF ESTIMATED RESERVES								6,258,073 Bb1s.	221,910,846 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 Moffat County. These graphs are presented in alphabetical order by Field name and then by producing horizons within each field.

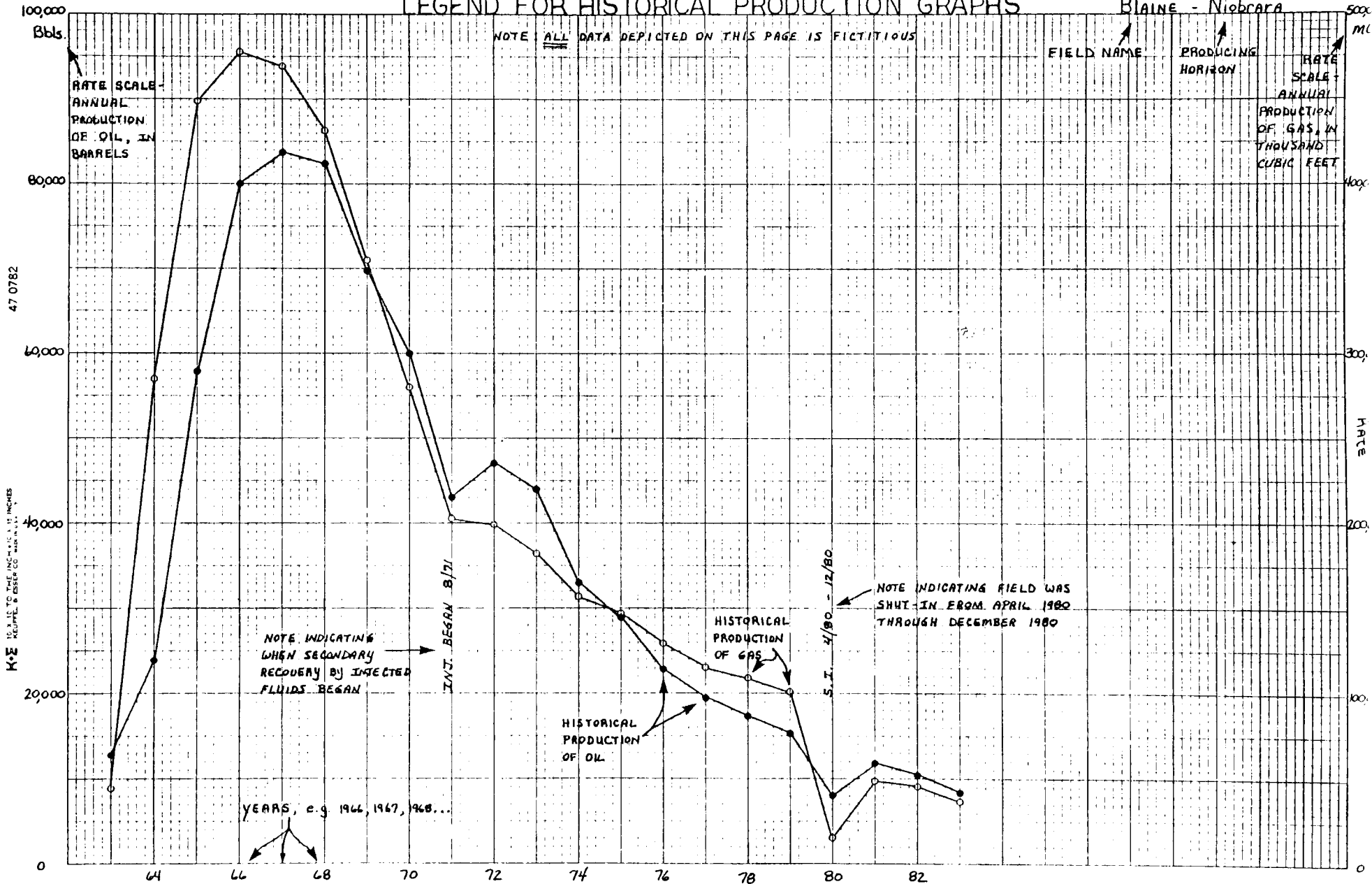
Note that only those fields actively producing as of 9-30-83 are included. Abandoned fields or field-horizons are not included.

LEGEND FOR HISTORICAL PRODUCTION GRAPHS

Blaine - Niobrara

NOTE ALL DATA DEPICTED ON THIS PAGE IS FICTITIOUS

FIELD NAME
 PRODUCING HORIZON
 RATE SCALE - ANNUAL
 PRODUCTION OF GAS, IN THOUSAND CUBIC FEET



47 0782

K&E 10.3.10 TO THE INCHES 11.11 INCHES
 K&E 10.3.10 TO THE INCHES 11.11 INCHES

RATE SCALE - ANNUAL PRODUCTION OF OIL, IN BARRELS

NOTE INDICATING WHEN SECONDARY RECOVERY BY INJECTED FLUIDS BEGAN

INTJ. BEGAN 8/71

HISTORICAL PRODUCTION OF OIL

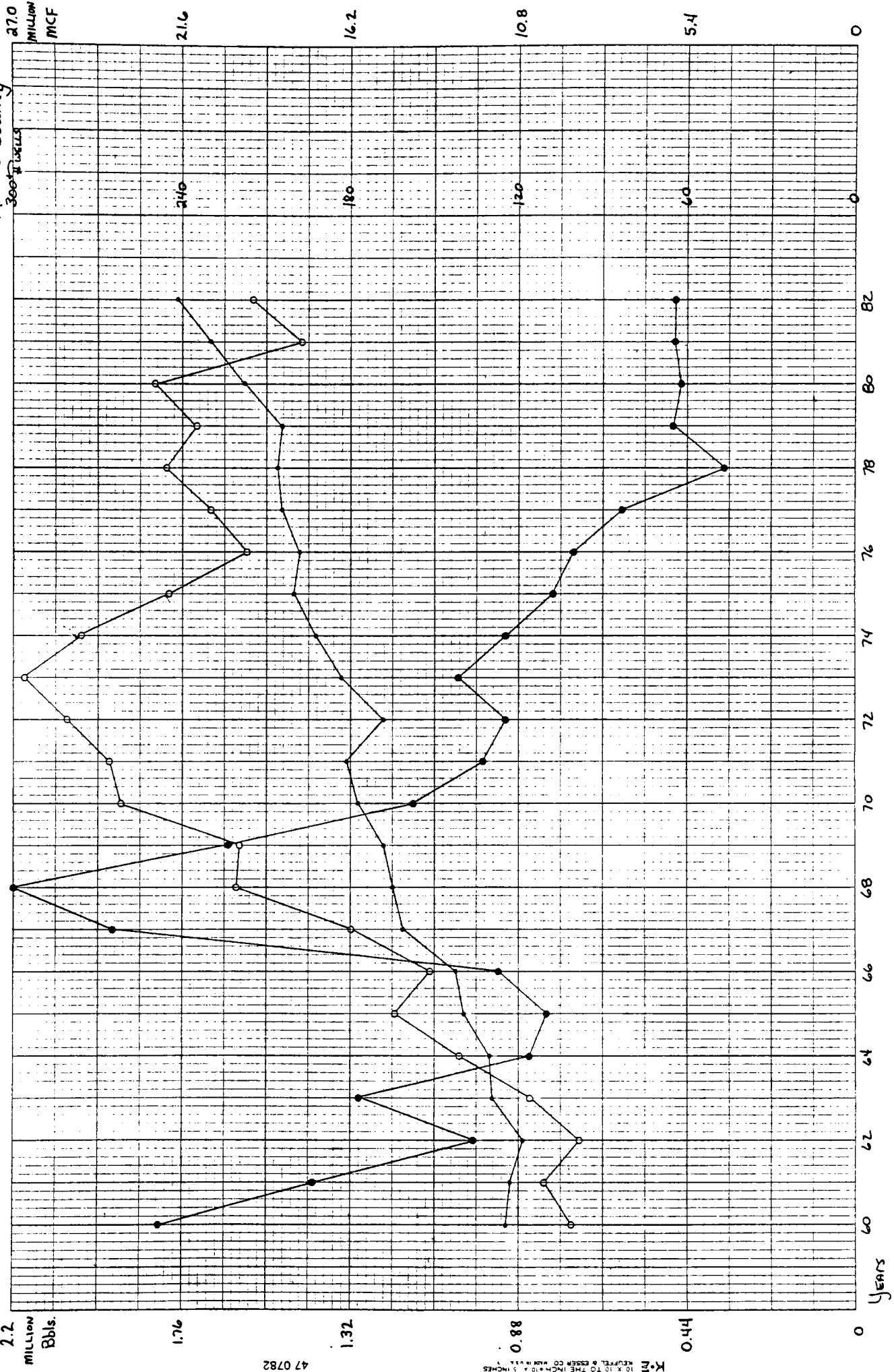
HISTORICAL PRODUCTION OF GAS

S.I. 4/80 - 12/80

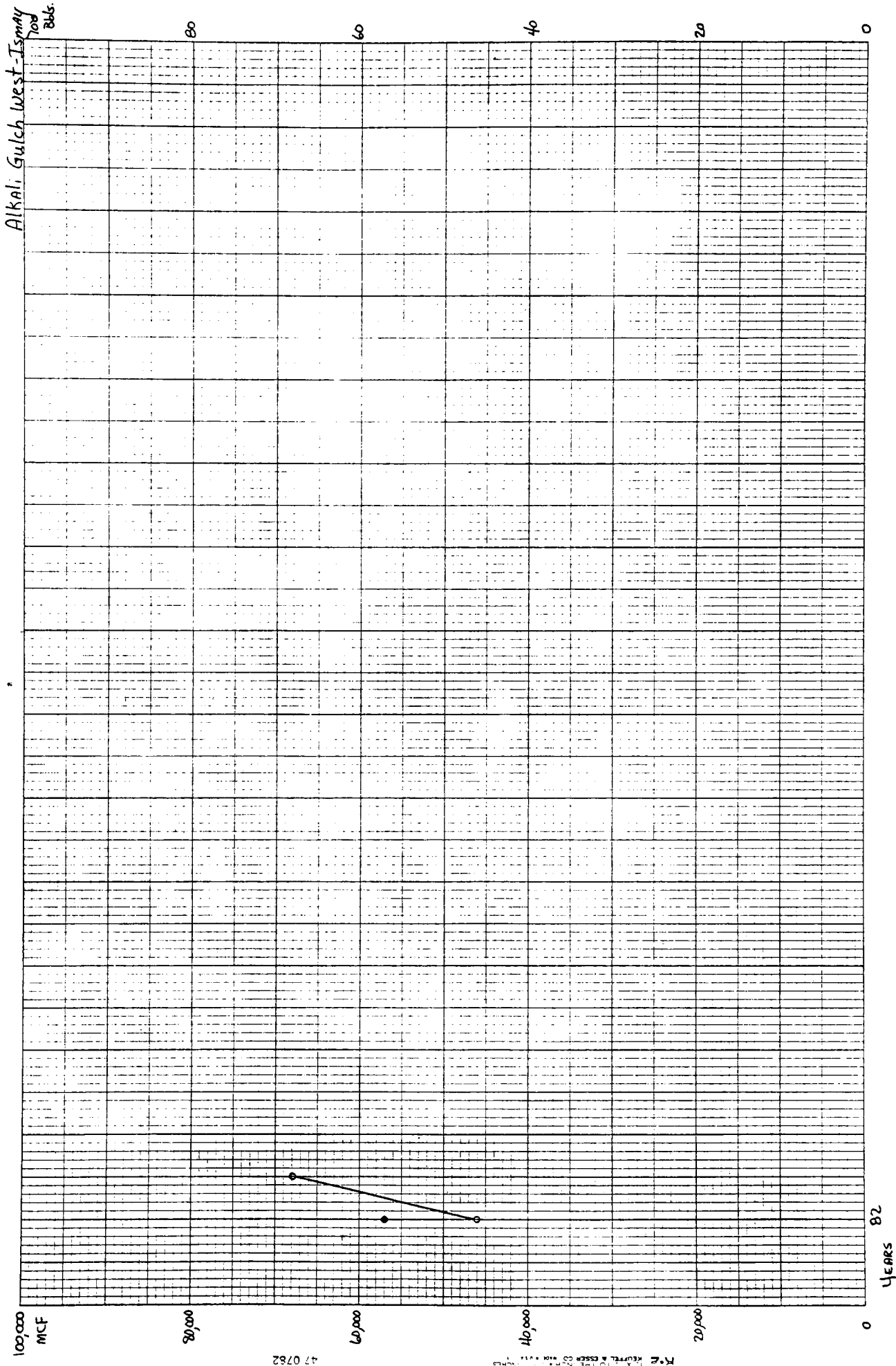
NOTE INDICATING FIELD WAS SHUT-IN FROM APRIL 1980 THROUGH DECEMBER 1980

YEARS, e.g. 1966, 1967, 1968...

Moffat County



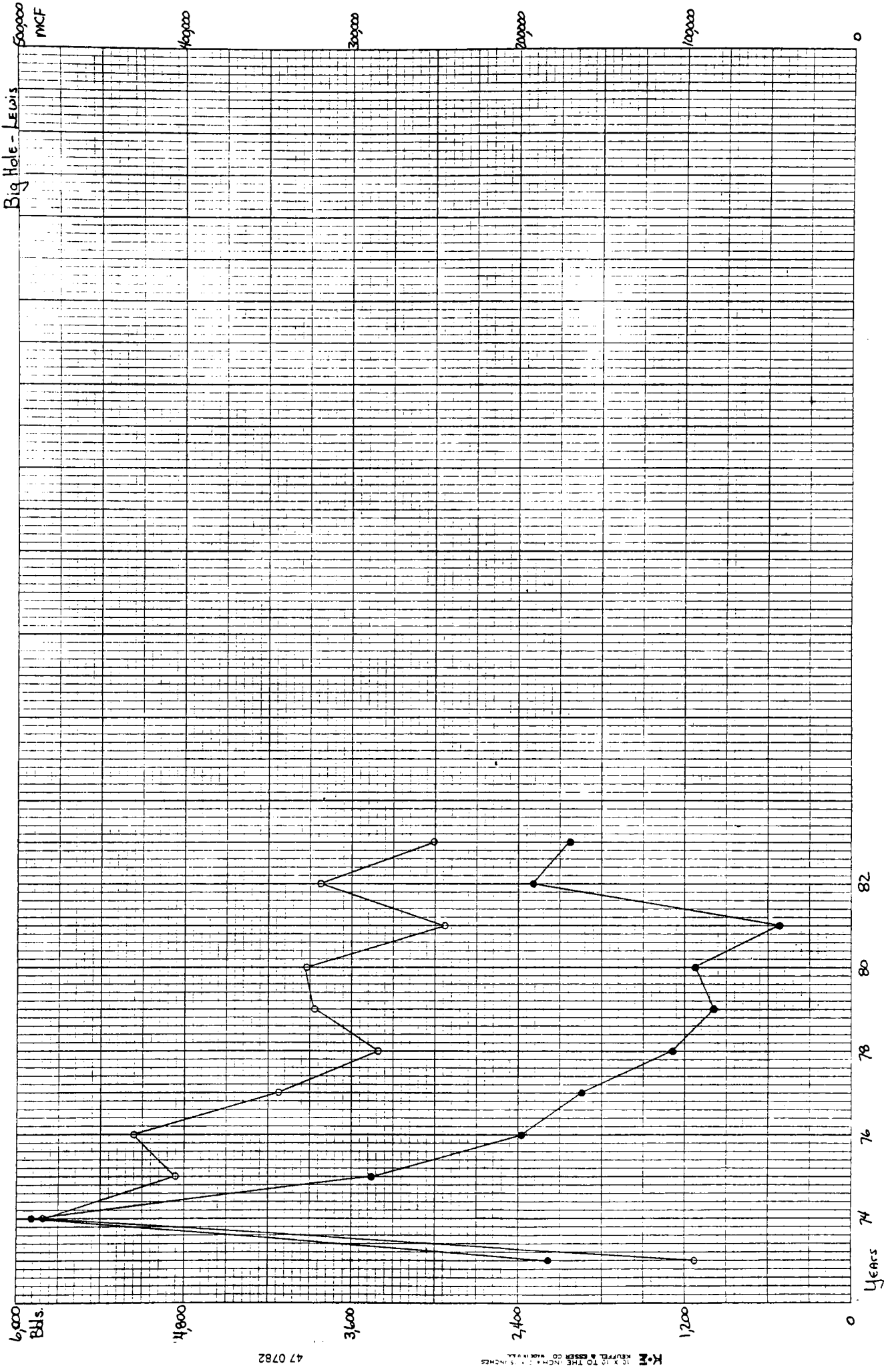
Alkali Gulch West - Ismny
100
866.



47 0782

R. L. KERRILL & SONS
TOLSON BLDG
WASHINGTON, D. C.

Years 82



47 0782

K-M
 1/2" x 1/2" TO THE INCH
 KEUFFEL & ESSER CO. BOSTON, MASS.

00009
 Bhs.

00084

00076

00072

00071

0

Big Gulch - Mesa Verde / Frontier

1.1 MILLION MCF

0.88

0.64

0.44

0.22

0

5,000 Bbls.

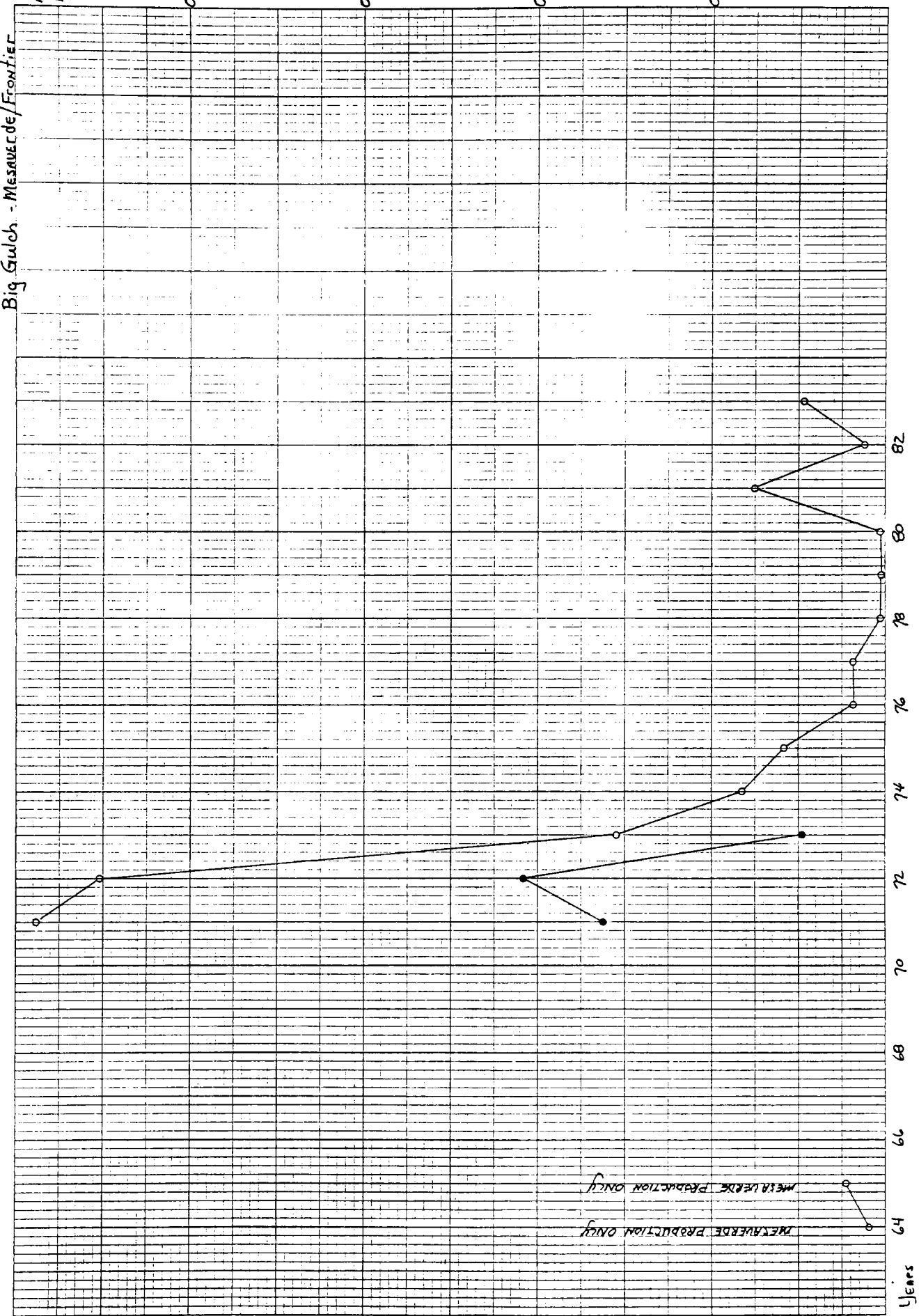
0000

0000

0000

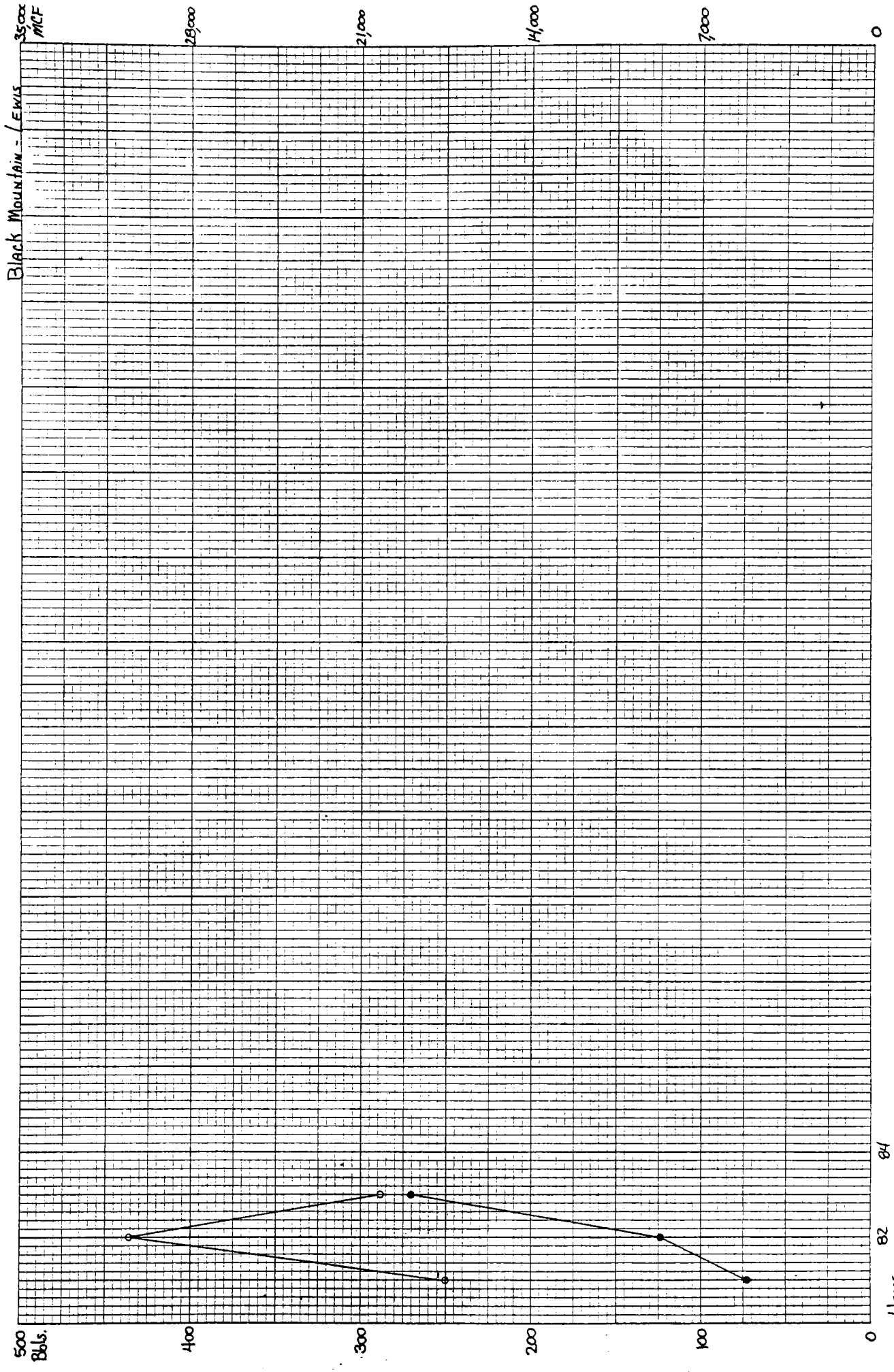
0001

0



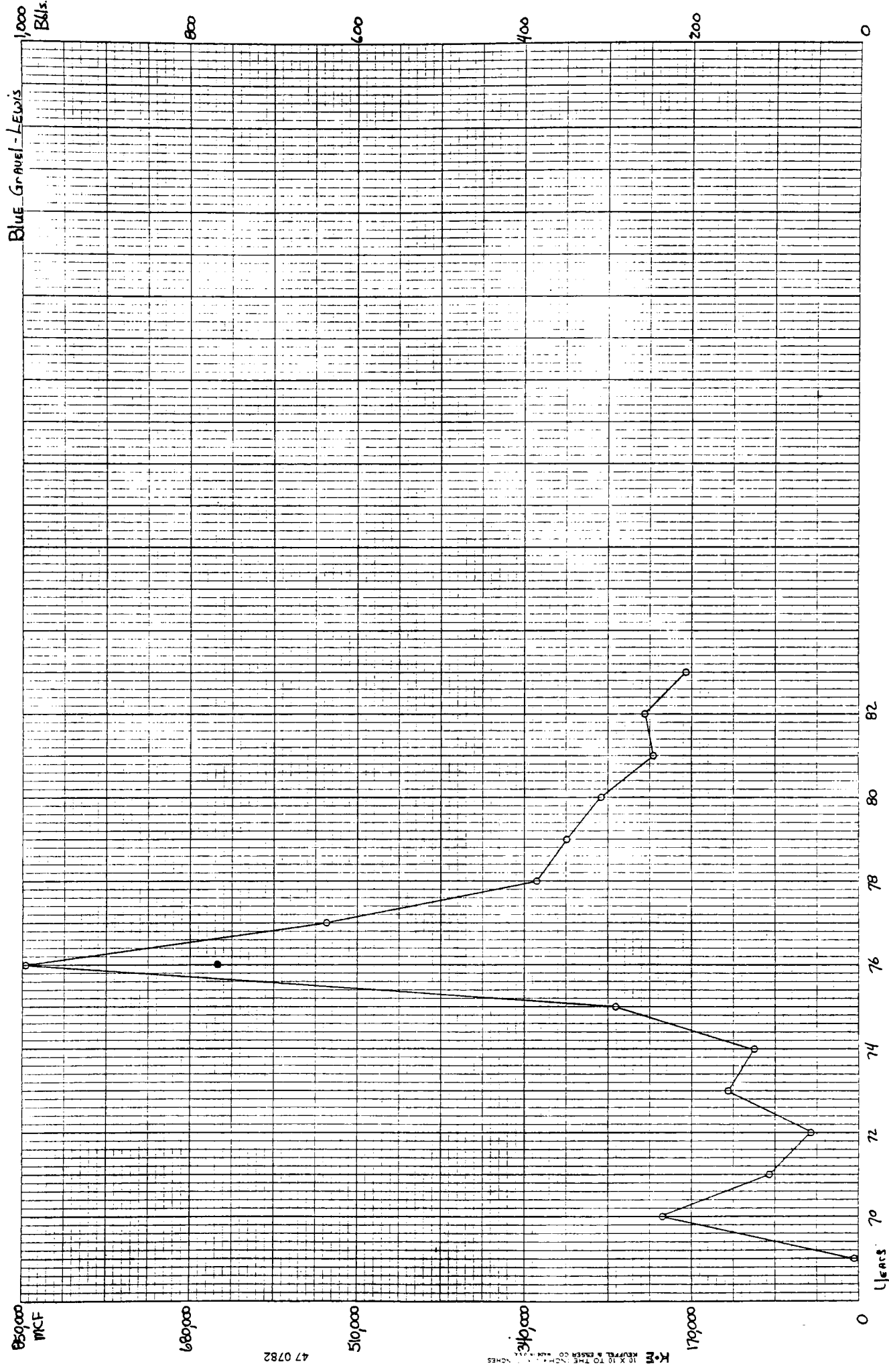
MESA VERDE PRODUCTION ONLY

MESA VERDE PRODUCTION ONLY



47 0782

K-M 10 X 10 TO THE INCH 4 10 X 15 INCH
 KEYPLOT & DRAW CO. SAN FRANCISCO, CALIF.



47 0782

K-E 10 X 10 TO THE INCHES
KEUFFEL & ESSER CO. NEW YORK, N.Y.

850,000
MCF

000,000

510,000

000,000

170,000

0

70

72

74

76

78

80

82

84

86

88

90

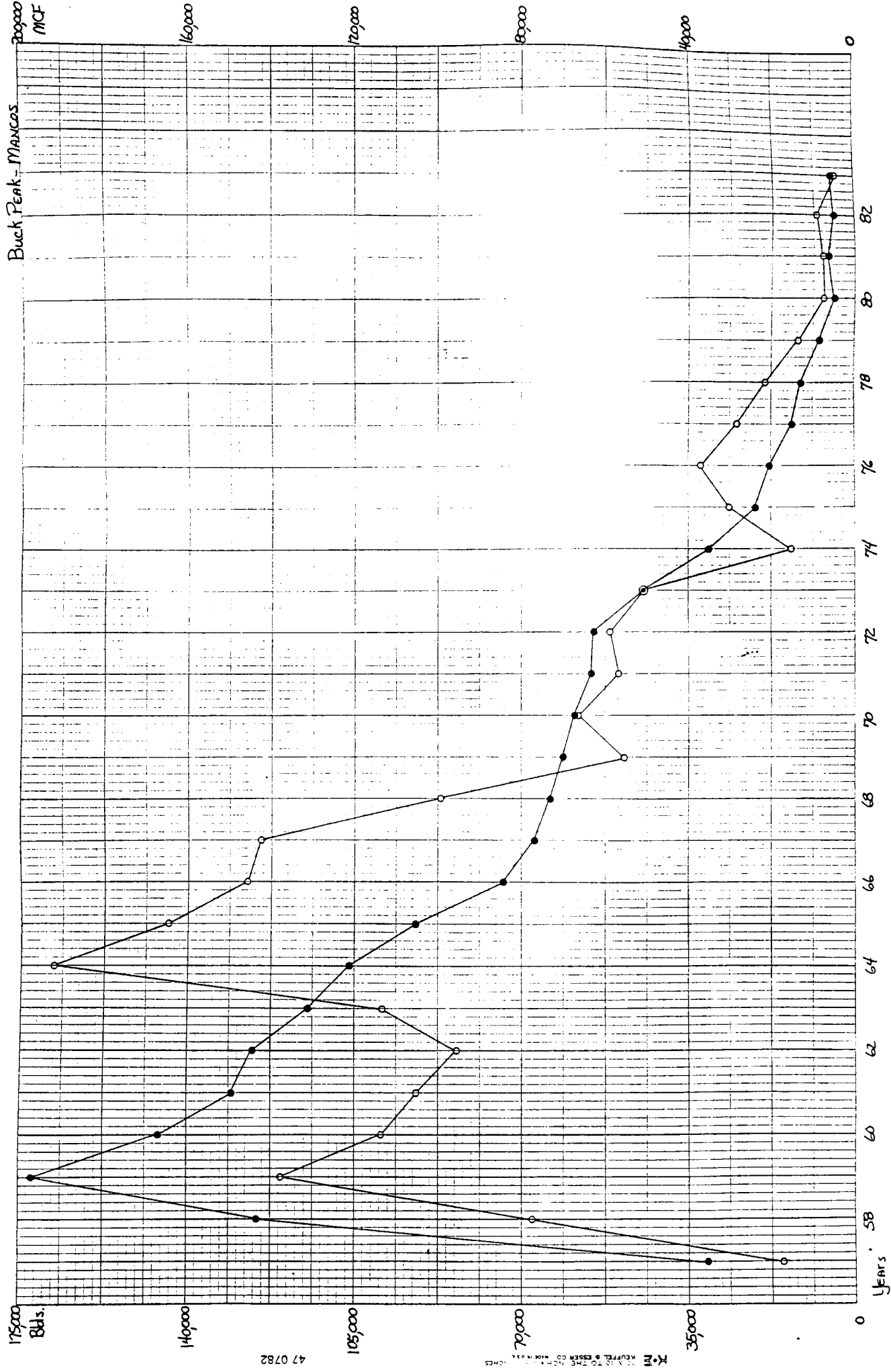
92

94

96

98

0



175000 Rls.

000091

000501

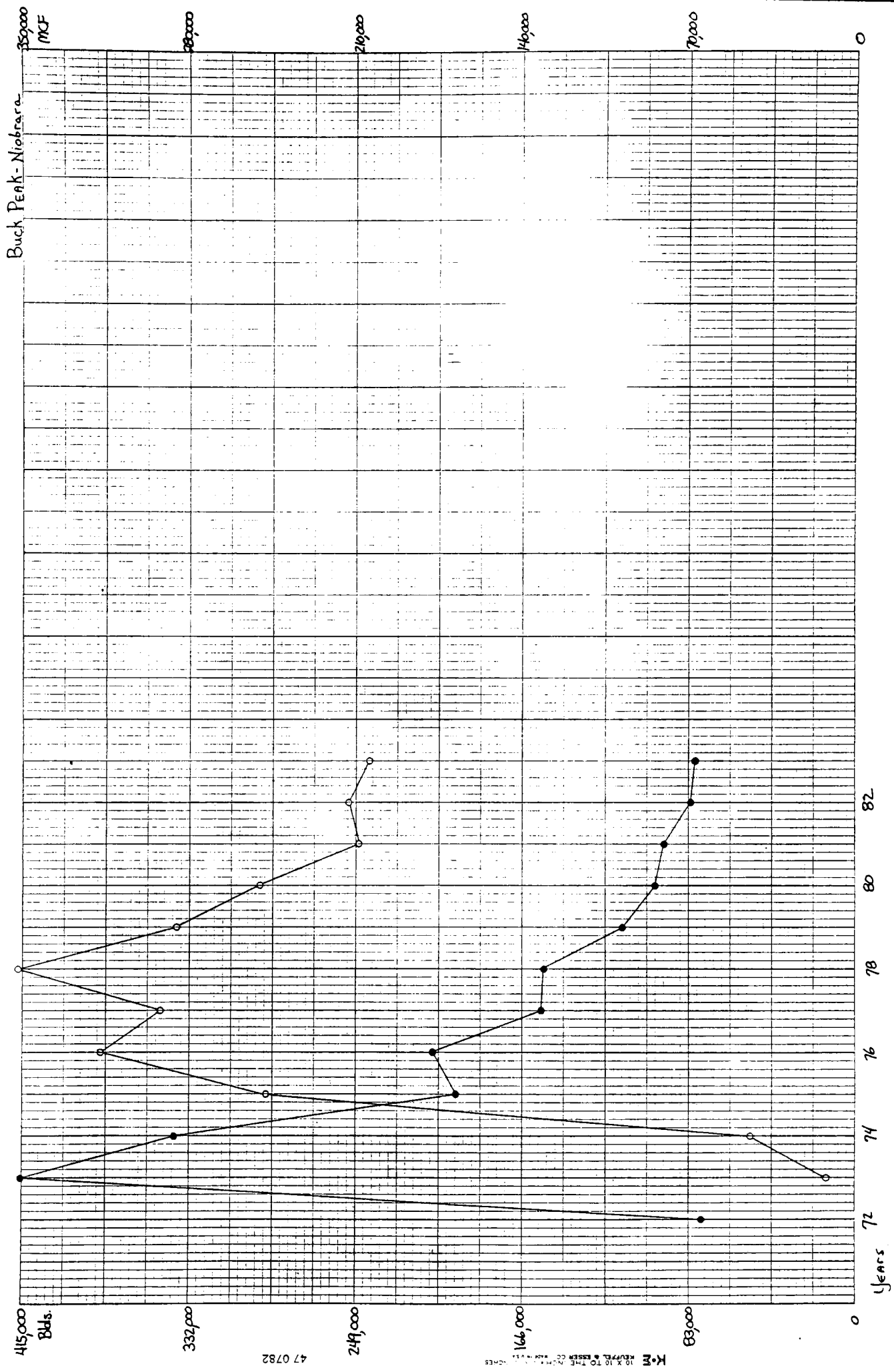
0000

00050

0

47 0782

K.M. KUPEL & ESSER CO. NEW YORK, N.Y.



415,000
Bbls.

332,000

249,000

166,000

83,000

47 0782

H·M
10 X 10 TO THE NORTH
KUPPEL & ESSER CO. MINN. U.S.A.

Years

72

80

78

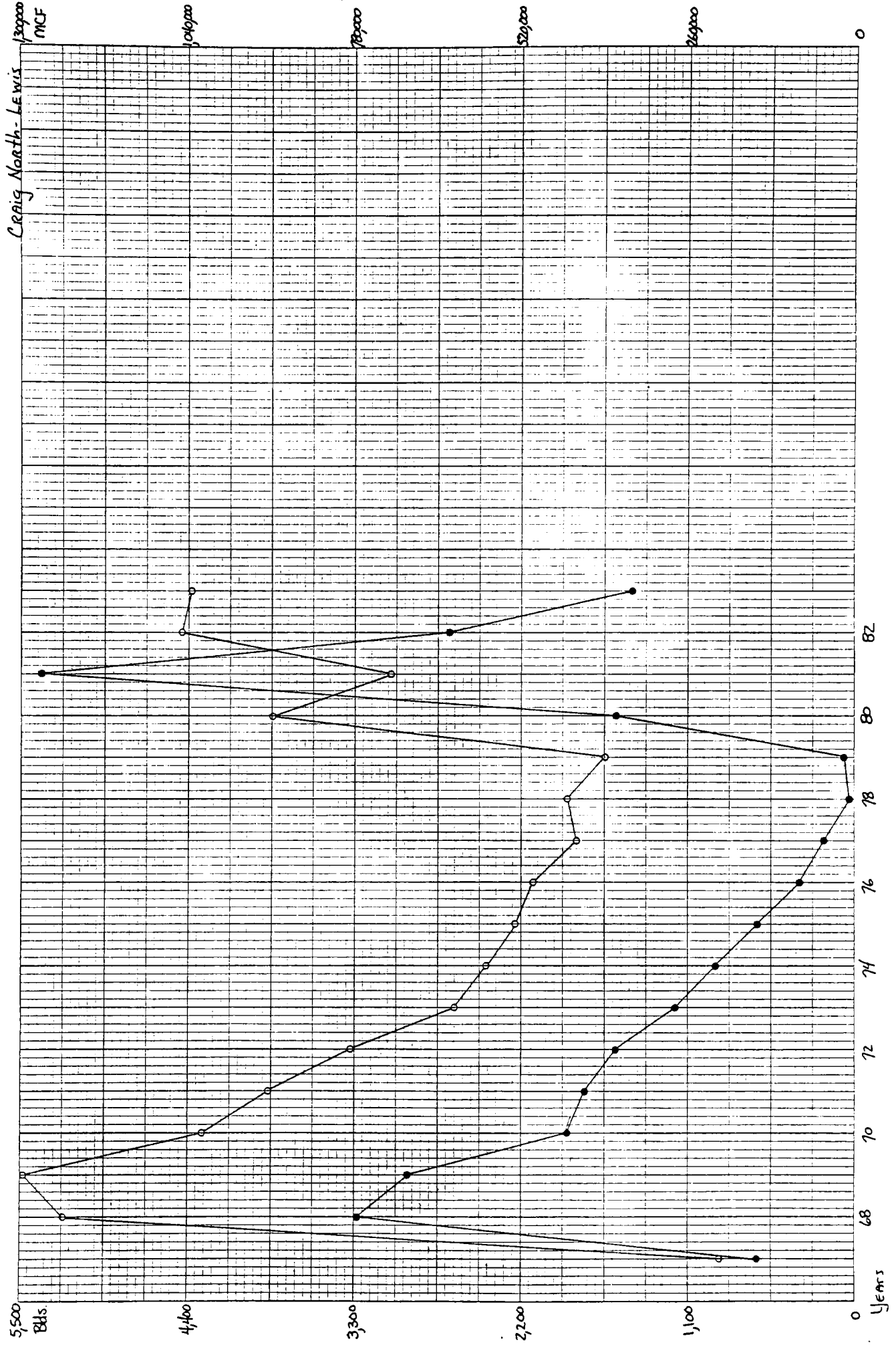
76

74

72

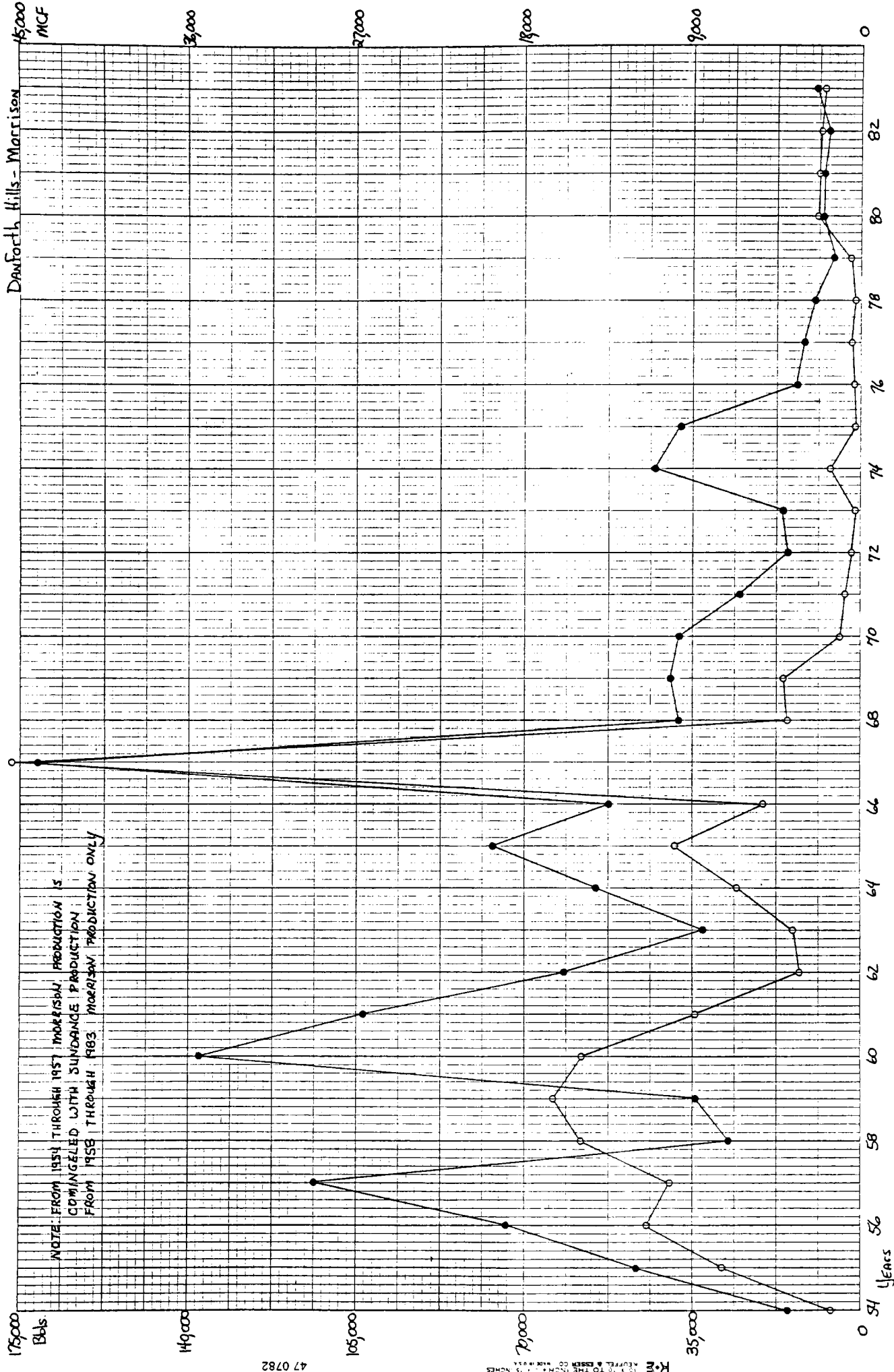
0

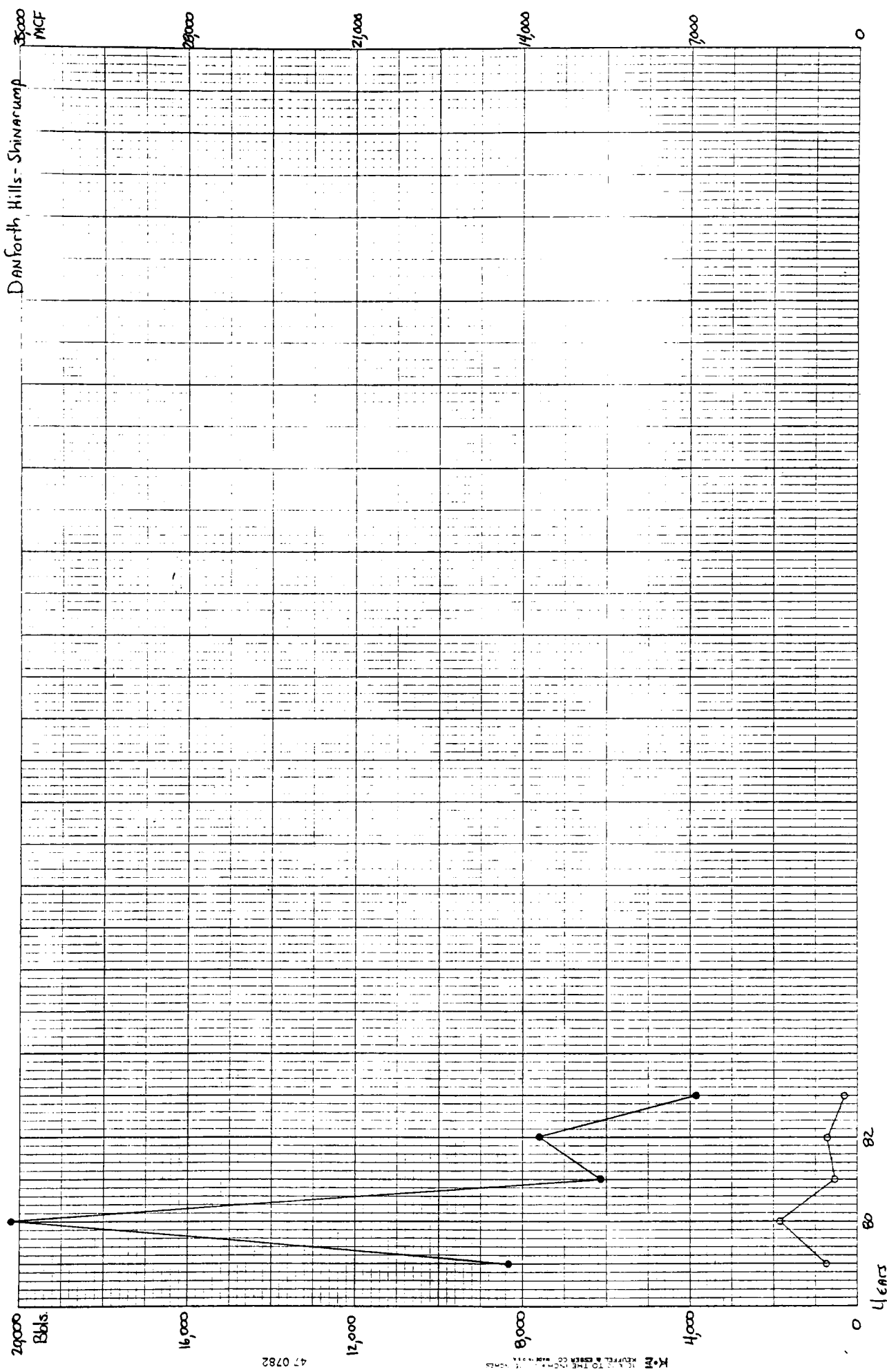
0



47 0782

K·E·M REUFEL & BROSCH CO. MINNEAPOLIS, MINN.





47 0782

K. M. KUPFER & SONS CO. MINNAPOLIS, MINN.

20000
Bbls

0000 91

0000 21

0000 8

0000 1

0

28

08

YEARS

0

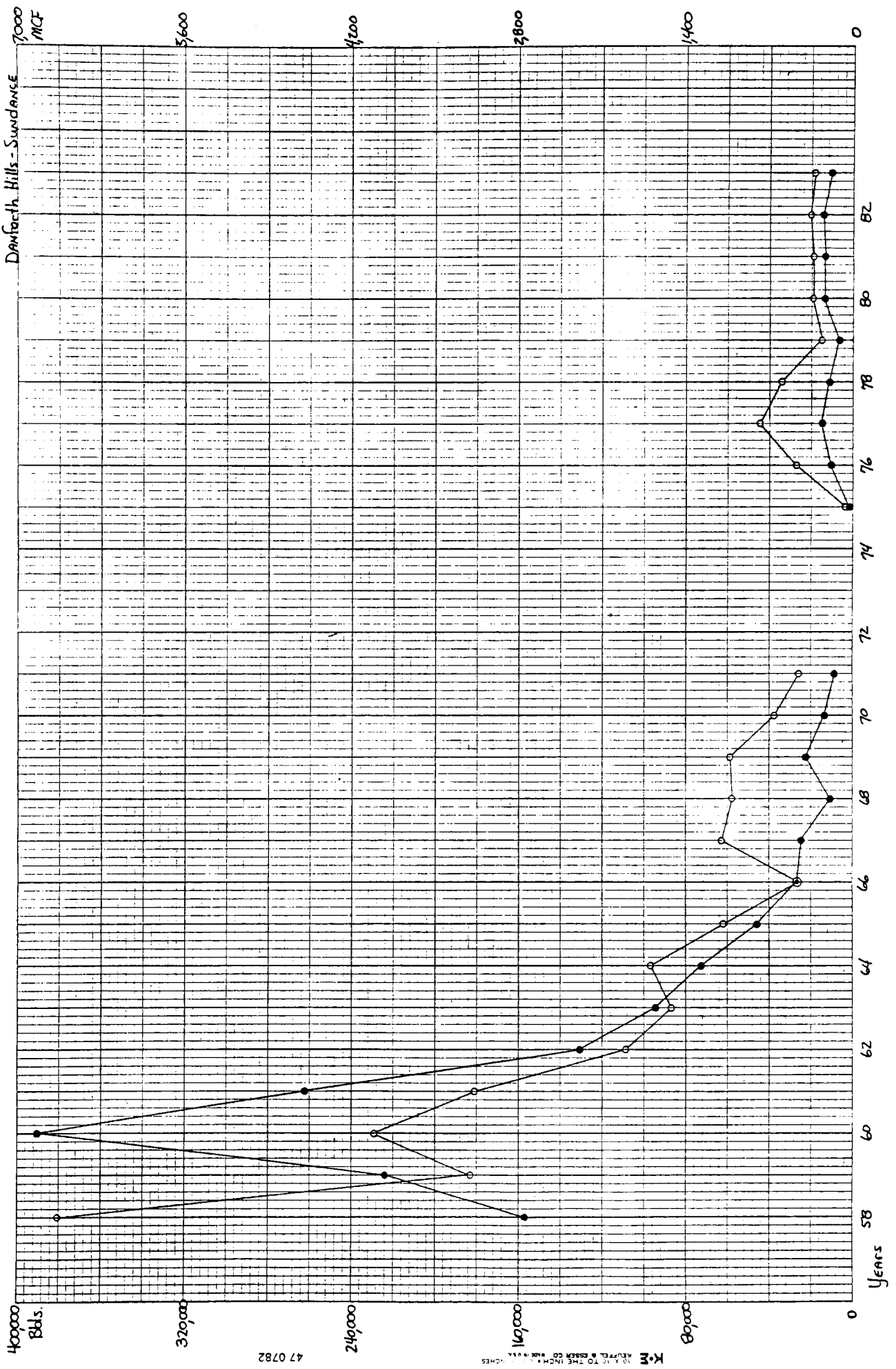
7000

14000

21000

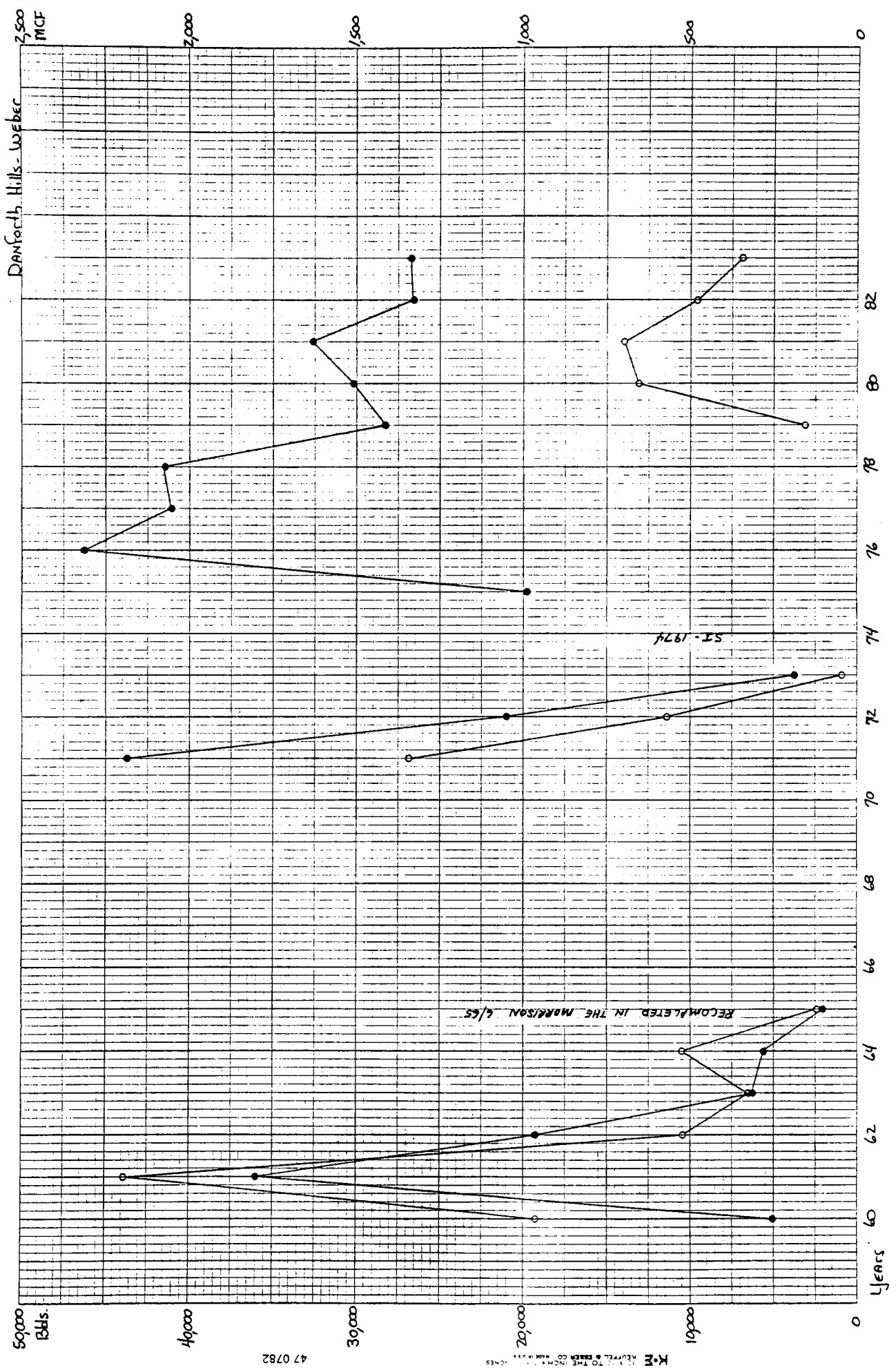
28000

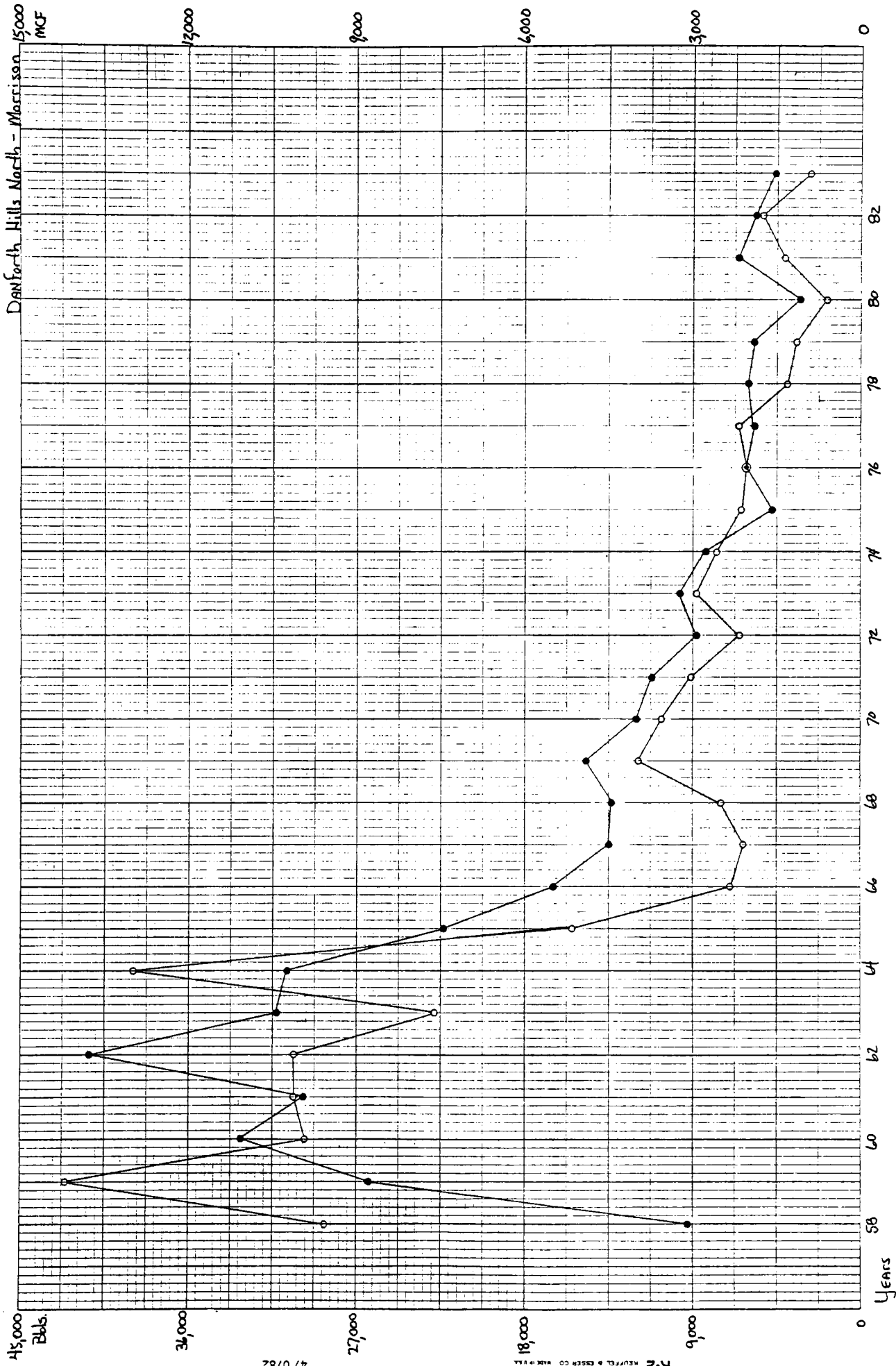
35000
MCF



47 0782

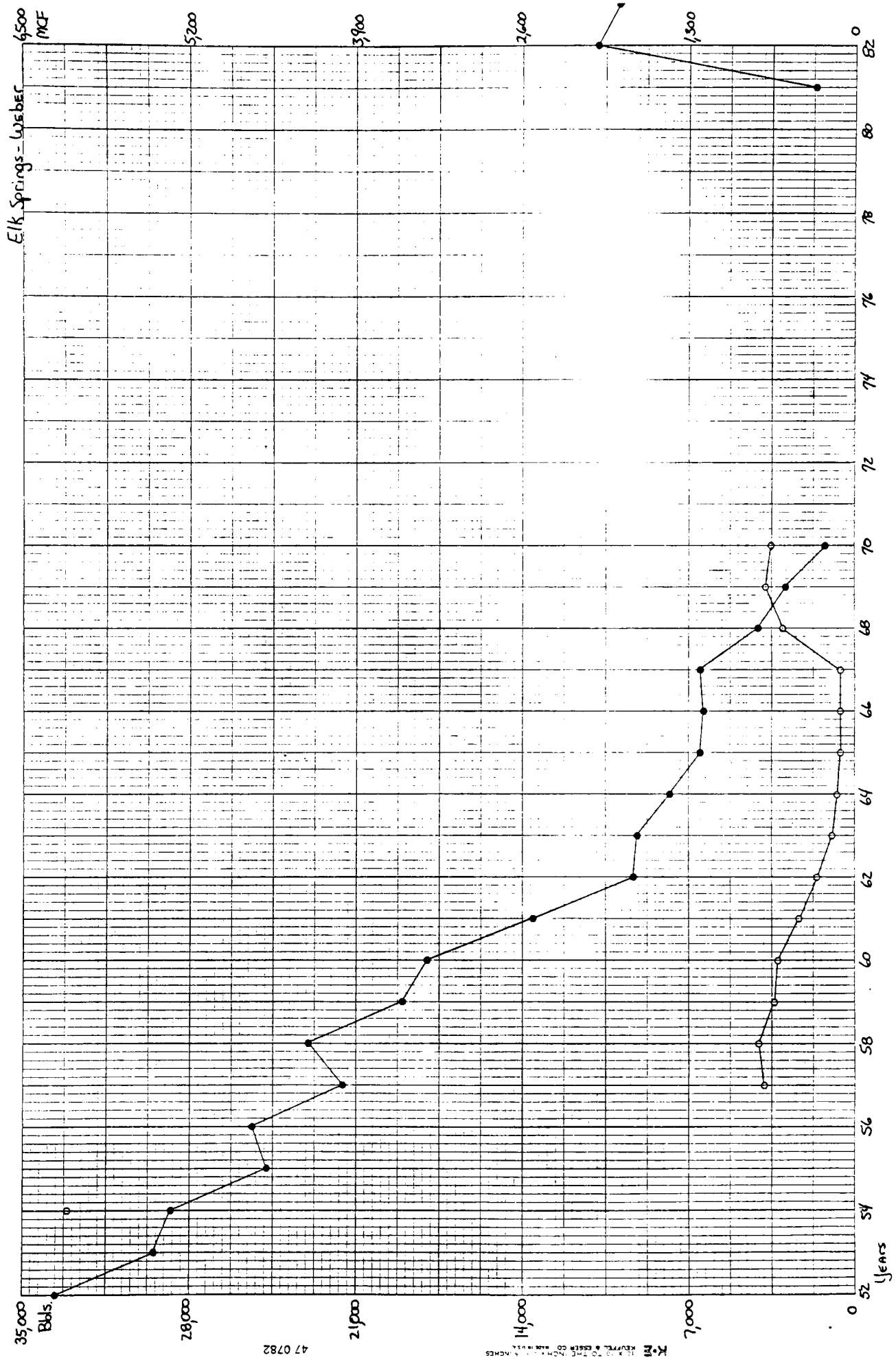
K.M. REPTILES & BIRDS CD BAR # 111
INCHES TO THE INCH





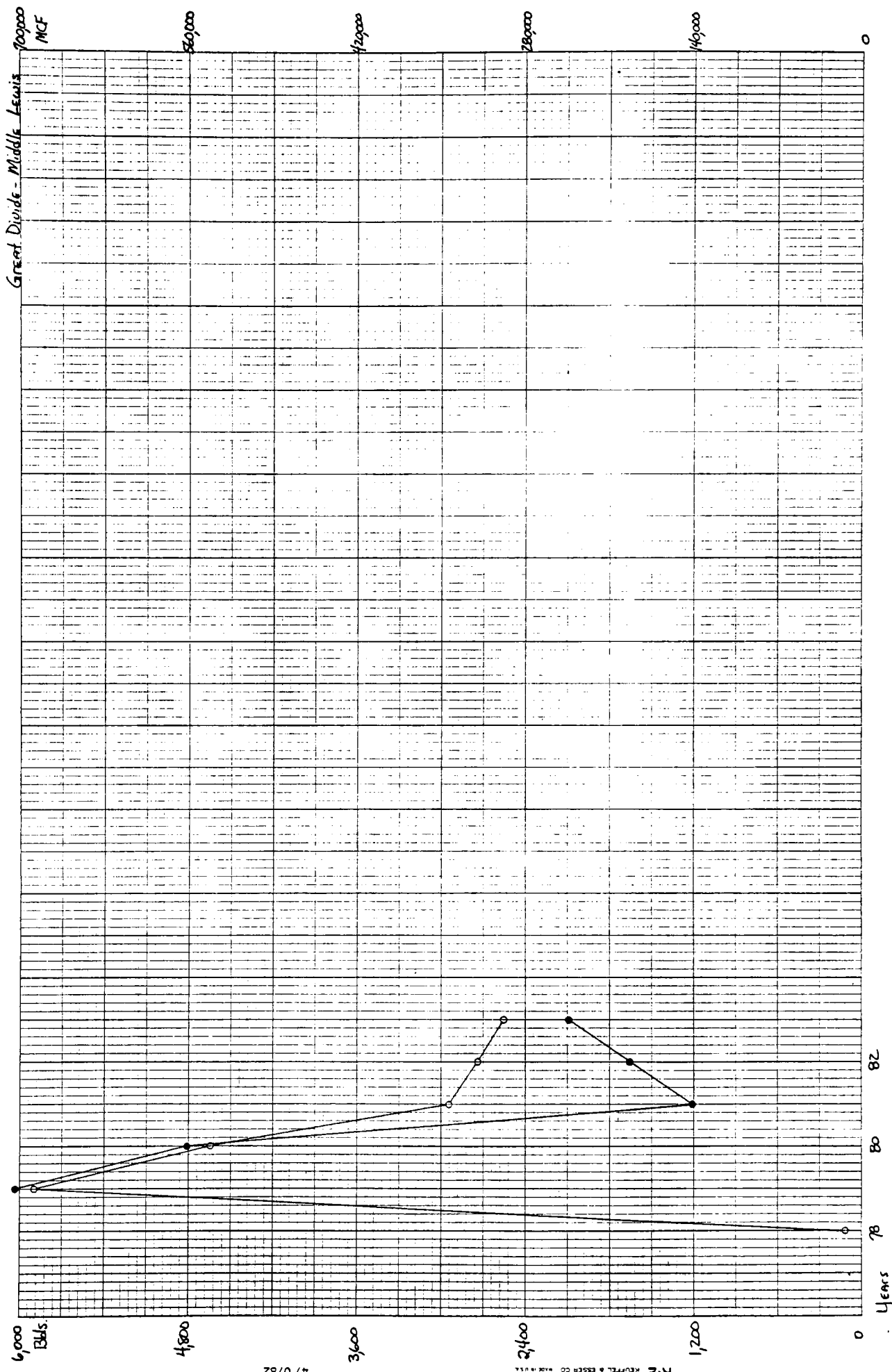
47 0782

KM REUPPEL & ENGINEERS
 NEW YORK, N.Y. 10017
 NEW YORK, N.Y. 10017



47 0782

K-M KUPPEL & ESSER CO. SALT LAKE CITY, UTAH



47 0782

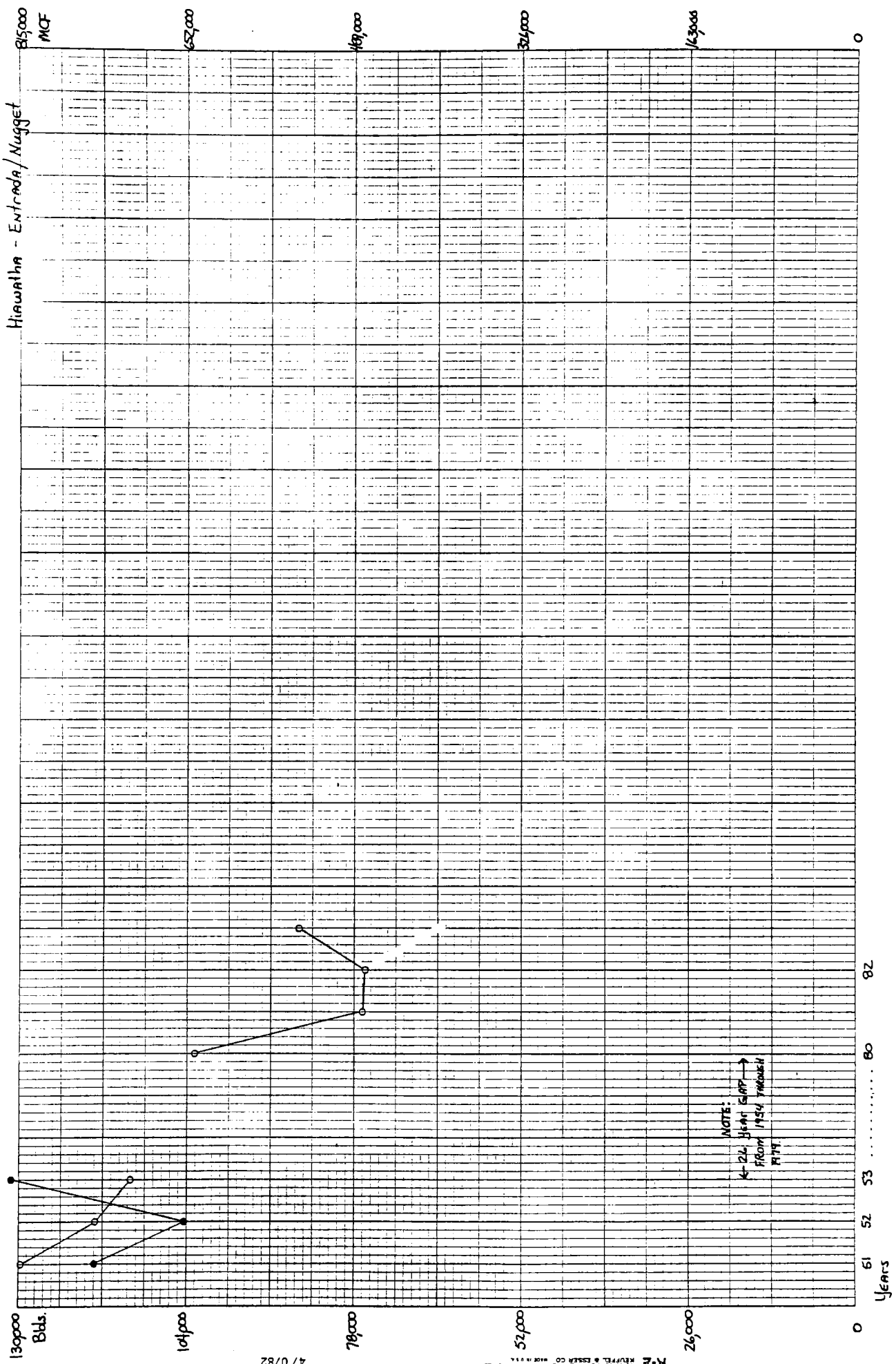
K.M. KUFFEL & ESSER CO. MARKERS

1981
1982
1983
1984
1985
1986
1987
1988

Years

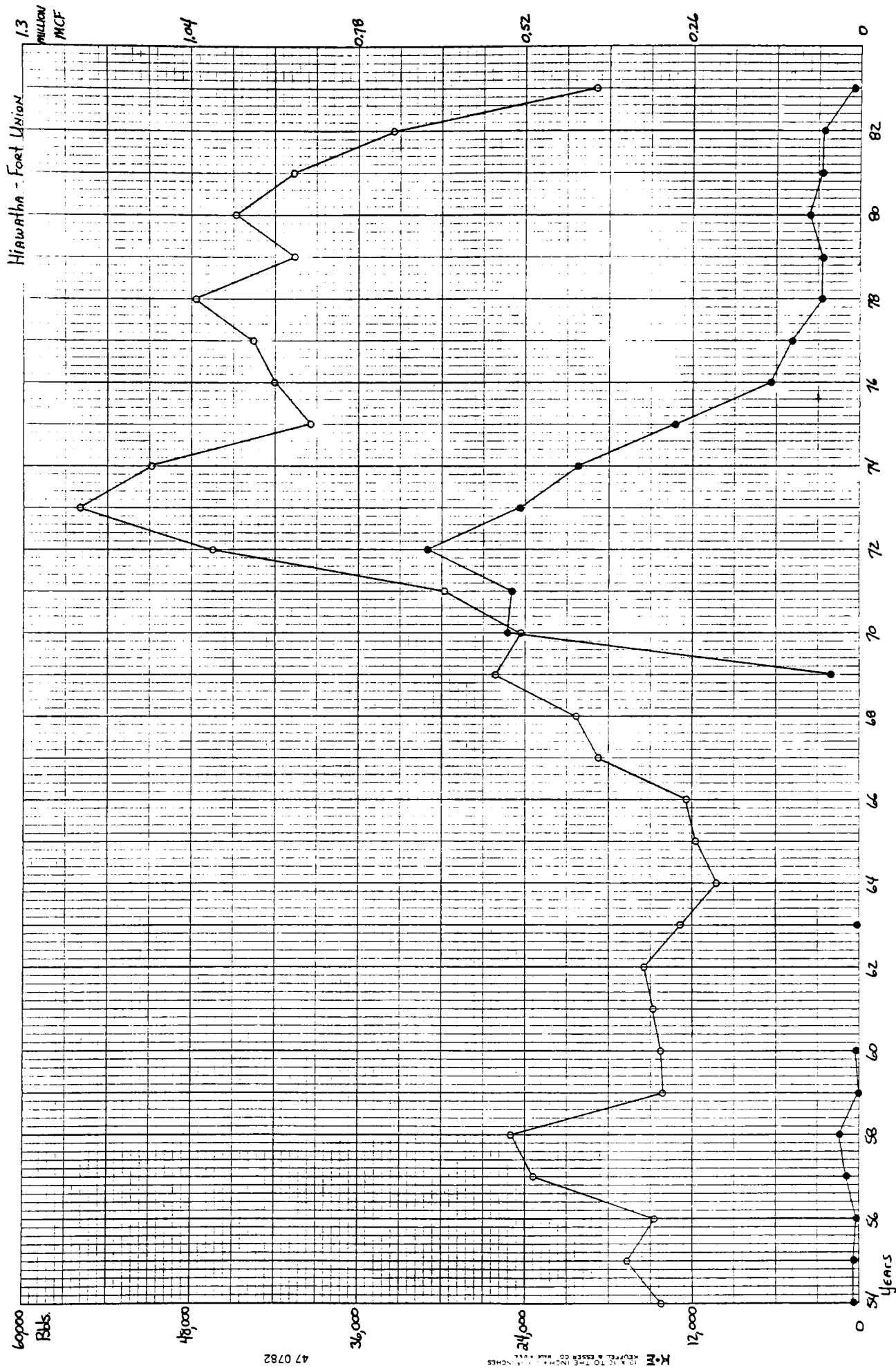
Great Divide - Middle Lewis
MCF

700,000
500,000
400,000
200,000
0



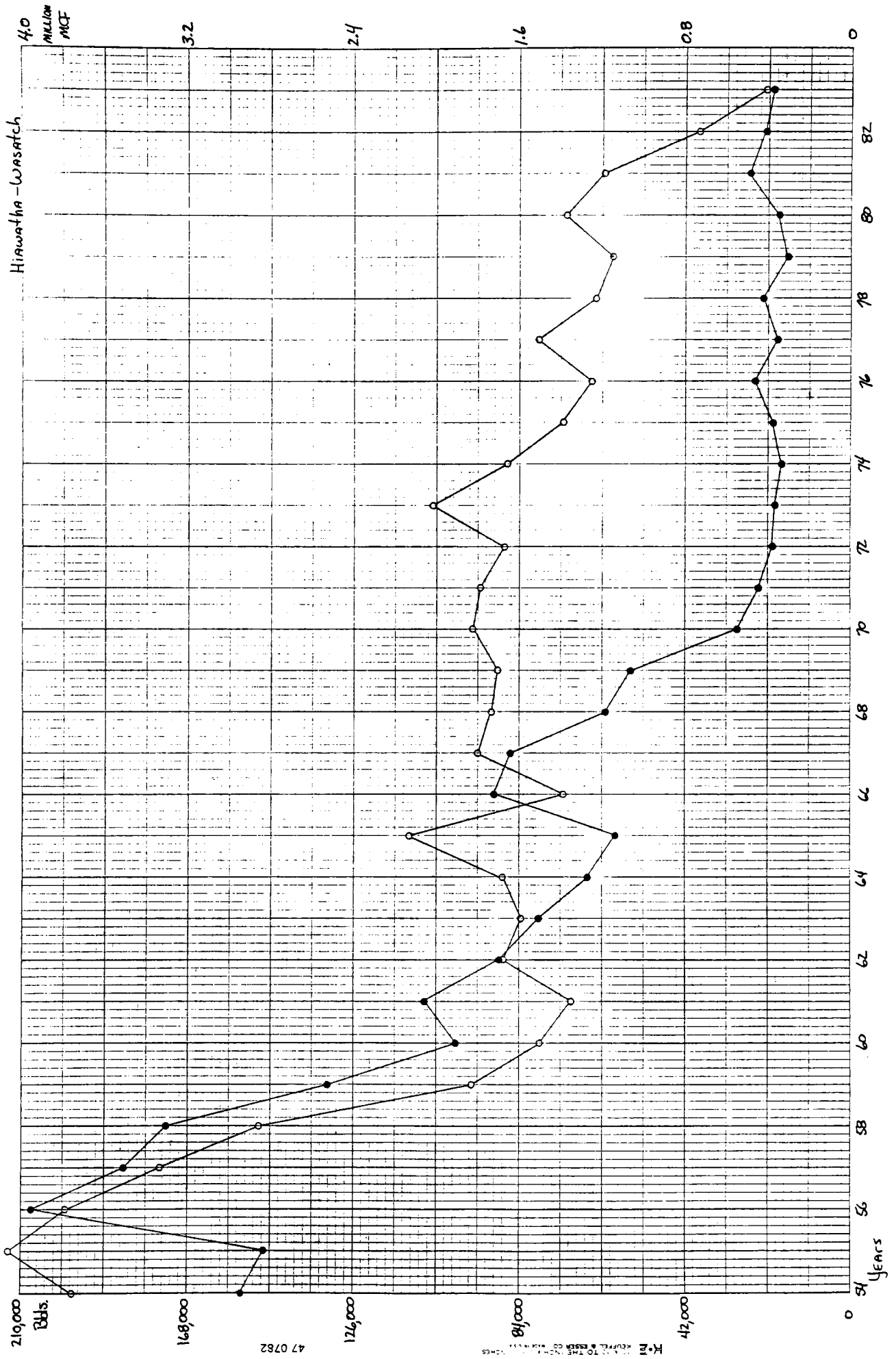
47 0782

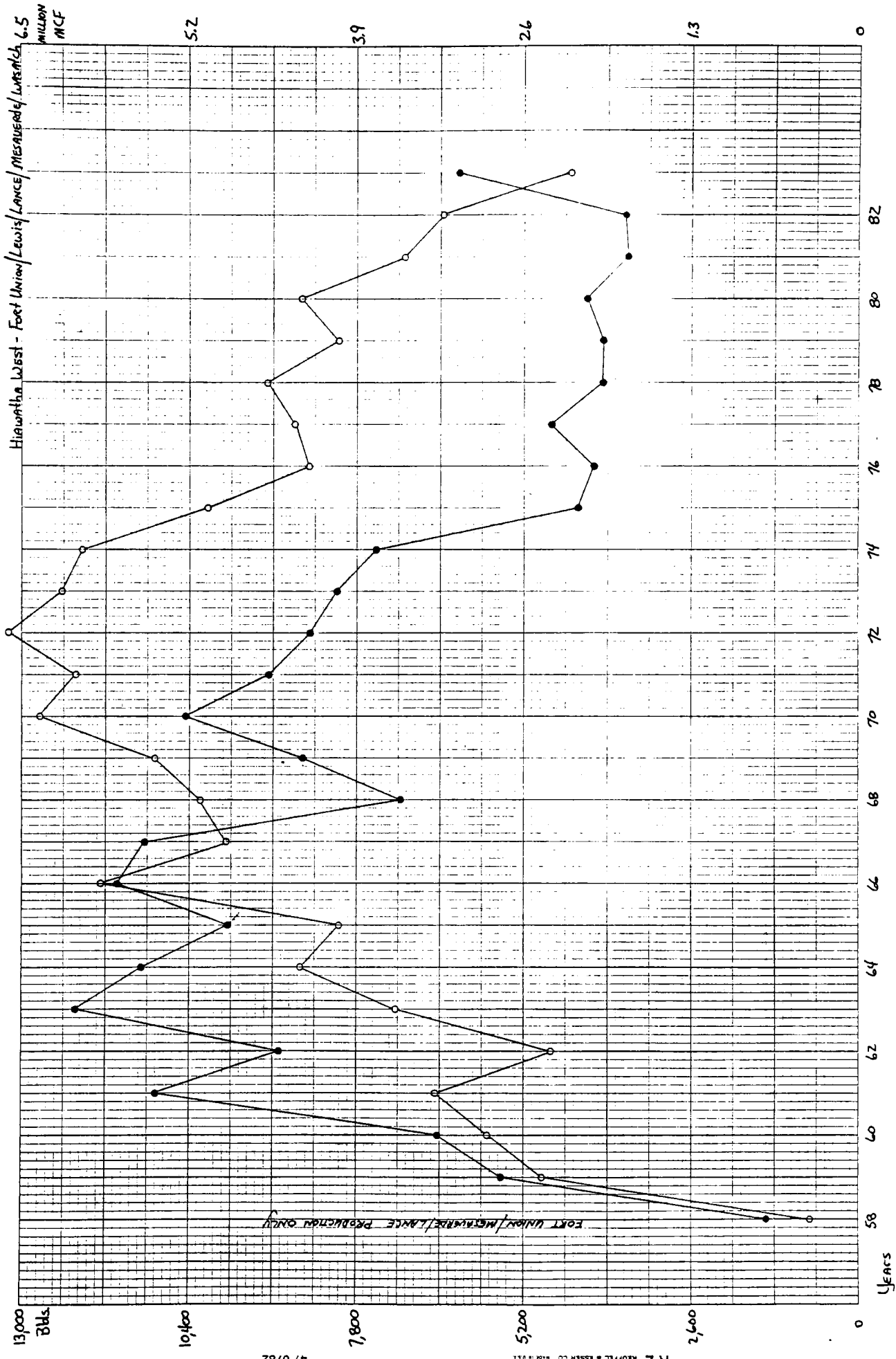
K-E
 10 X 10 TO THE INCHES
 REPPED & ESSEX CO. MADE IN U.S.A.



47 0782

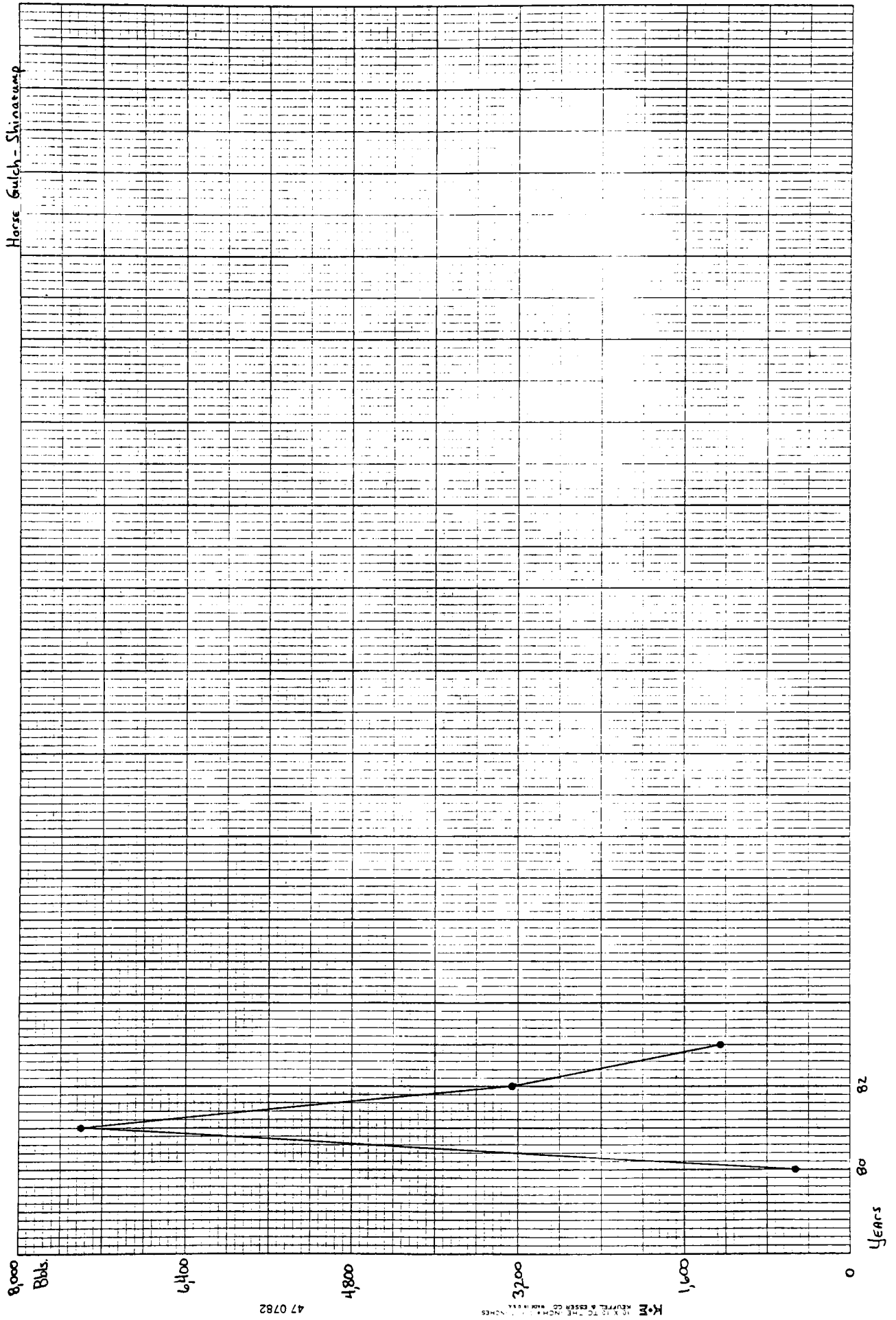
K-M
 1/2 X 1/2 TO THE INCH
 KEUFFEL & ESSER CO. NEW YORK





47 0782

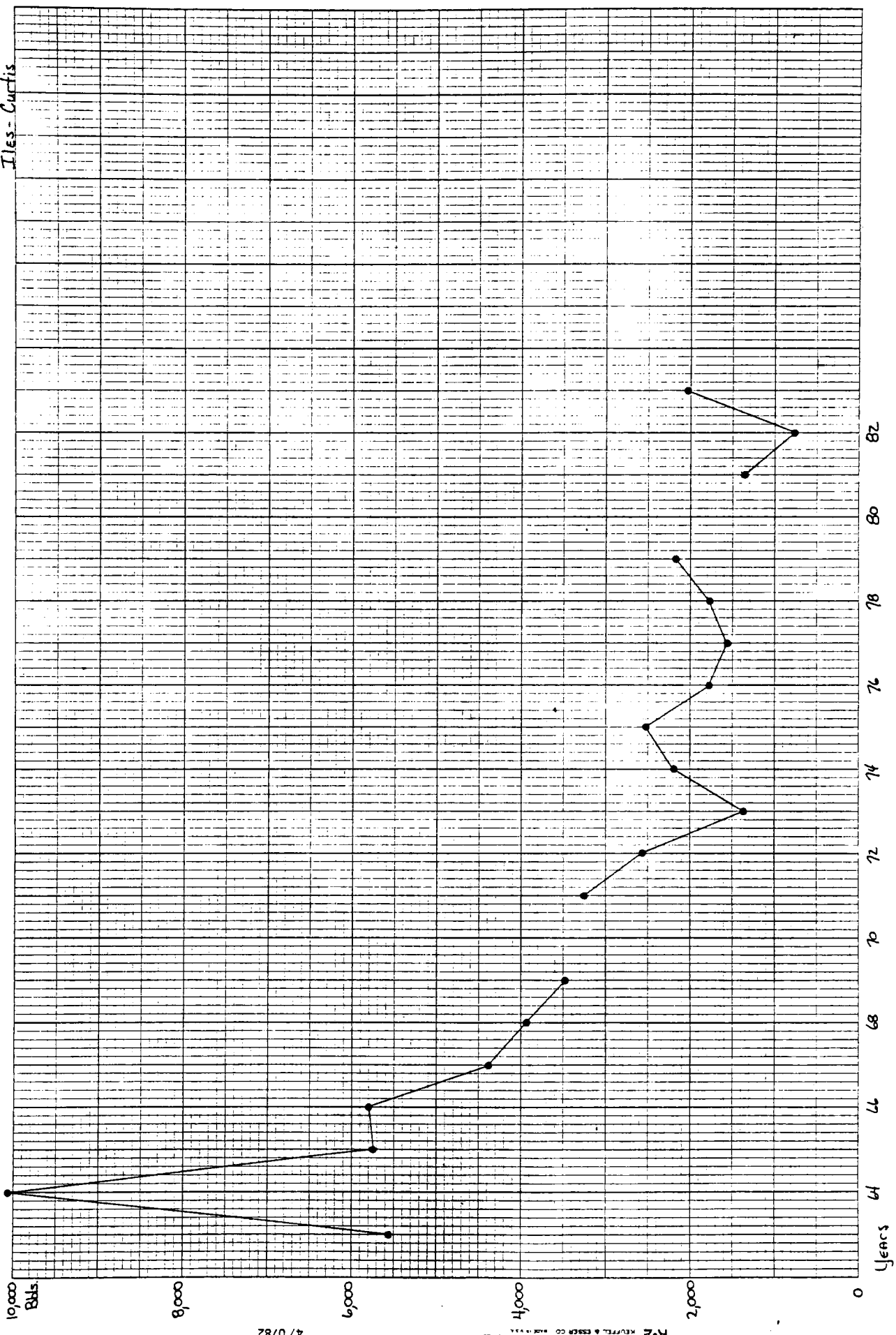
K&E
 10 X 10 TO THE INCH
 REVUEL & ESSER CO. HOUSTON, TEXAS



47 0782

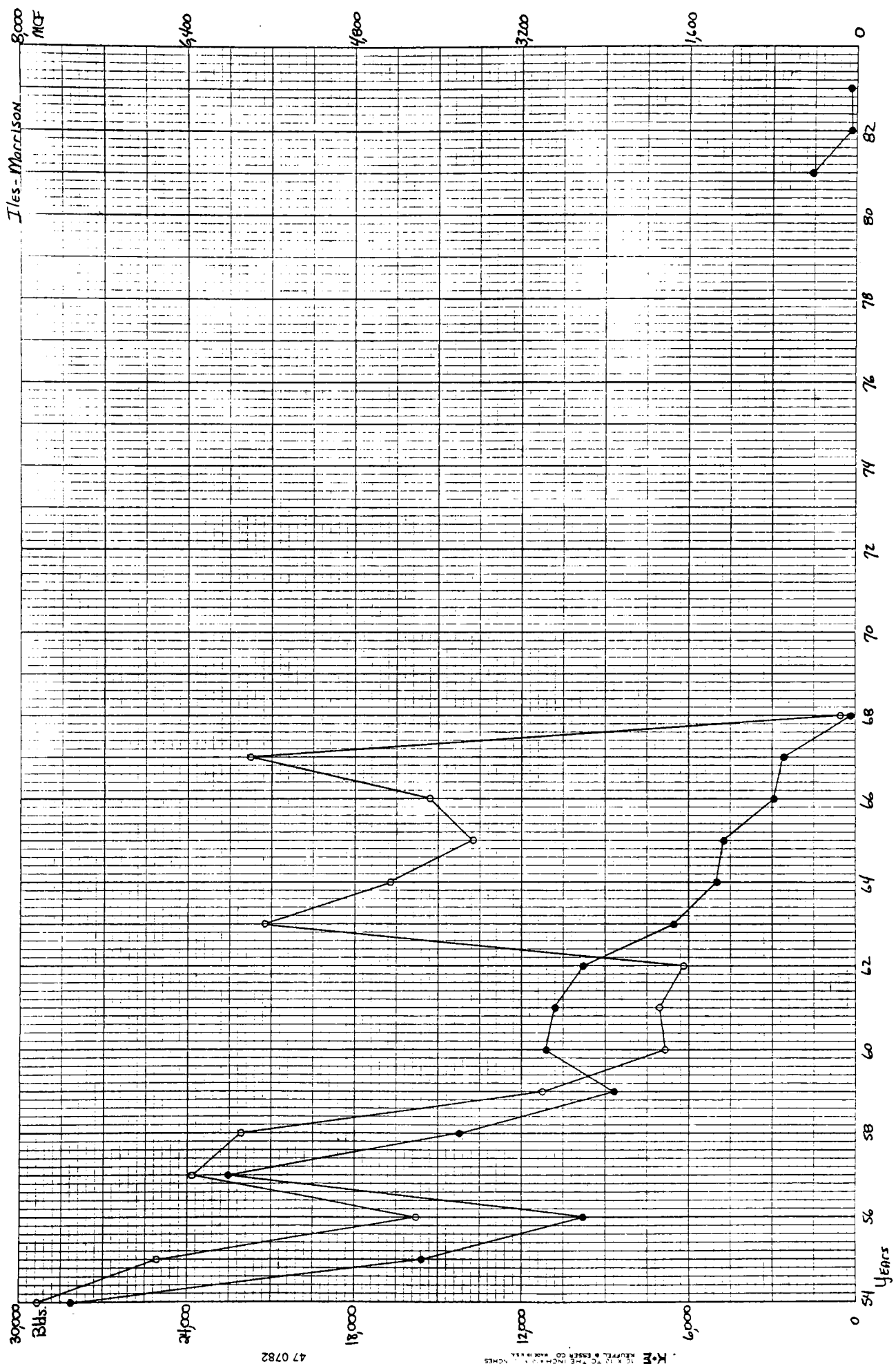
K·M
 REVISED BY THE
 U.S. GEOLOGICAL SURVEY

Iles - Curtis



47 0782

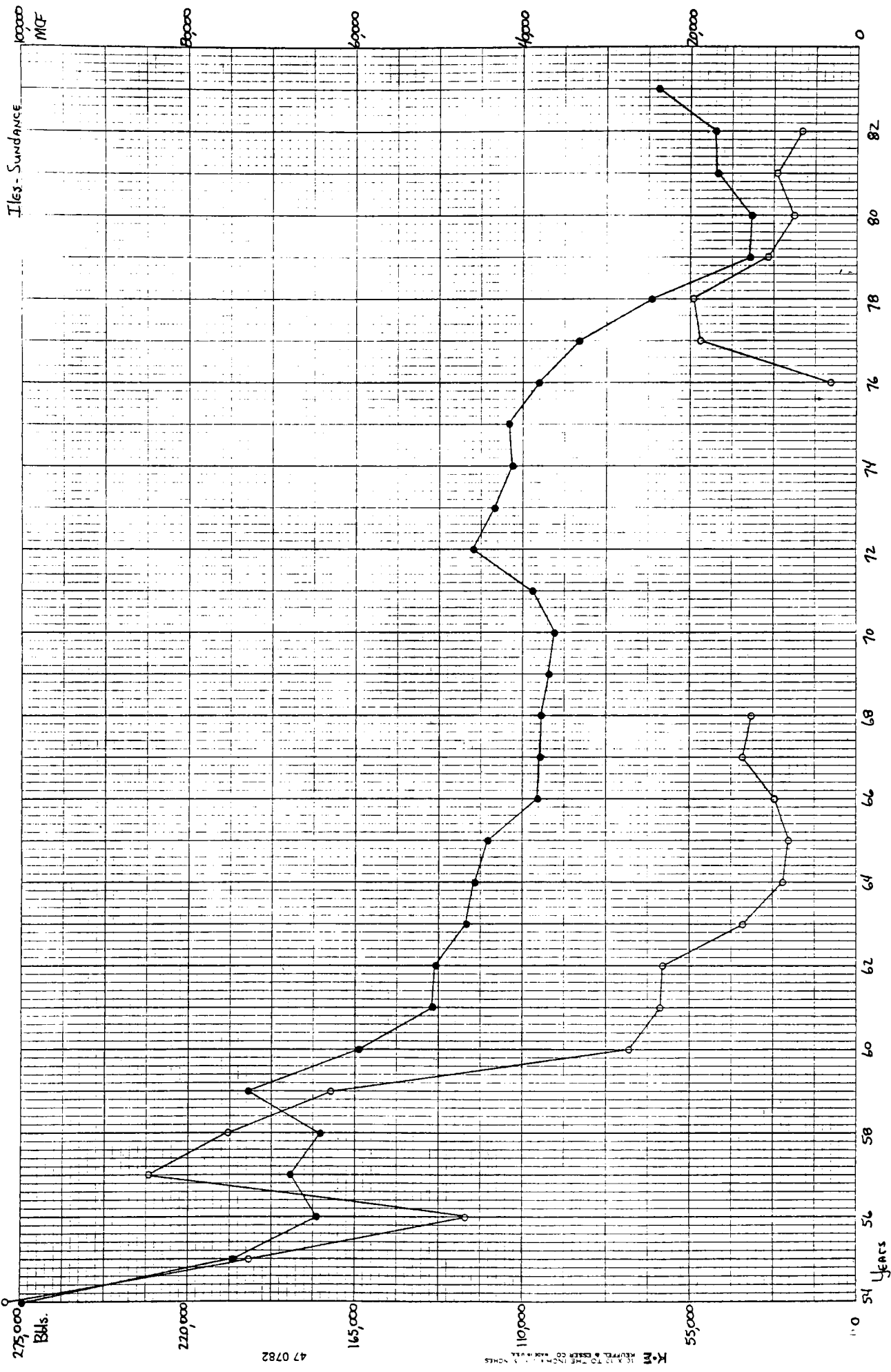
K.M
10 X 10 TO THE INCHES
KEUFFEL & ESSER CO. NEW YORK, N.Y.



Iles - Marclison

47 0782

U.S. GEOLOGICAL SURVEY WASHINGTON, D.C. 20508



KN 10 10 10 TO THE 20th AND 10th

47 0782

275,000
Bbls.

220,000

165,991

110,000

55,000

0

100,000
MCF

80,000

60,000

40,000

20,000

0

Iles - Sundance

82

80

78

76

74

72

70

68

66

64

62

60

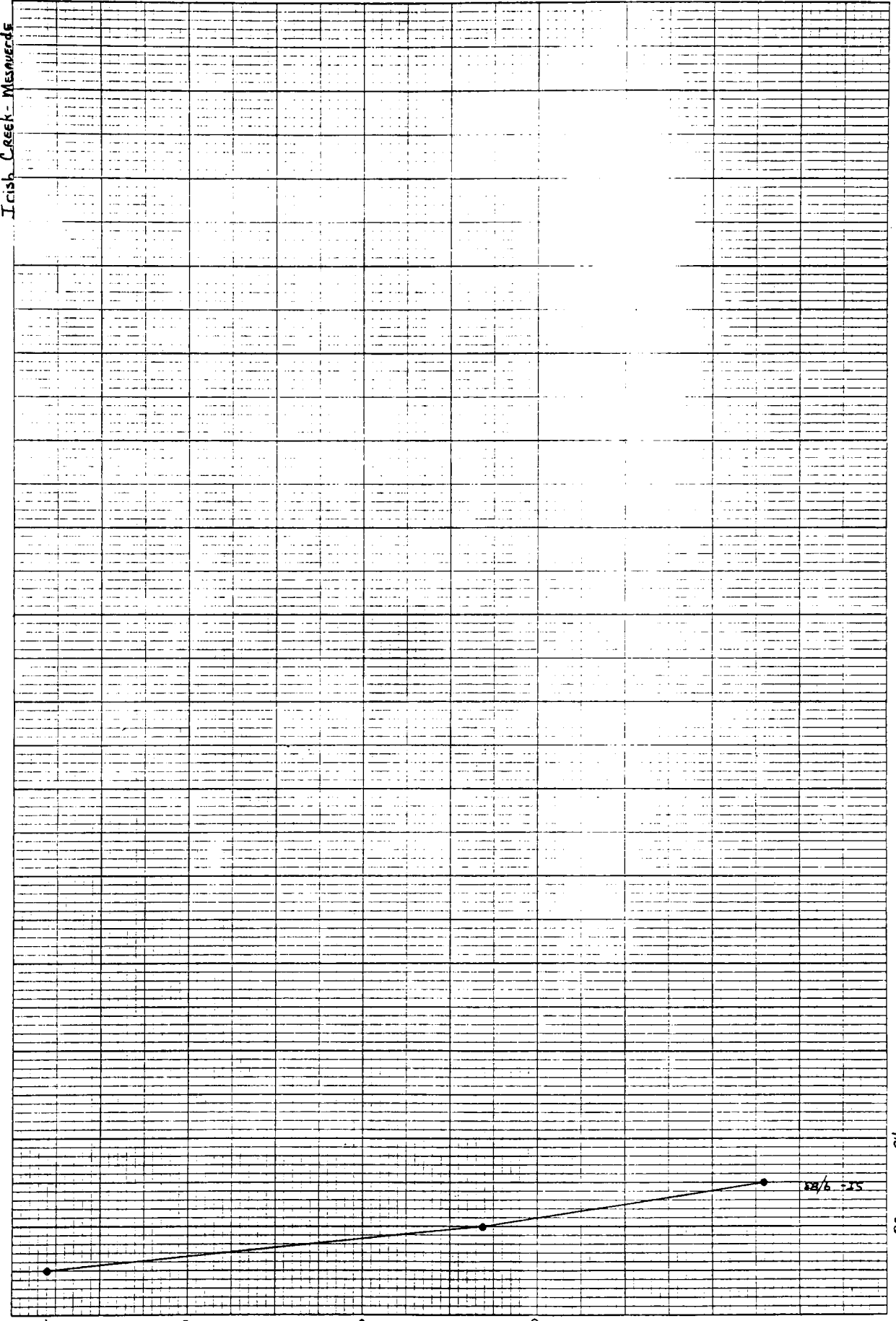
58

56

54

Years

Irish Creek - Mesquite



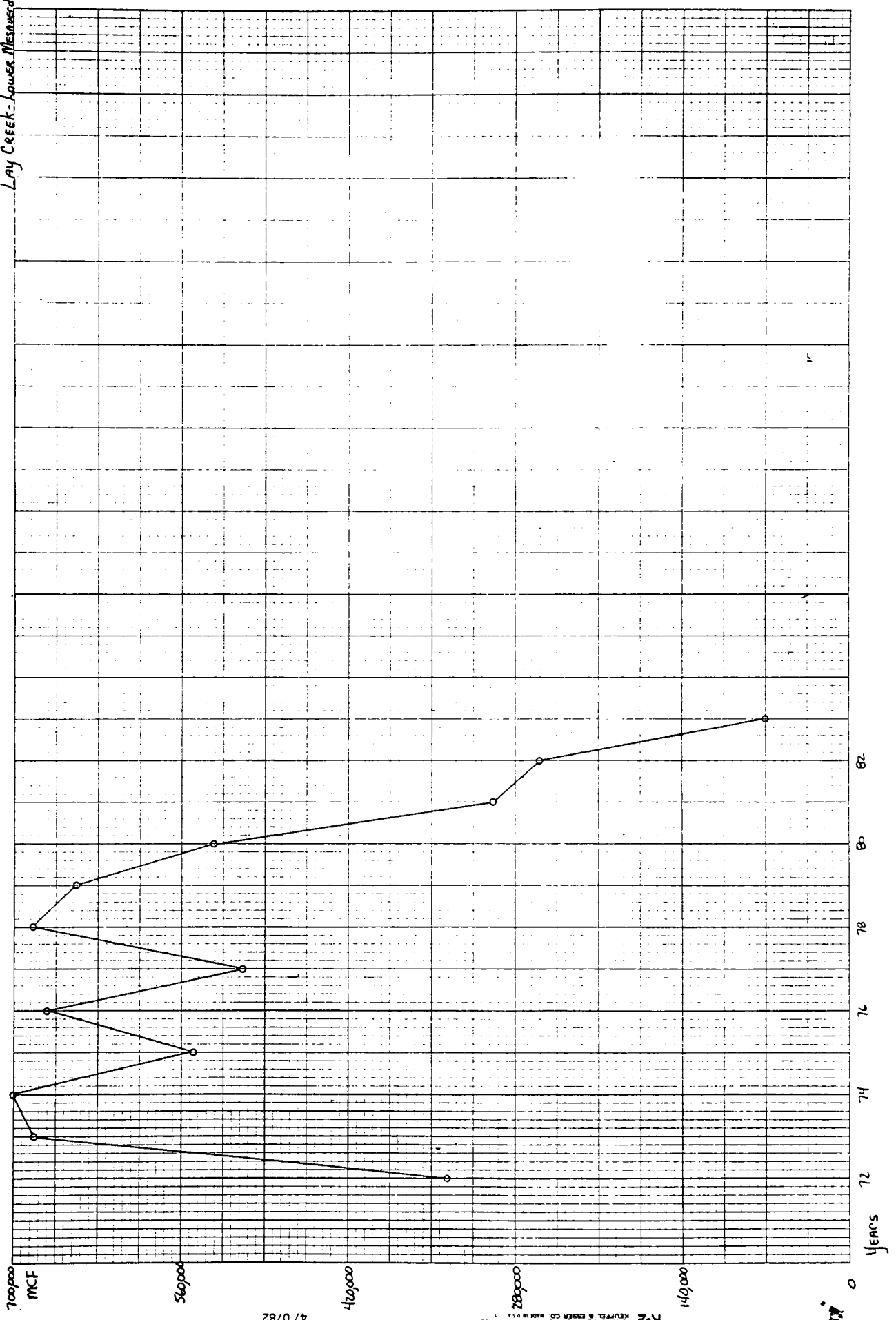
15,000
9,000
6,000
3,000
0

84
82
Years

47 0782

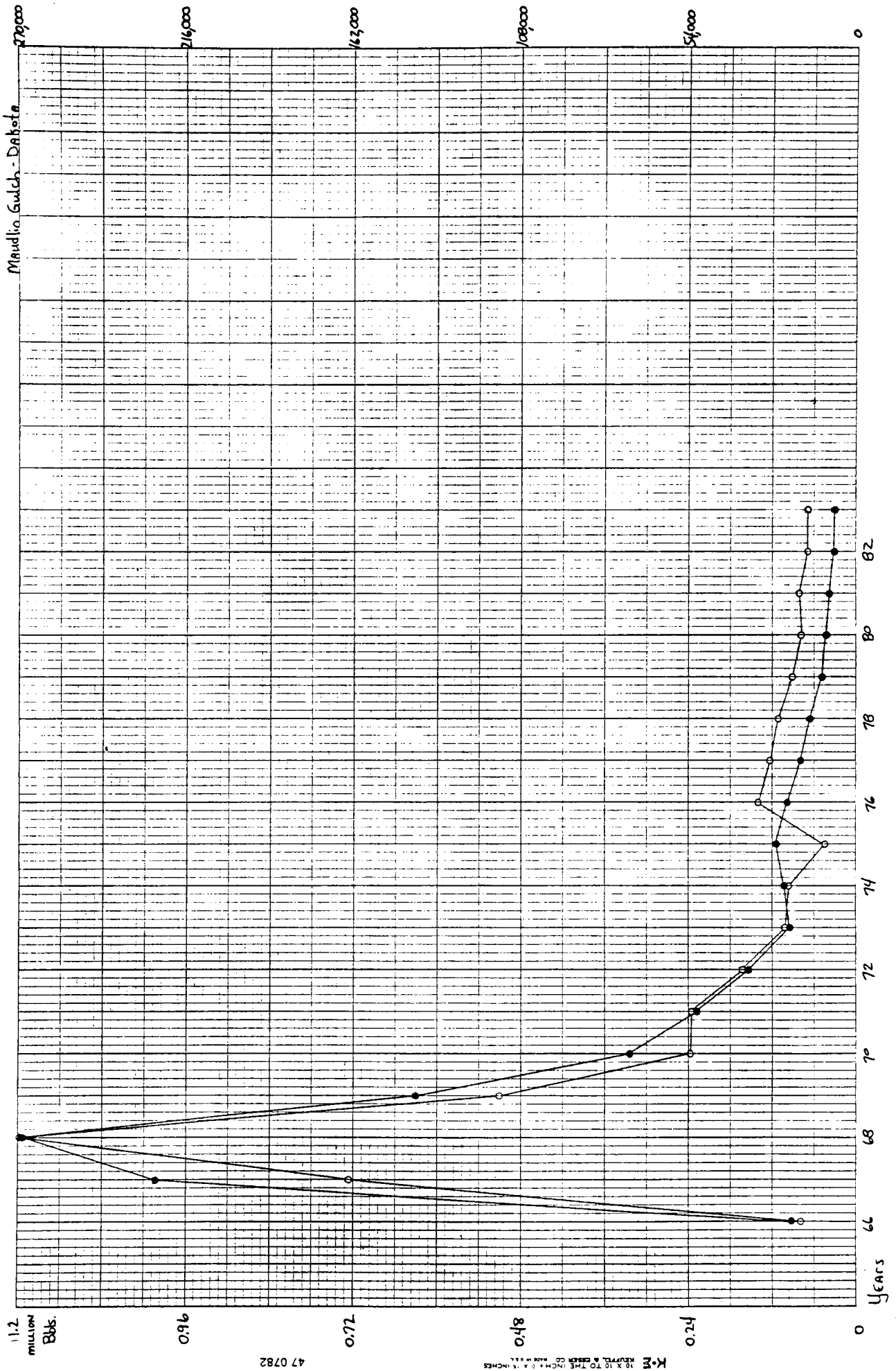
K-M
REVISED BY ESSEX CO. 1982
10 X 12 TO THE INCH 1/4 INCHES

Lay Creek - Lower Mississippi



47 0782

K·M
10 X 10 TO THE INCH
REFUEL & BURN CO. MADE IN U.S.A.



47 0782

K-E 10 X 10 TO THE INCH • 0.1 X INCHES
 KEUFFEL & ESSER CO. MADE IN U.S.A.

11.2
 MILLION
 Bbls.

9.60

7.20

4.80

2.40

0

Years

70

72

74

76

78

80

82

0

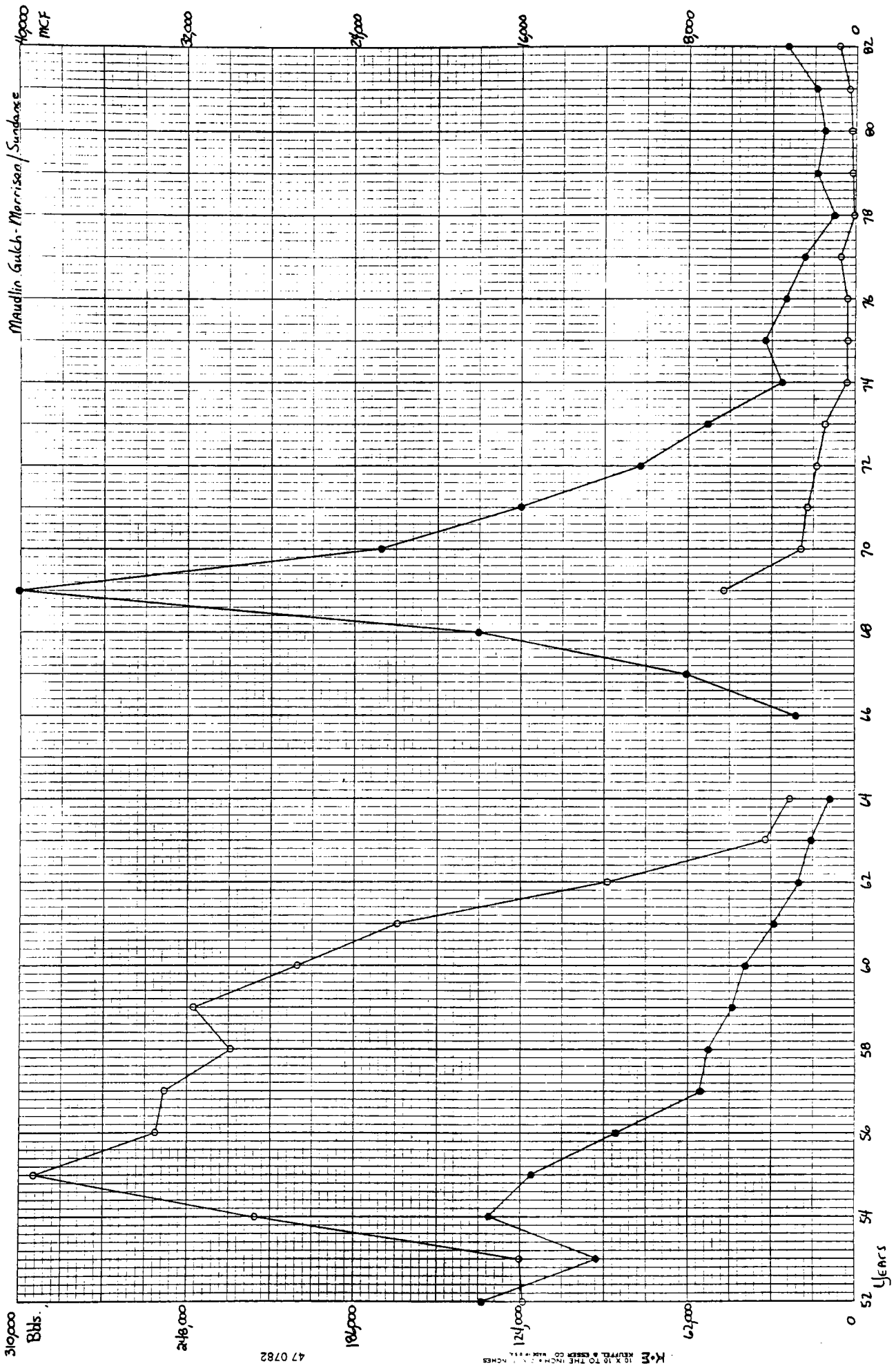
50,000

100,000

150,000

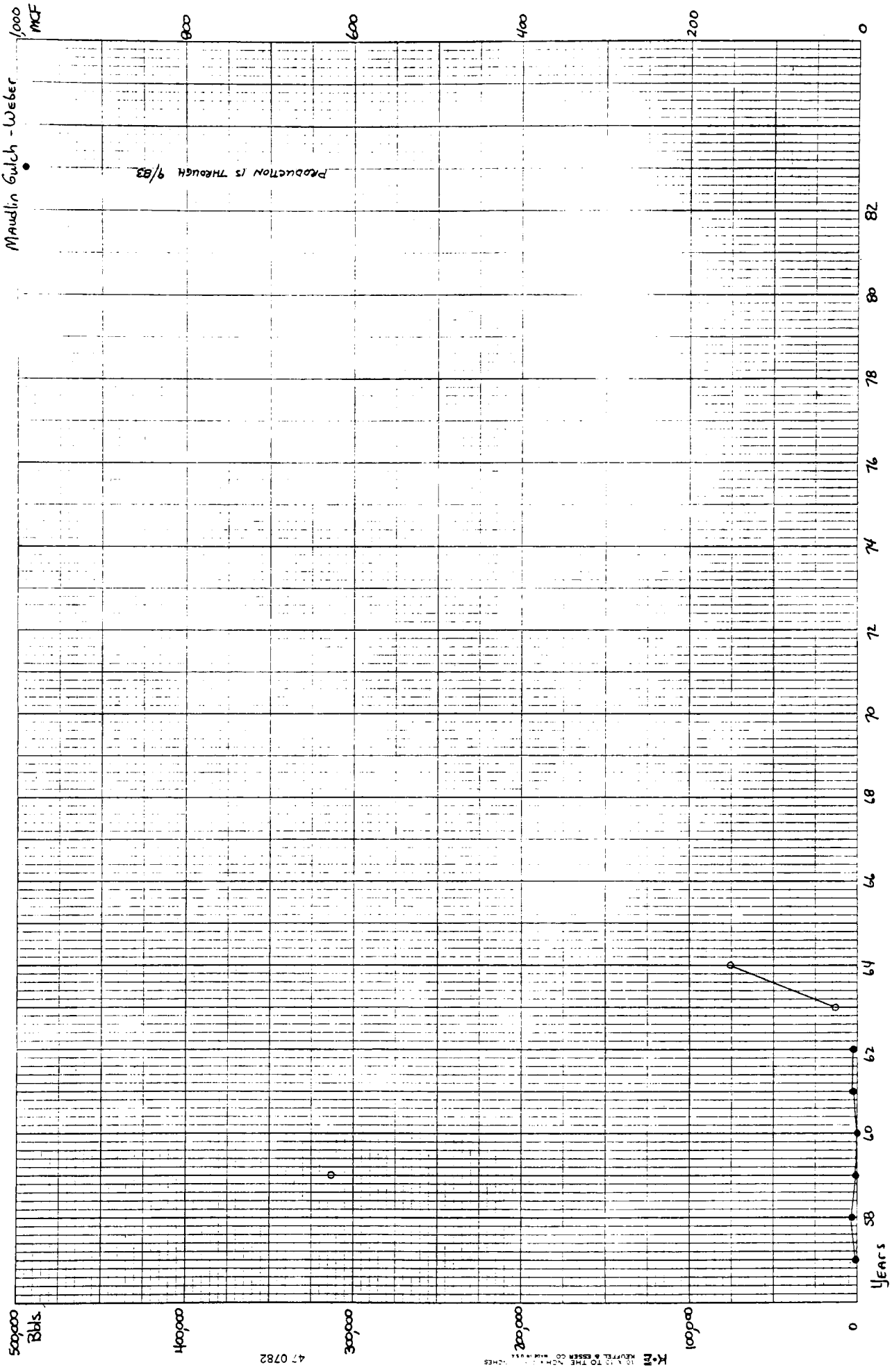
200,000

250,000



47 0782

K.M. 10 X 10 TO THE INCH. 1 INCHES



500,000 RBbls
 100,000
 0

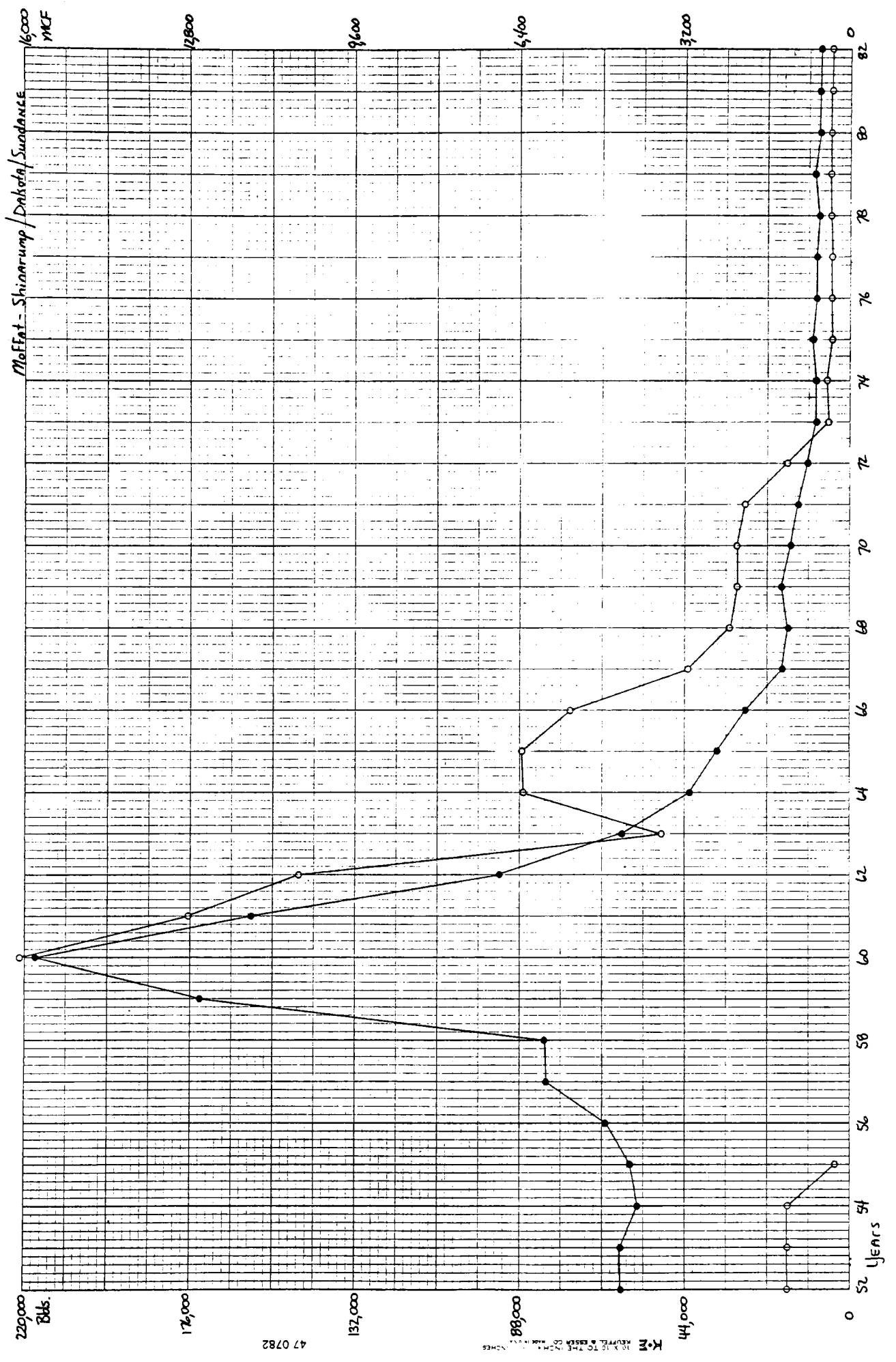
1000
 200
 400
 600
 800
 1000

58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82

Years

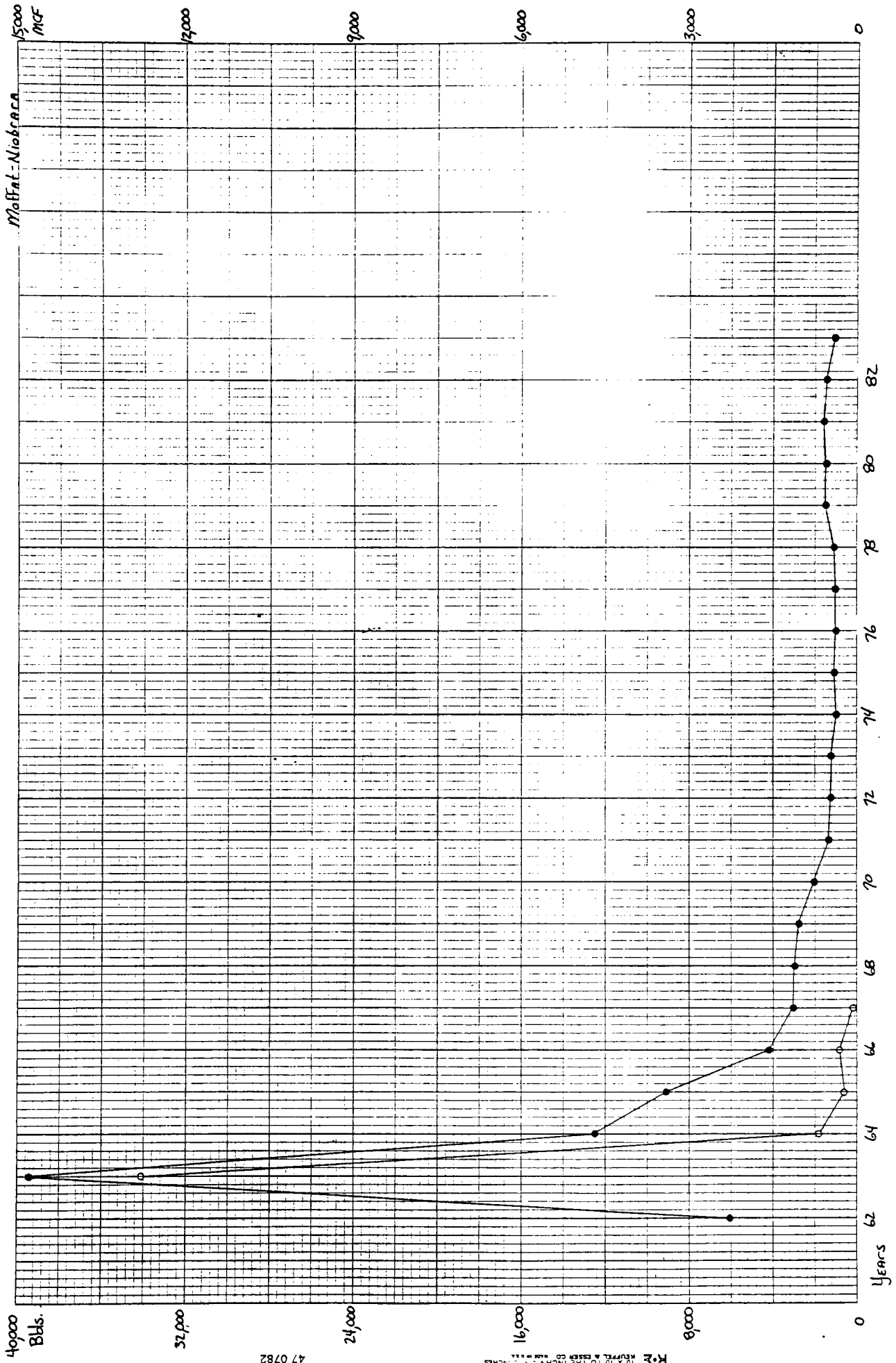
47 0782

MEMPHIS TO THE CHEMICAL INDUSTRIES



47 0782

K M
REVISED BASED ON
10 X 10 TO THE NORTH
NAMES



K·M
 REFUEL & BURN
 1/3 TO THE INCH
 1/4 INCHES

47 0782

10000
 Bbls.

000'75

000'72

000'91

000'8

0

years

79

89

91

92

94

96

98

00

02

04

06

08

10

15000
 MCF

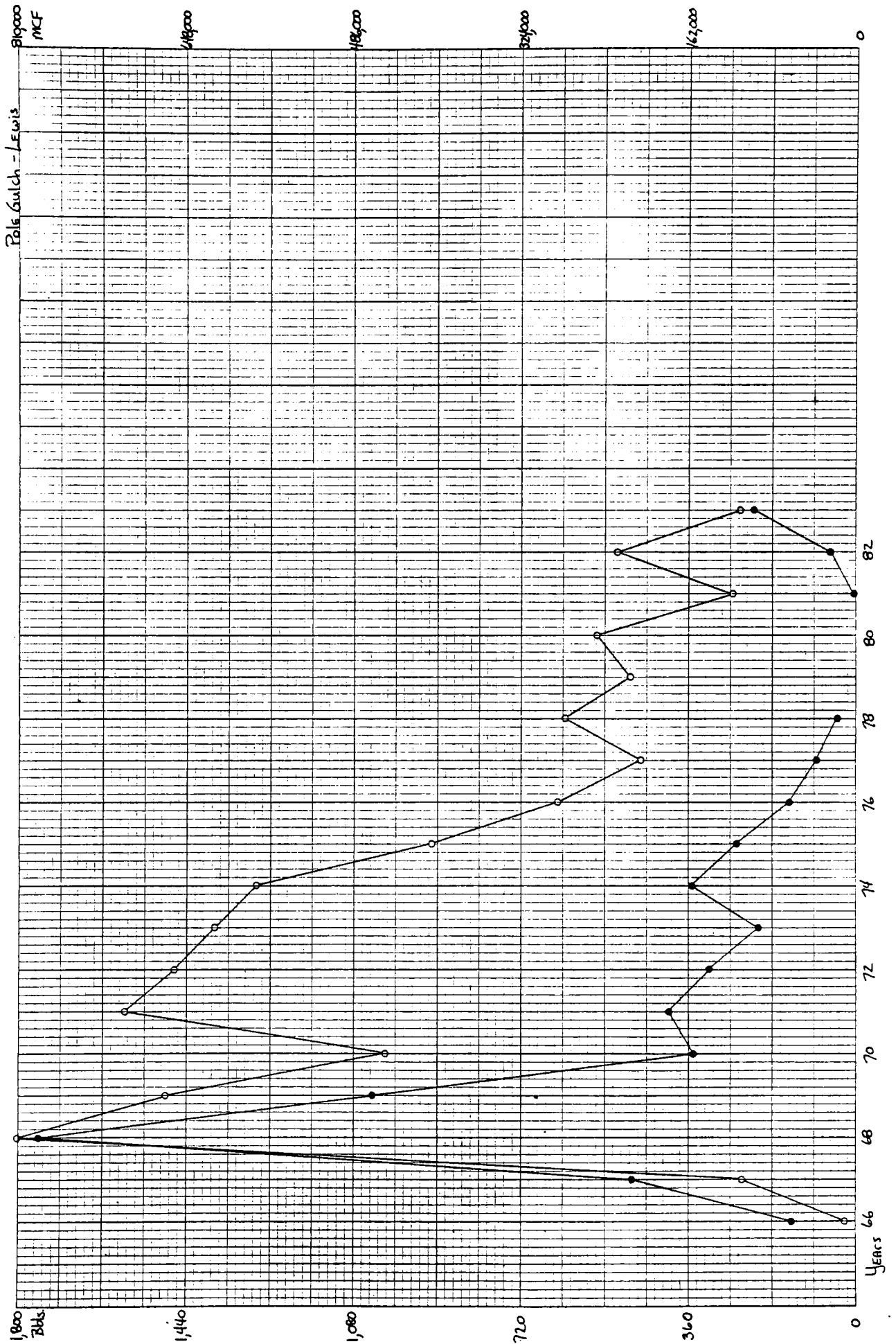
12000

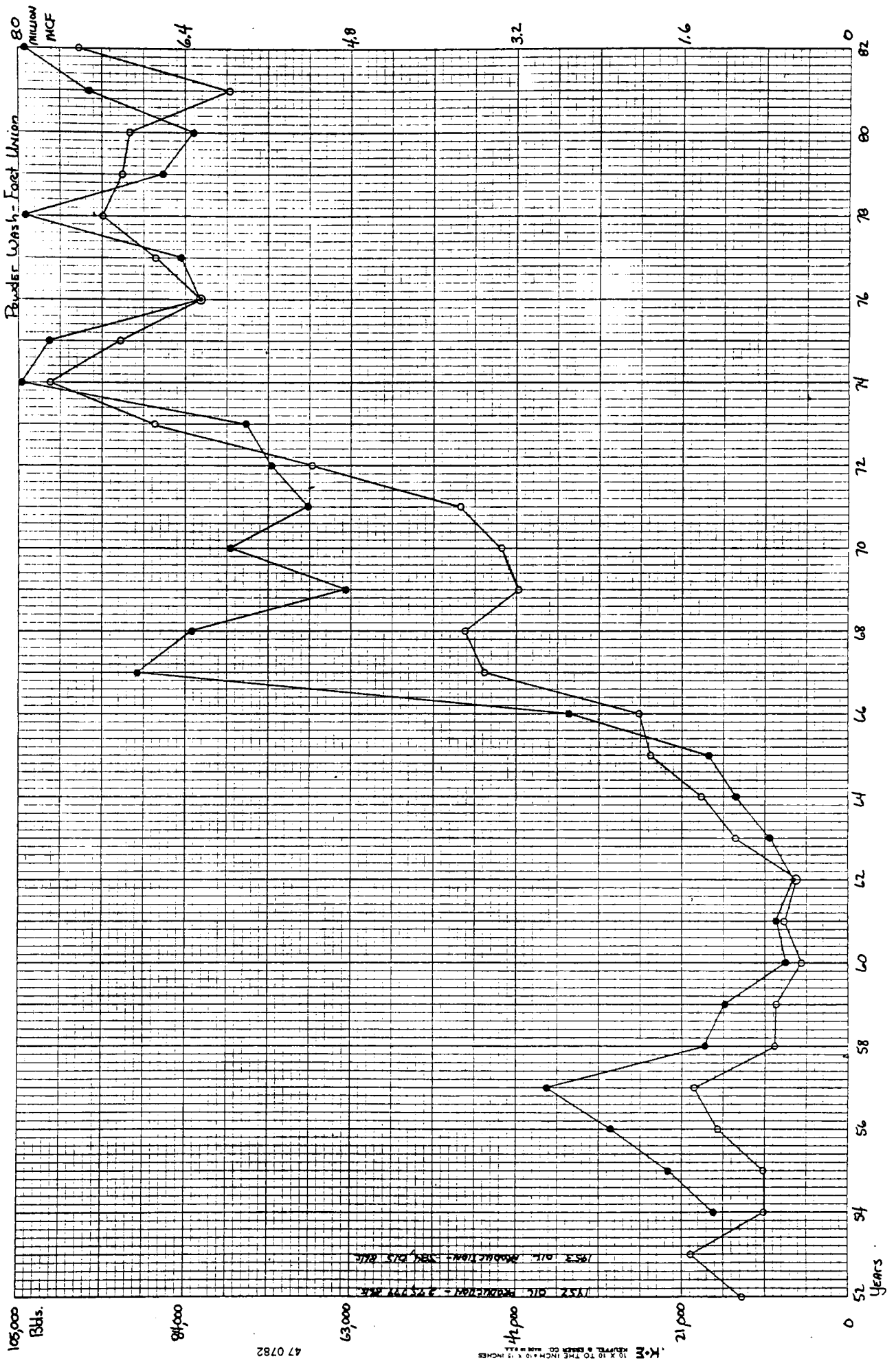
9000

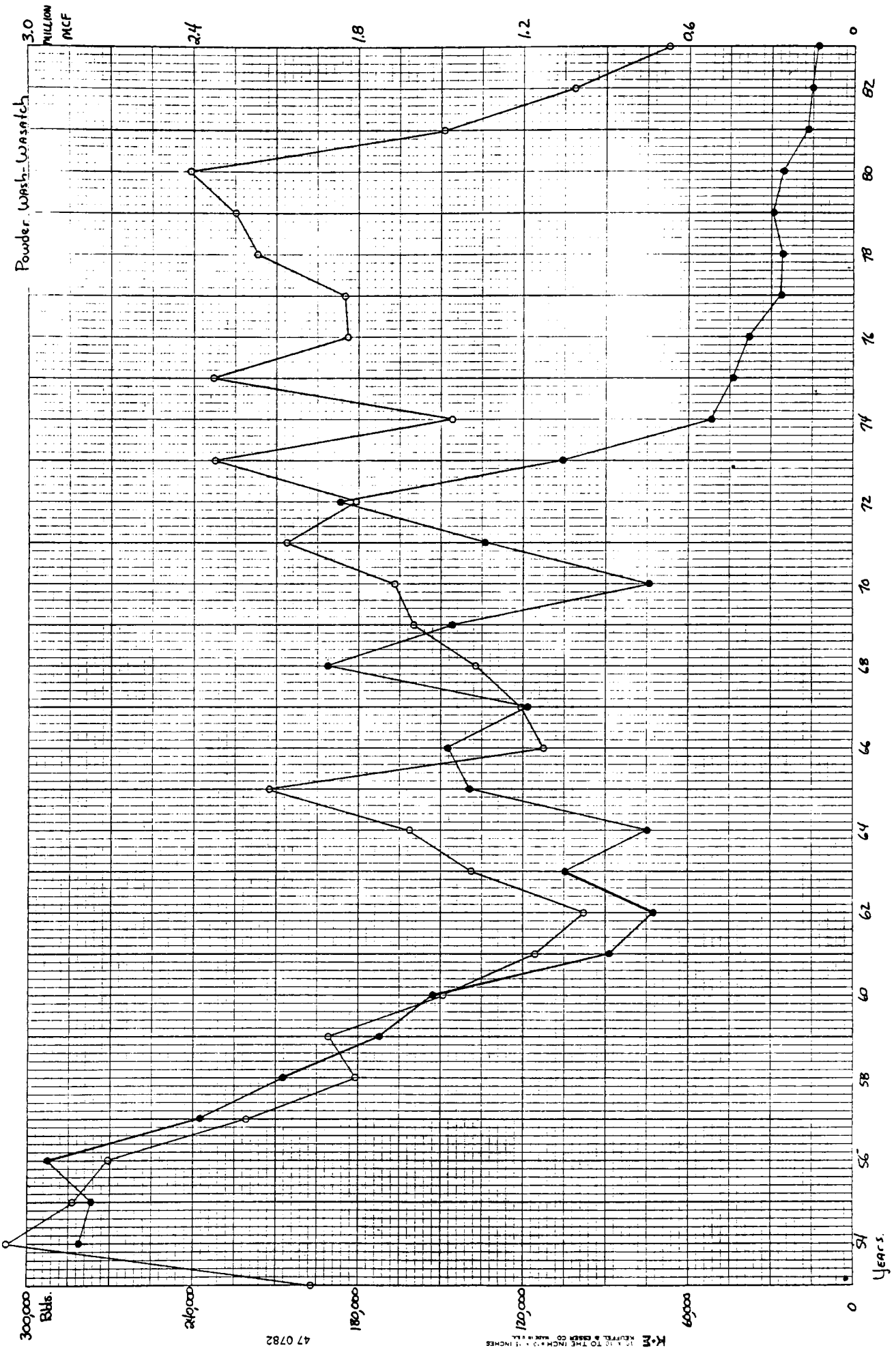
6000

3000

0







47 0782

K-E KEUFFEL & ESSER CO. MADE IN U.S.A. 1/2" x 10" TO THE INCH

300,000
Bbls.

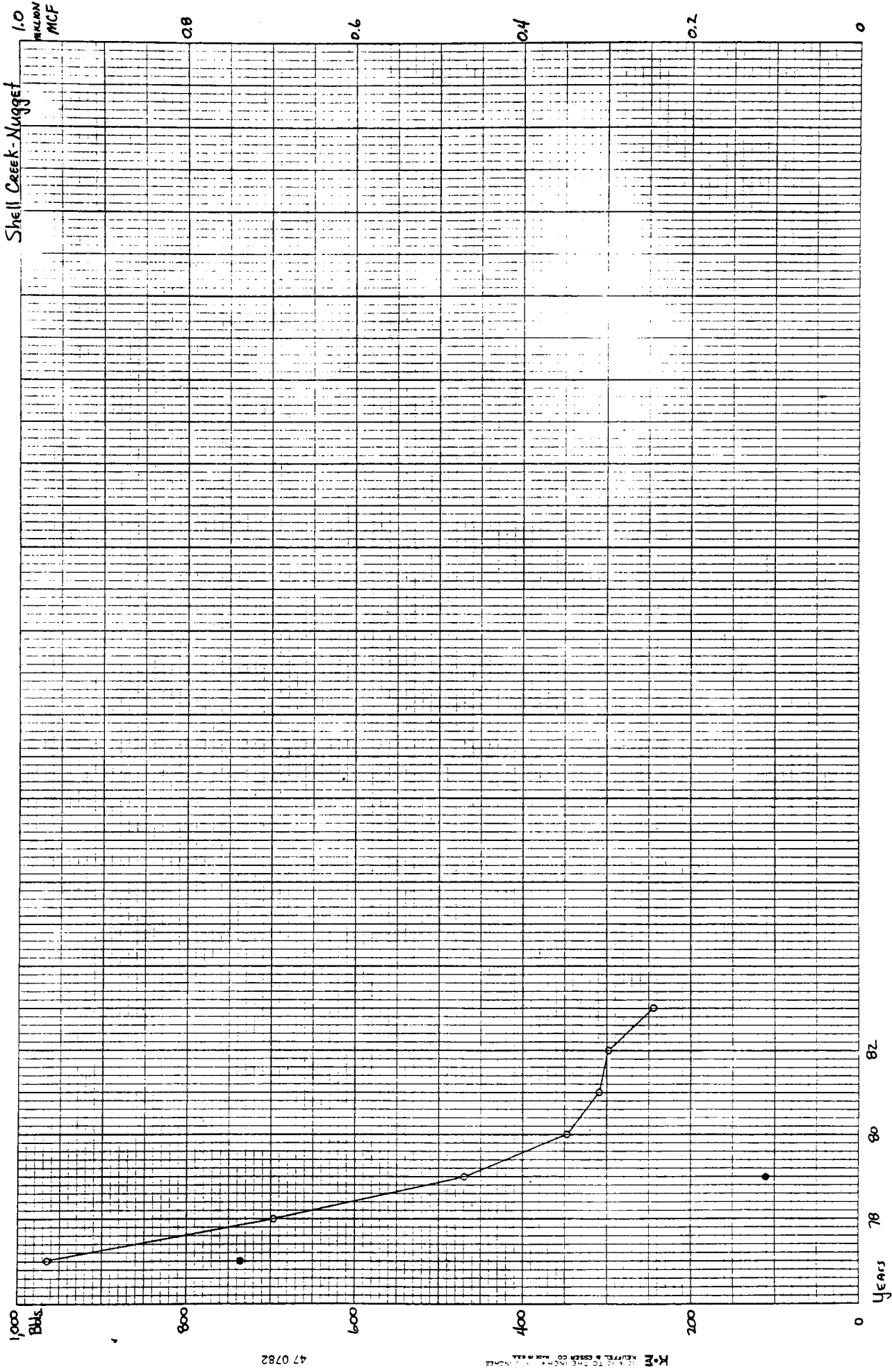
000,000

000,000

000,000

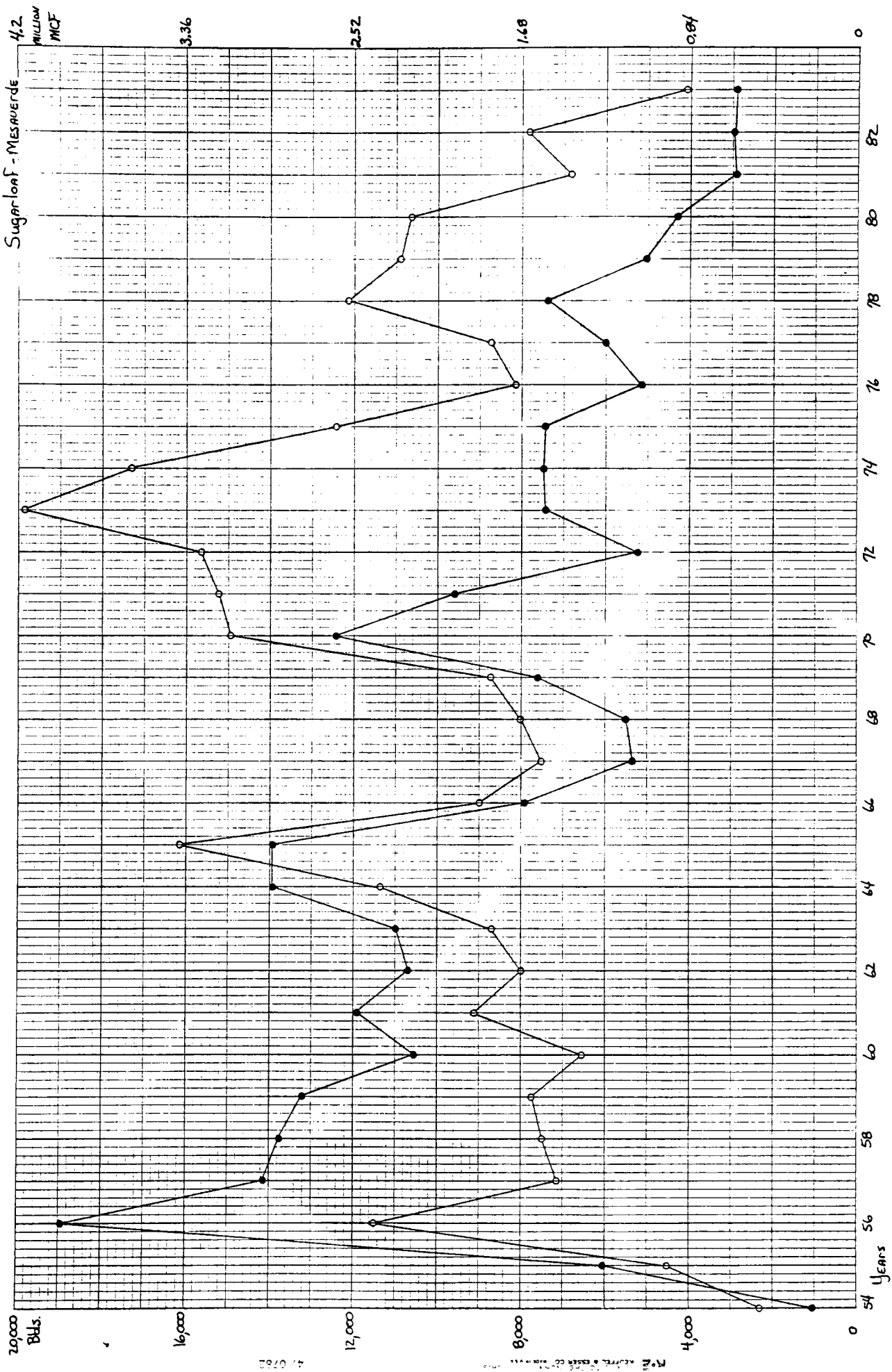
000,000

0



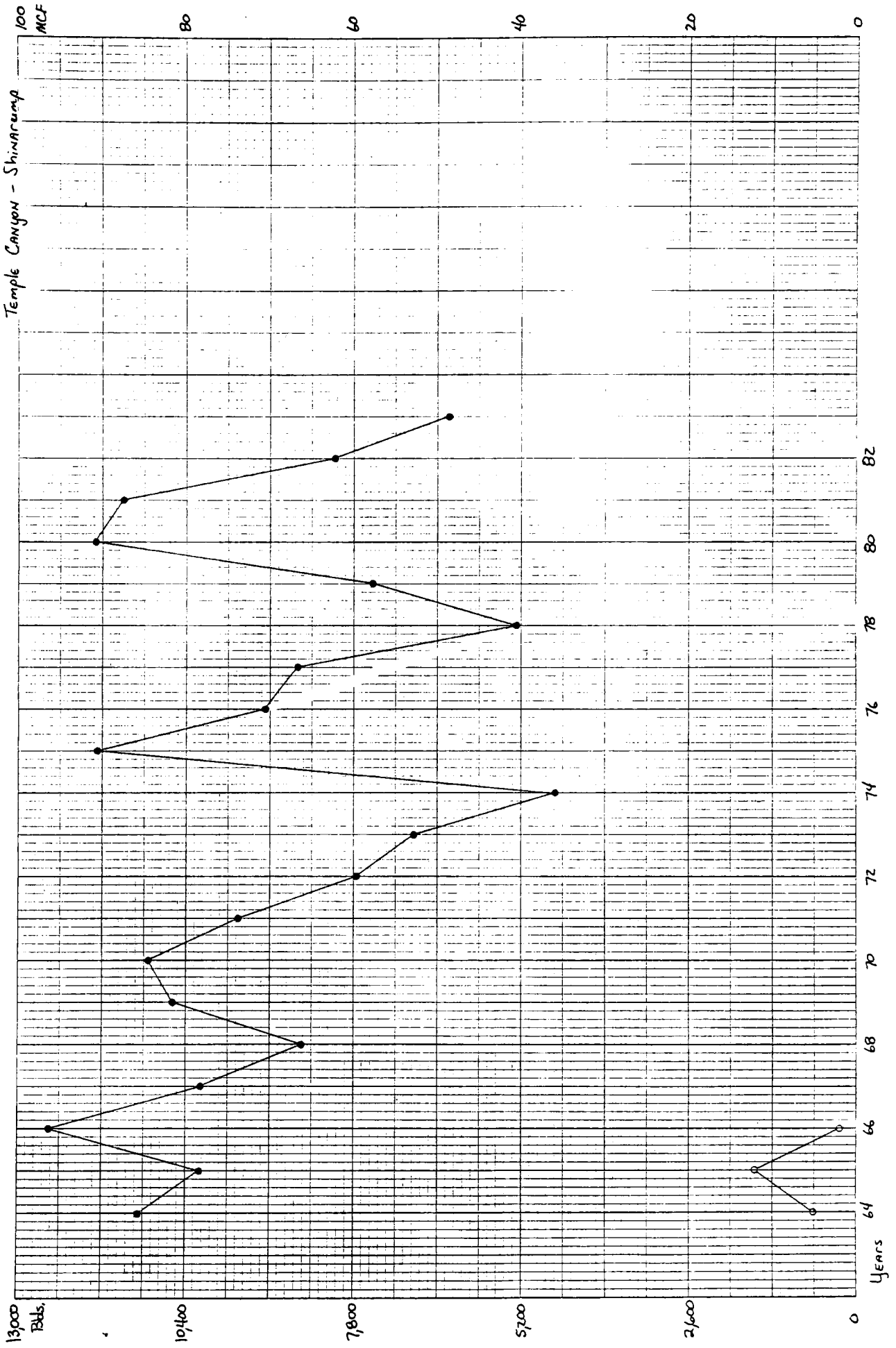
47 0782

K.M. RUFFE & SONS INCORPORATED



47-0782

THE UNIVERSITY OF TEXAS AT AUSTIN



13000
Bbls.

10400

7800

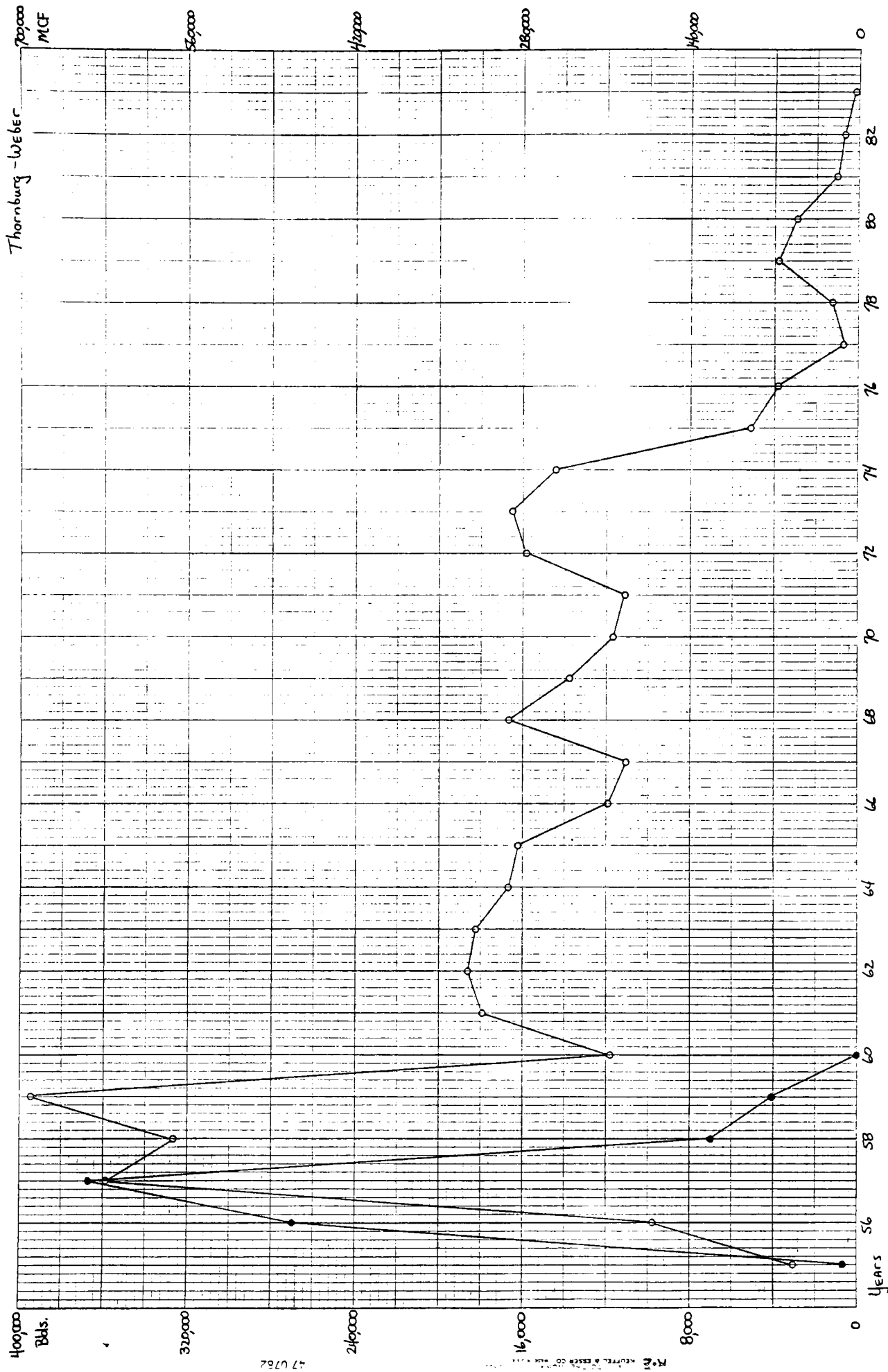
5700

2600

0

47 0782

R.P. KEUFFEL & ESSER CO. MINNEAPOLIS



47 0762

NO. 2 KEUFFEL & ESSER CO. MILWAUKEE, WIS.

400,000
Bbls.

300,000

200,000

100,000

0

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

0

40,000

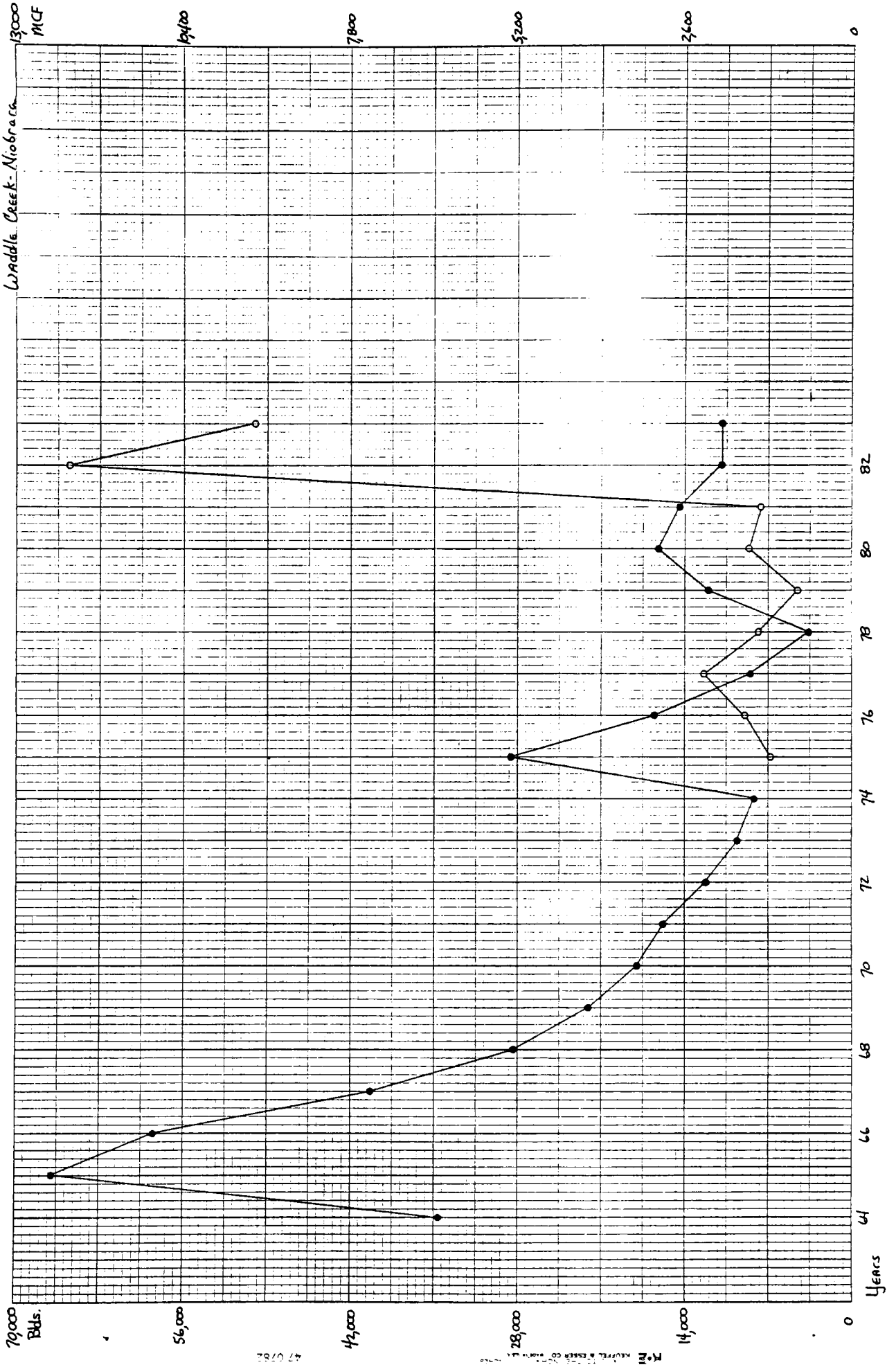
20,000

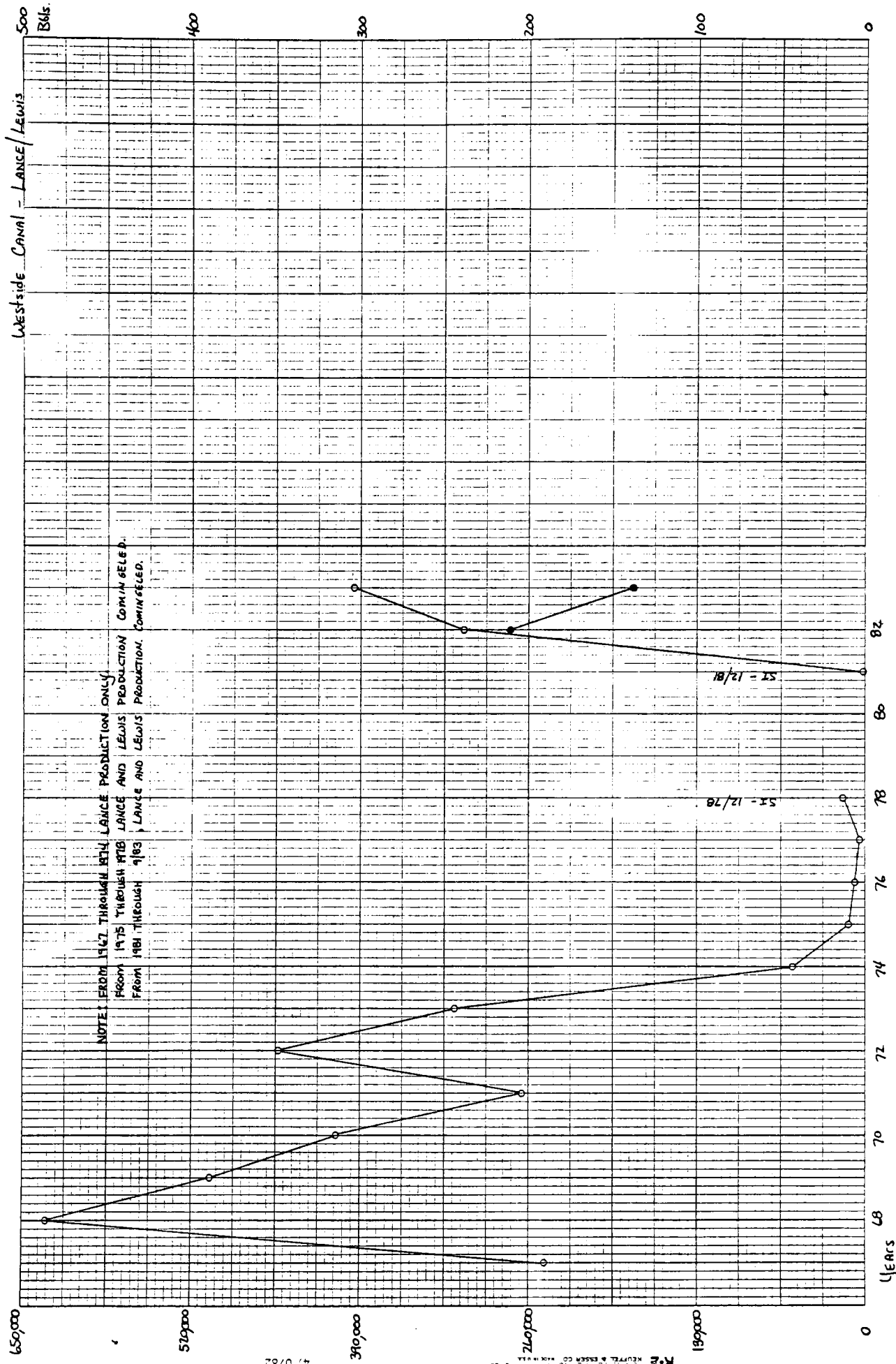
0

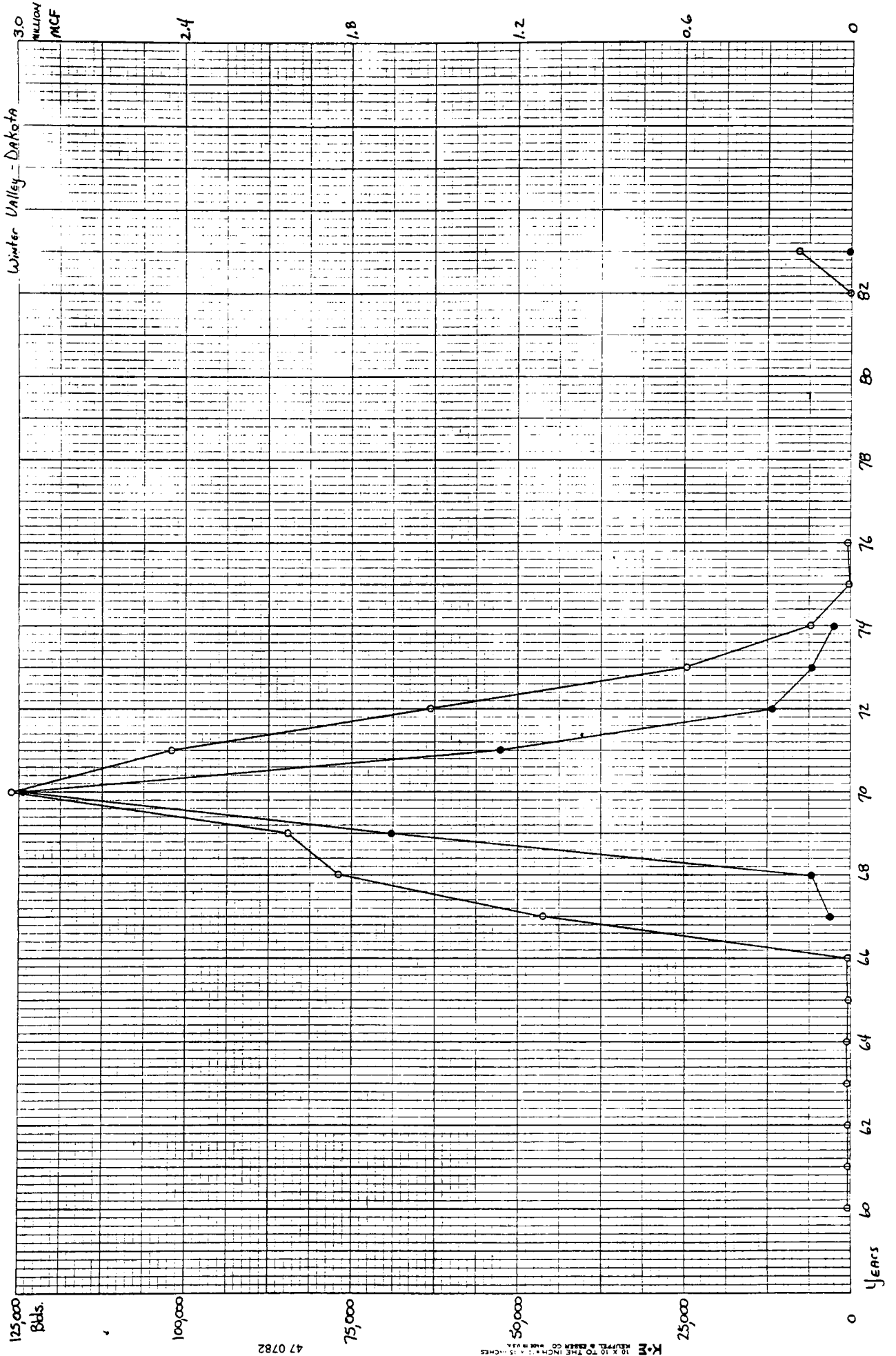
0

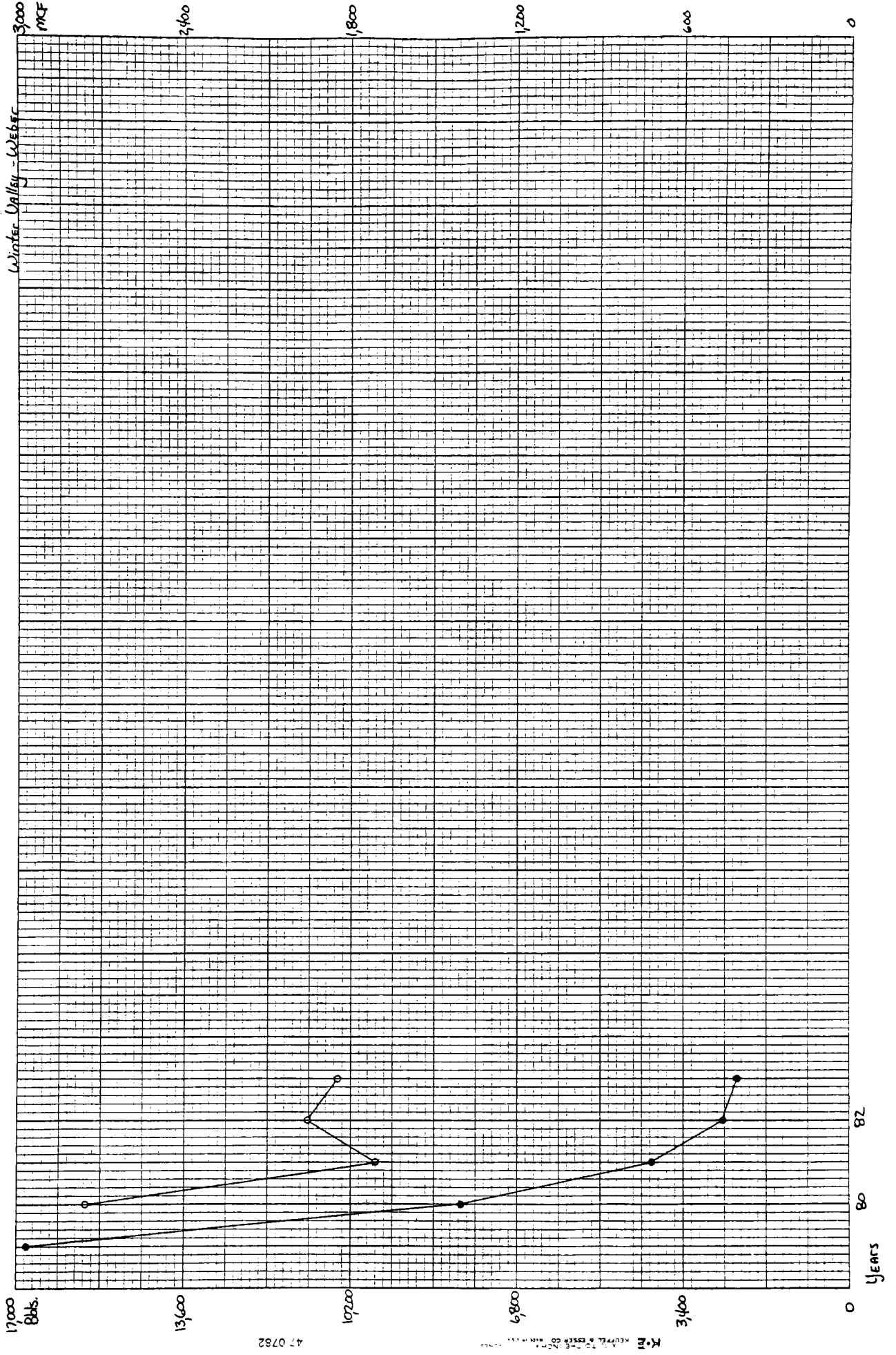
70,000

MCF









Other Publications

INFORMATION SERIES 18--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 83-6: 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.

OPEN-FILE REPORT 84-10: Estimated Oil and Gas Reserves for Garfield County, Colorado;

OPEN-FILE REPORT 84-11: Estimated Oil and Gas Reserves for La Plata County, Colorado;

OPEN-FILE REPORT 84-12: Estimated Oil and Gas Reserves for Moffat County, Colorado;

OPEN-FILE REPORT 84-13: Estimated Oil and Gas Reserves for Elbert County, Colorado;

OPEN-FILE REPORT 84-14: Estimated Oil and Gas Reserves for Mesa County, Colorado;

OPEN-FILE REPORT 84-15: Estimated Oil and Gas Reserves for Routt County, Colorado;

OPEN-FILE REPORT 84-16: Estimated Oil and Gas Reserves for Yuma County, Colorado.

The Colorado Geological Survey has other publications covering topics in mineral fuels, minerals, groundwater, geothermal, and engineering and environmental geology. For a current publication list please contact:

Colorado Geological Survey
Publications Department
1313 Sherman St., Room 715
Denver, CO 80203
(303) 866-2611