

SAN JUAN 29-5 UNIT #91

WELL HISTORY

07-30-80 Well first delivered. Q=2776 MCF/D

11-25-80 Completed 12 day liquid production test - 19 BWP.

05-01-81 Installed stopcock set for 6 hours off & 2 hours on.

12-29-81 Changed stopcock time to 2 hours off & 4 hours on.
QI=1011 MCF/D, QA=252 MCF/D.

04-12-82 Changed stopcock time to 2 hours off & 10 hours on.
QI=607 MCF/D, QA=400 MCF/D.

09-19-84 Well shut in for overproduction.
QI=313 MCF/D, QA=261 MCF/D.

12-20-84 Well scheduled to produce. Logged. Csg pressure=1620#,
tubing pressure=880#.

12-26-84 Equalized tubing and casing. Well still logged.

10-18-85 Swab well.
to
10-29-85

10-30-85 Acidized well.

10-31-85 Swab well.
to
11-02-85

11-11-85 Well on line; stopcock set for 5 hours off & 1 hour on.
QI=575 MCF/D, QA=96 MCF/D.

11-12-85 Well logged.

11-20-85 Swab well.

12-03-85 Well on line; stopcock set for 7 hours off & 1 hour on.
QI=622 MCF/D, QA=78 MCF/D.
Well produced steady and did not log at this setting.

12-16-85 Changed stopcock time to 5 hours off & 1 hour on.
QI=601 MCF/D, QA=100 MCF/D.
Well produced steady and did not log at this setting. First
day of log-off test.

12-18-85 Changed stopcock time to 6½ hours off and 1½ hours on.
QI=571 MCF/D, QA=107 MCF/D.
Well produced steady throughout this time setting. Third
day of log-off test.

EXHIBIT

Produced by

#2

12-20-85 Changed stopcock time to 11 hours off & 1 hour on.
QI=612 MCF/D, QA=51 MCF/D.
Well produced steady throughout time setting. Fifth day
of log-off test.

12-24-85 Changed stopcock time to 5½ hours off & ½ hour on.
QI=618 MCF/D, QA=57 MCF/D.
Well produced steady throughout time setting. Ninth day
of log-off test.

12-26-85 Log-off test concluded. Stopcock time changed back to
11 hours off & 1 hour on.

01-07-86 Log-off test inconclusive. Changed stopcock time to
11½ hours off and ¾ hours on.
QI=721 MCF/D, QA=45 MCF/D.
Start log-off test.

01-08-86 Changed stopcock time to 11½ hours off & ½ hour on.
QI=650 MCF/D, QA=27 MCF/D.
Well produced steady throughout time setting. Second
day of log-off test.

01-15-86 Changed stopcock time setting to 11-¾ hours off and ¼
hour on.
QI=739 MCF/D, QA=15 MCF/D.
Ninth day of log-off test.

01-17-86 Found well logging with stopcock set at 11-¾ hours off
and ¼ hour on. Unloaded well through unit and changed
time to 11 hours off and 1 hour on. Log-off test concluded.

01-22-86 Log-off test conclusive. Changed stopcock time back to
11-¾ hours off and ¼ hour on.
QI=748 MCF/D, QA=16 MCF/D.
Start log-off test.

01-25-86 Well logging with stopcock set at 11-¾ hours off and ¼
hour on. Unloaded well through unit and changed stopcock
time to 5 hours off and 1 hour on. Log-off test concluded.

SWABBING COST SUMMARY

Well Name: San Juan 29-5 Unit #91 DK

Rig: Silver Star Swabbing

Invoice Date	Cost	Days
10/26/85	\$4,287.64	5
11/11/85	3,580.65	5
11/20/85	514.66	1
Total	\$8,381.95	11

NWP Representative: Production technician at \$22.11 hr

Average 10 hrs/day = \$221.10/day
Total = \$2,432.10

NWP Vehicle: 1 ton pickup at \$.77/mile

Distance to San Juan 29-5 Unit #91 = 65 miles one way
130 miles/day at \$.77/mile = \$100.10/day
Total = \$1,101.10

NWP Engineering overhead
& miscellaneous charges: \$165/day

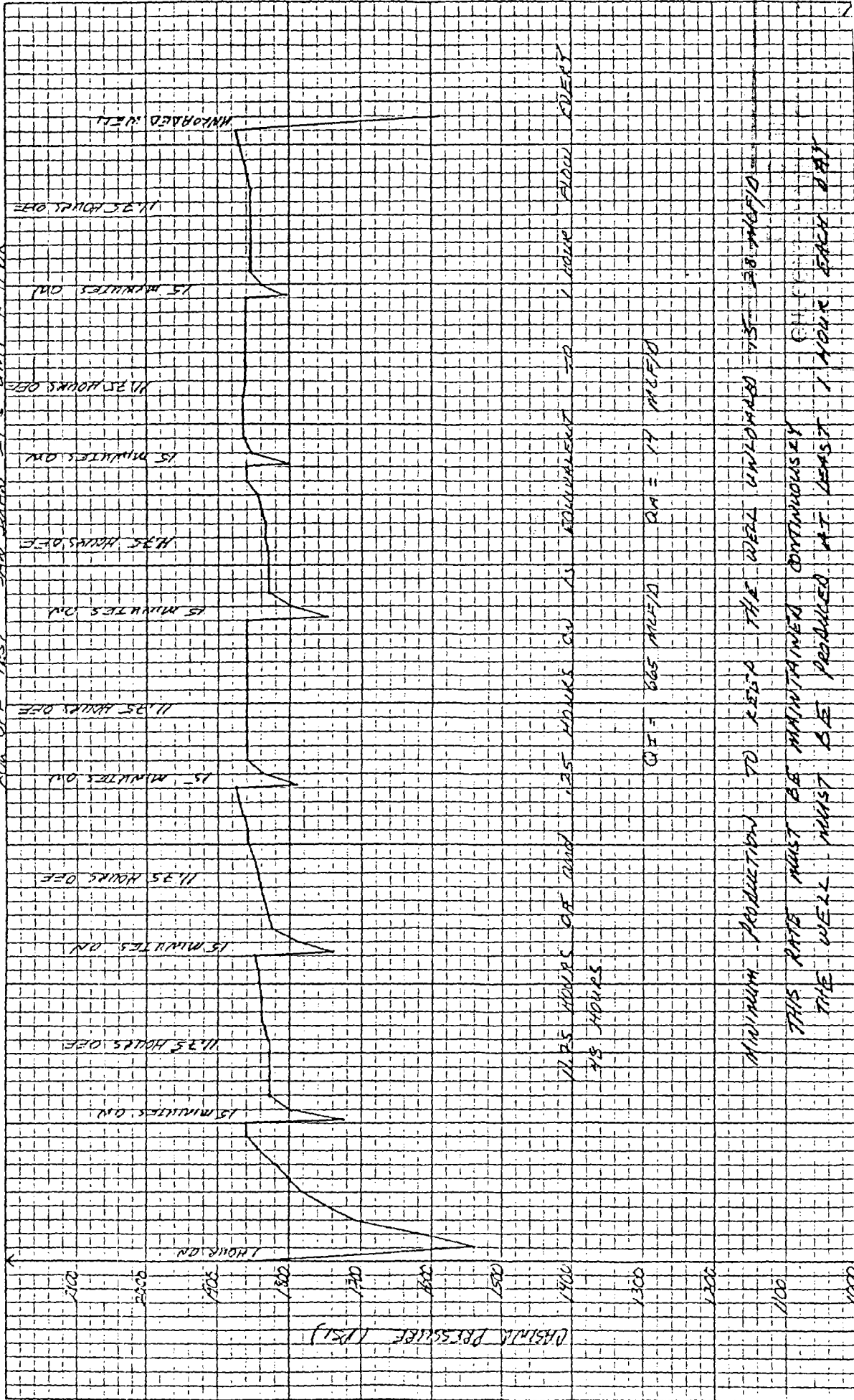
Total = \$1,815.00

Totals:	Rig	\$ 8,381.95
	Man	2,432.10
	Vehicle	1,101.10
	OH	<u>1,815.00</u>
		<u>\$13,730.15</u>

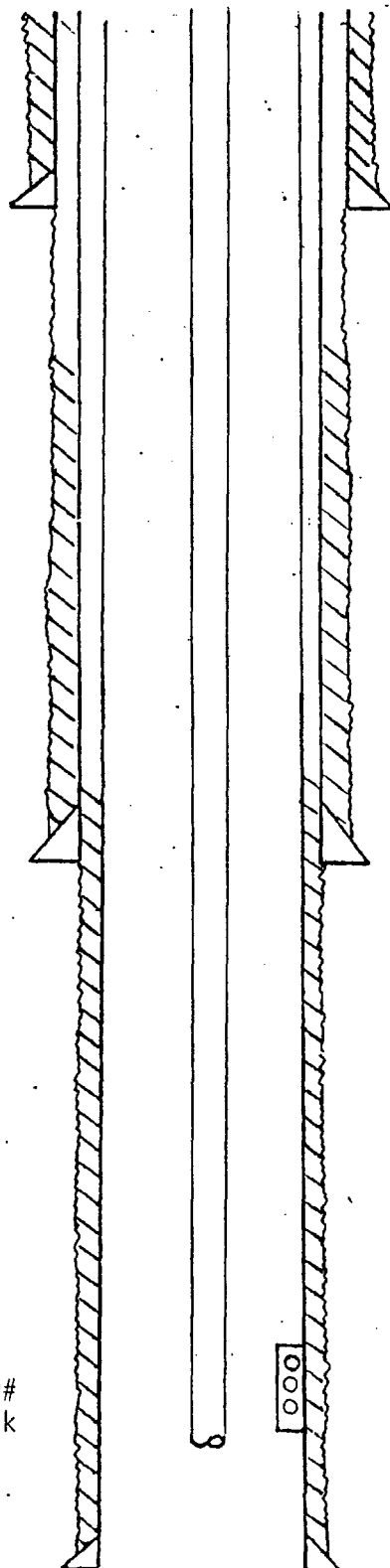
MAM/dd

CHIEF OF DIVISION Santa Fe, New Mexico Case No. _____ EXHIBIT #3
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LOG-OFF TEST SAN JUAN 29-5 UNIT H-910K



WELL BORE DIAGRAM FOR San Juan 29-5 Unit #91 DK



9-5/8" - 36# - Set at 393'
Cmt with 165 sx

7" - 20# & 23# - Set at 4630'
Cmt with 175 sx

2-3/8" - 4.7# - Set at 8750'
SN at 8719'

Completed with 50,000#
of 40/60 sand in slick
water

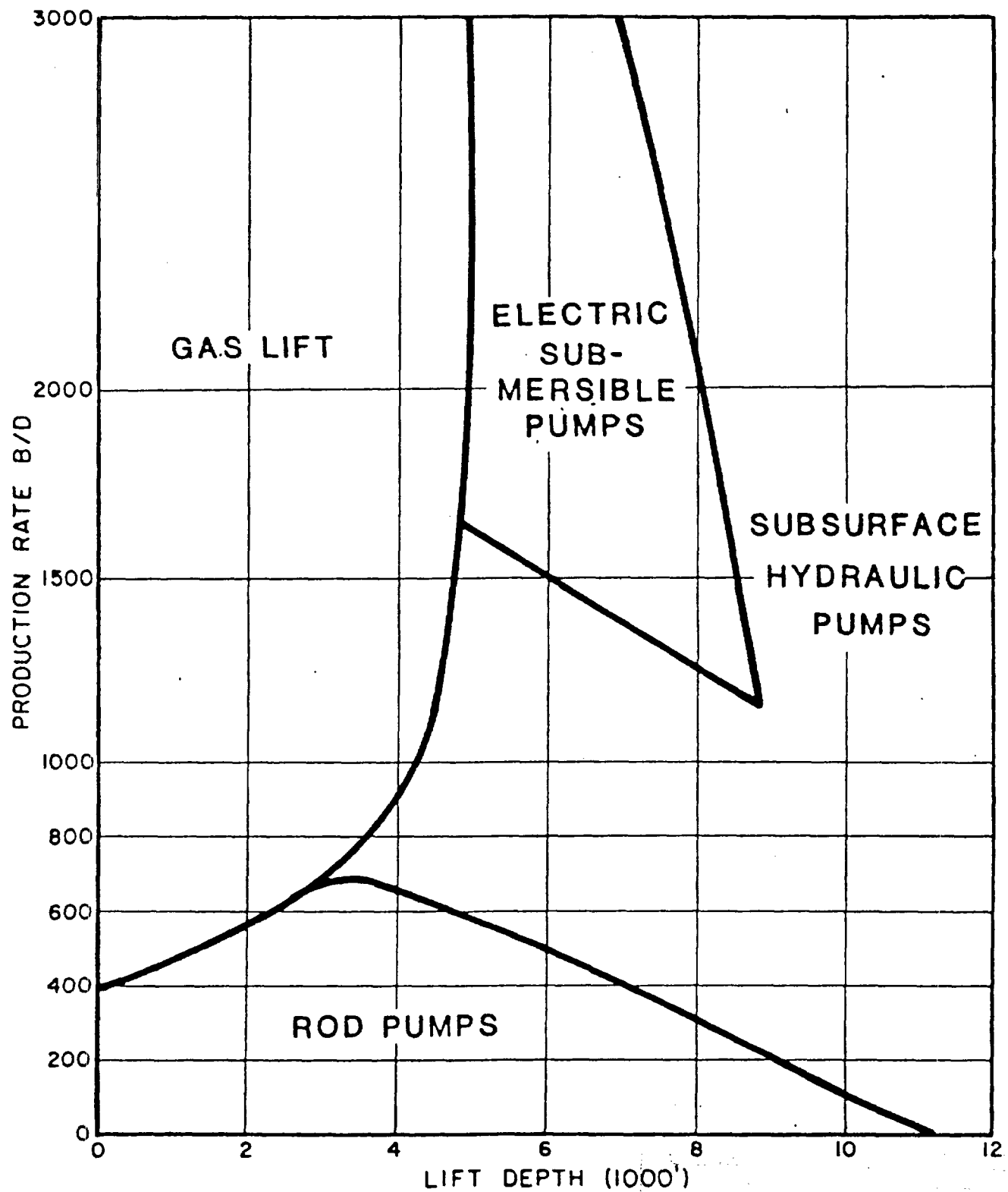
8726' Perfs
8736' 22 holes 2 spf

EXHIBIT

#5

4-1/2" - 10.5# & 11.6# - Set at 8827'
Cmt with 345 sx

OPTIMUM LIFT SYSTEM 10 YEAR LIFE



EXHIBIT

#6

SAN JUAN 29-5 UNIT #91
PRODUCTION ECONOMICS

Gas Price

Market Out Gas Price 8-1-86	=	1.35	\$/MMBTU
Royalties	-	.17	
Taxes	-	.15	
		<u>1.03</u>	\$/MMBTU
BTU Adjustment Factor	x	<u>1.045</u>	MMBTU/MCF
		1.08	\$/MCF

1. Normal Production Costs

Fixed annual overhead costs	\$243/month x 12 mo.	= \$2914
Routine annual production costs	\$125/month x 12 mo.	= \$1493

Breakeven Production Costs

$$(2914 + 1493)/1.08 \text{ \$/MCF} = 4081 \text{ MCF/yr} \times 365 \text{ day/yr} = 11 \text{ MCF/D.}$

Using exponential decline analysis, remaining reserves at abandonment are 14.6 MMCF.

2. Swabbing Costs

Assume 3 swabbing jobs/yr requiring 5 days each time at 1000 \$/day = \$15,000/yr.

Breakeven Production Requirements

$$(2914 + 1493 + 15000)/1.08 \text{ \$/MCF} = 17,970 \text{ MCF/yr} \times 365 \text{ day/yr} = 49 \text{ MCF/D.}$ Assuming 50% curtailment due to low demand breakeven production required is 98 MCF/D.

Using exponential decline analysis, remaining reserves at abandonment are 127.8 MMCF.

3. Pumping Unit Costs

Used pumping unit, rods, motor, pump, downhole separator, and installation cost \$90,000.

Operation costs are negligible.

Assume well life of 7.5 years (28% decline to breakeven volume of 11 MCF/D).

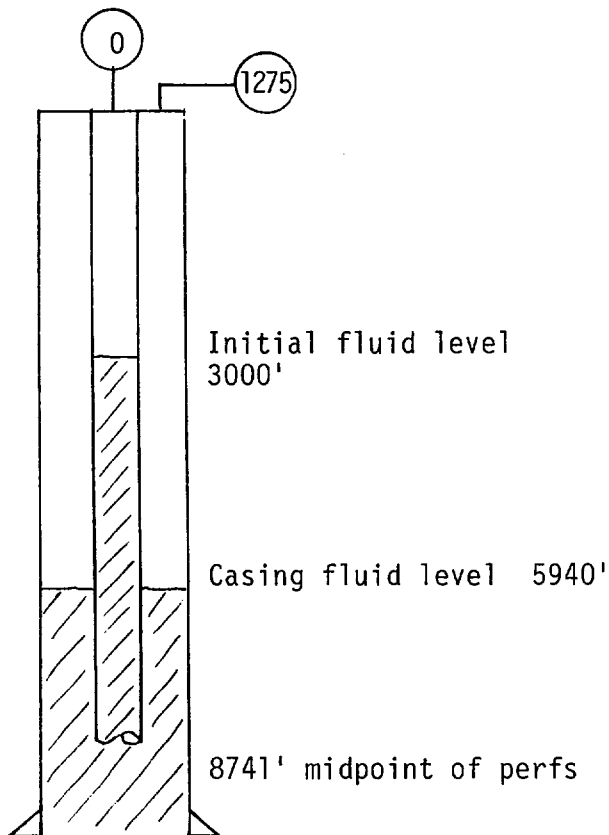
Annual pumping costs $\$90,000/7.5 \text{ yr} = \$12,000$

Breakeven Production Requirements

$$(2914 + 1493 + 12,000)/1.08 \text{ \$/MCF} = 15192 \text{ MCF/yr} \times 365 \text{ day/yr} = 42 \text{ MCF/D.}$ Assuming 50% curtailment due to low demand, breakeven production required is 84 MCF/D.

Using exponential decline analysis, remaining reserves at abandonment are 109.5 MMCF.

San Juan 29-5 Unit #91
Smallbore Tubing Effects



Well Condition 10-16-85

Tbg pressure - 0 PSIG

Csg pressure - 1275 PSIG

Tbg fluid level - 3000 Ft

Calculated BHP - 2485 PSIG

$(8731-3000) \times 8.34 \times .052 = 2485 \text{ PSIG}$

Volume of water in tubing required to log well off:

In 2-3/8", 4.7 lb/Ft, EUE tbg.

$(8731-3000)\text{Ft} \times .00387 \text{ BBL/Ft} = \underline{22.2 \text{ BBLS}}$

In 1-1/2", 2.90 lb/Ft, EUE tbg.

$(8731-3000)\text{Ft} \times .00252 \text{ BBL/Ft} = \underline{14.4 \text{ BBLS}}$

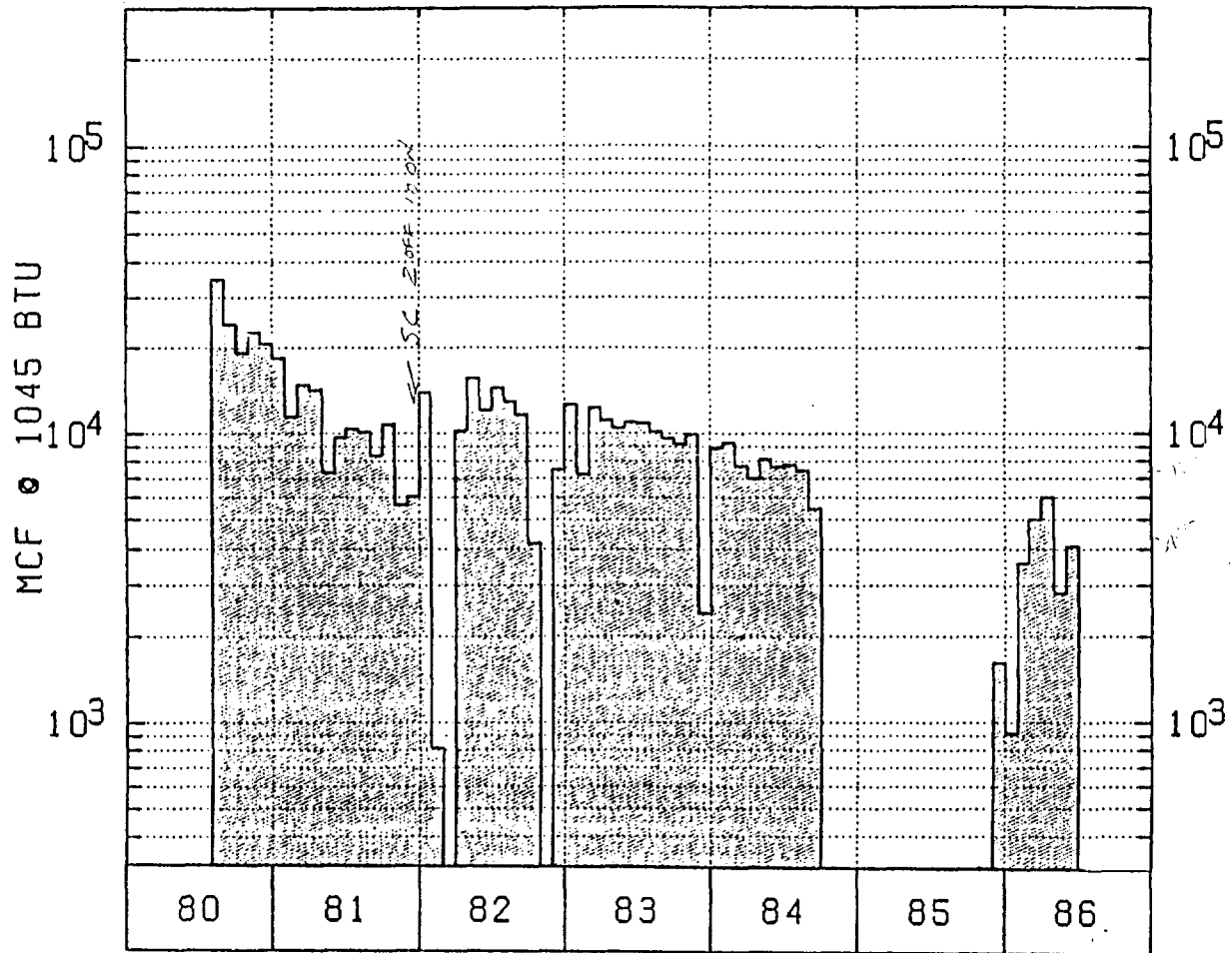
In 1-1/4", 2.33 lb/Ft, IJ tbg.

$(8731-3000)\text{Ft} \times .00185 \text{ BBL/Ft} = \underline{10.6 \text{ BBLS}}$

Exhibit _____

EXHIBIT

SJ 29-5 UNIT #91



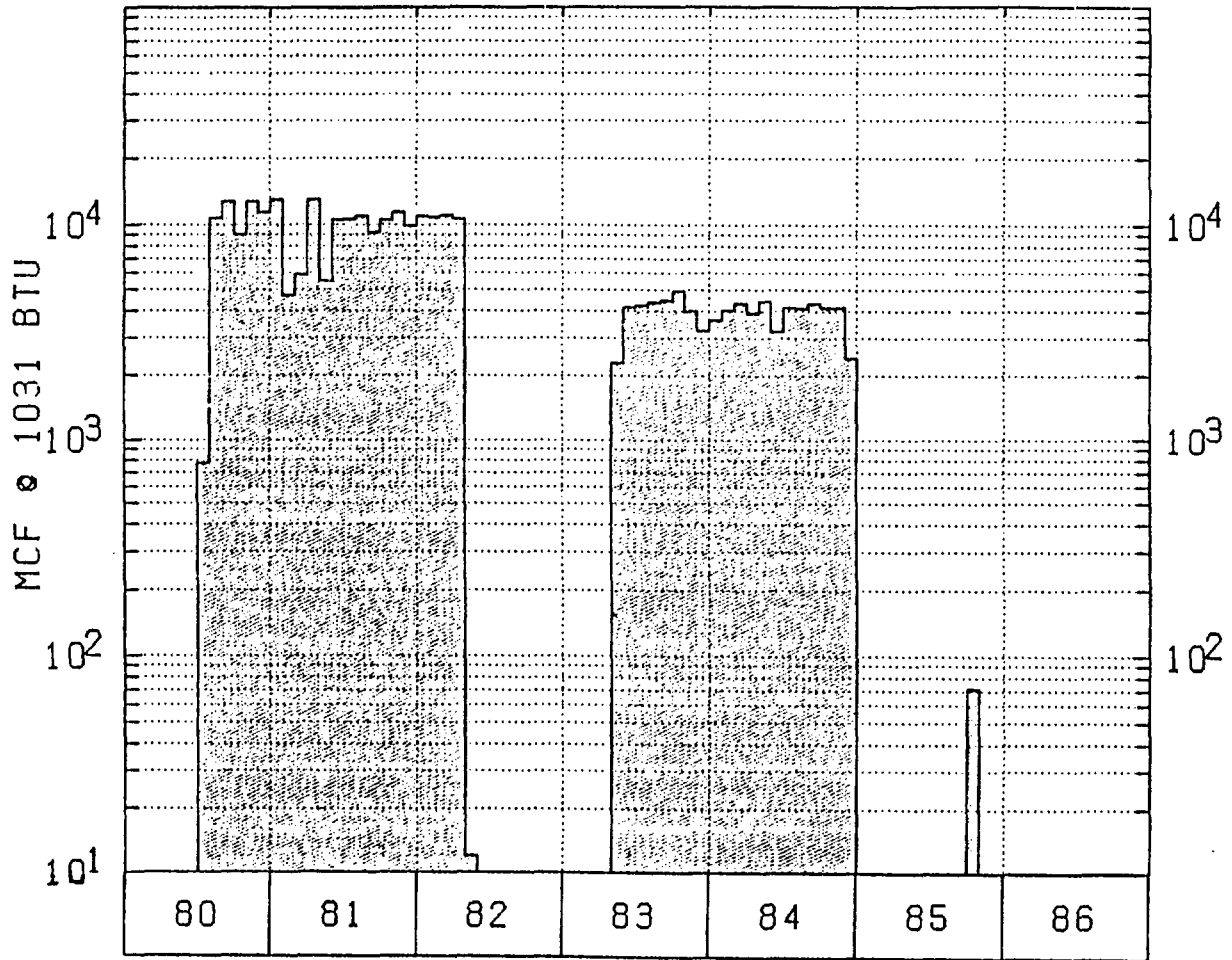
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 N MEXICO
 BASIN FIELD
 DAKOTA FORMATION

MHP RESERVOIR
 ENGINEERING
 07/30/86

EXHIBIT

#9

SJ 29-5 UNIT #90



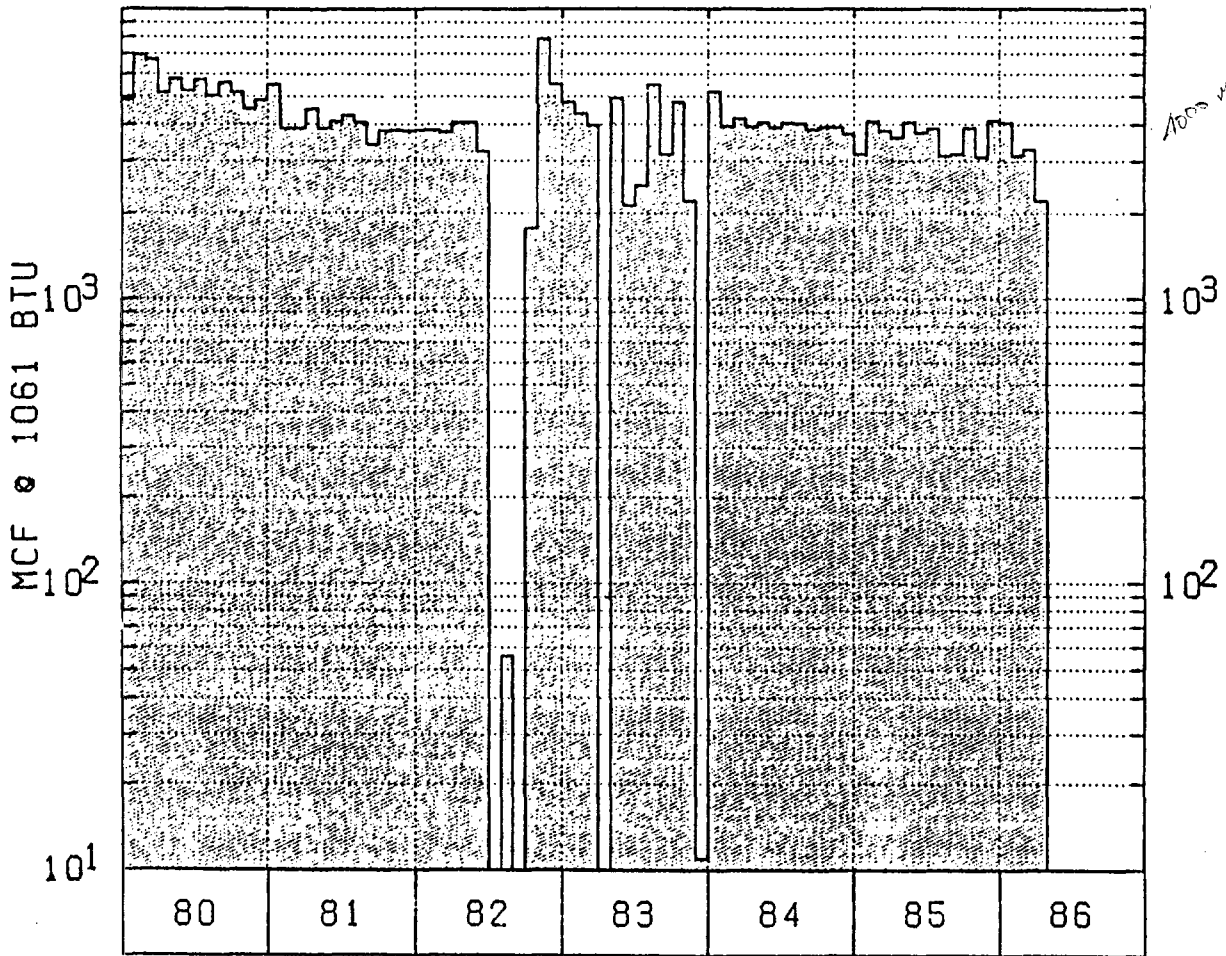
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N MEXICO
BASIN FIELD
DAKOTA FORMATION

NMP RESERVOIR
ENGINEERING
07/30/86

EXHIBIT

#10

SJ 29-5 UNIT COM #70 DK



METER:89270 T29N R5W 28H

N MEXICO
BASIN FIELD
DAKOTA FORMATION

NHP RESERVOIR
ENGINEERING
07/30/86



EXHIBIT

#11

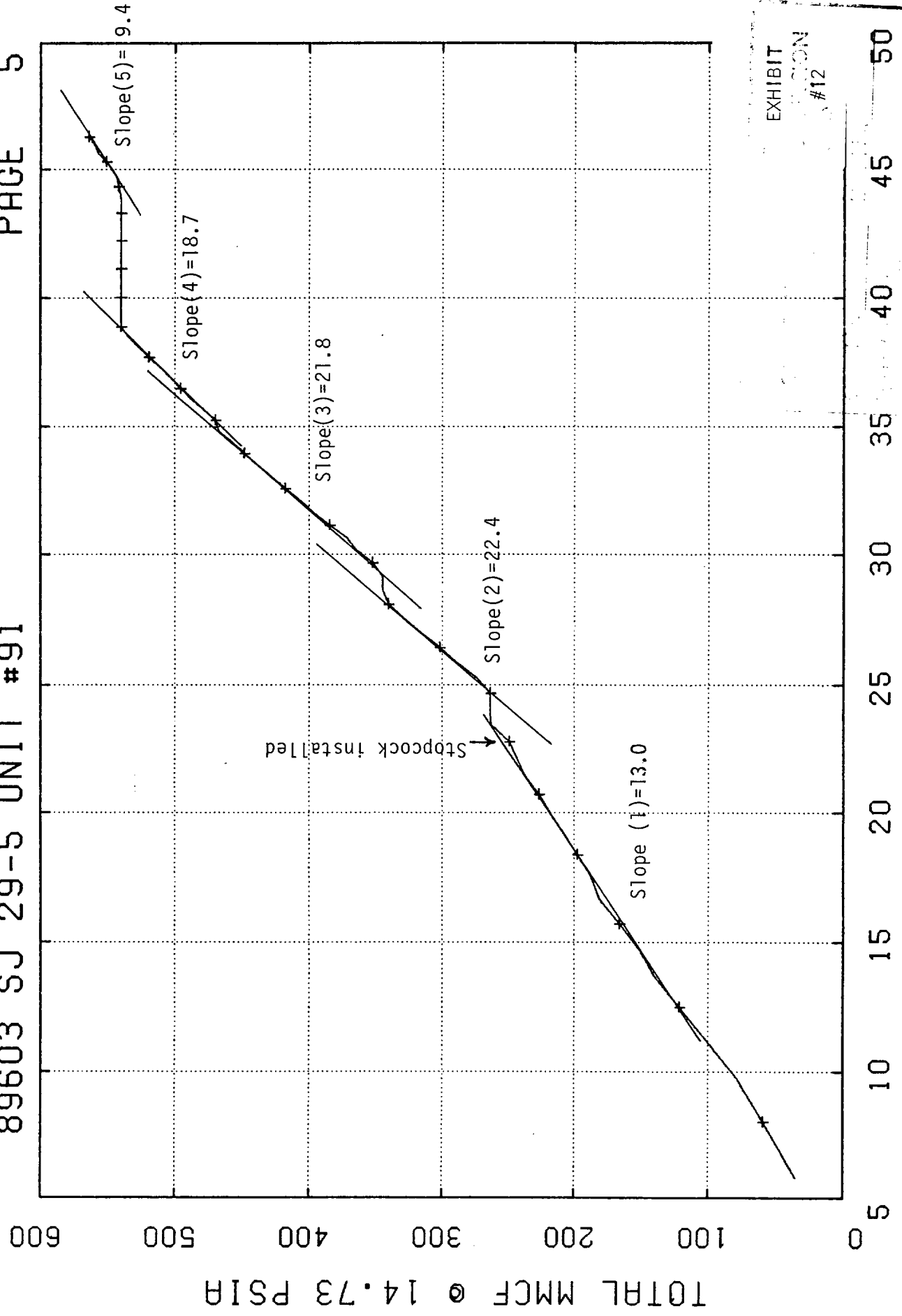
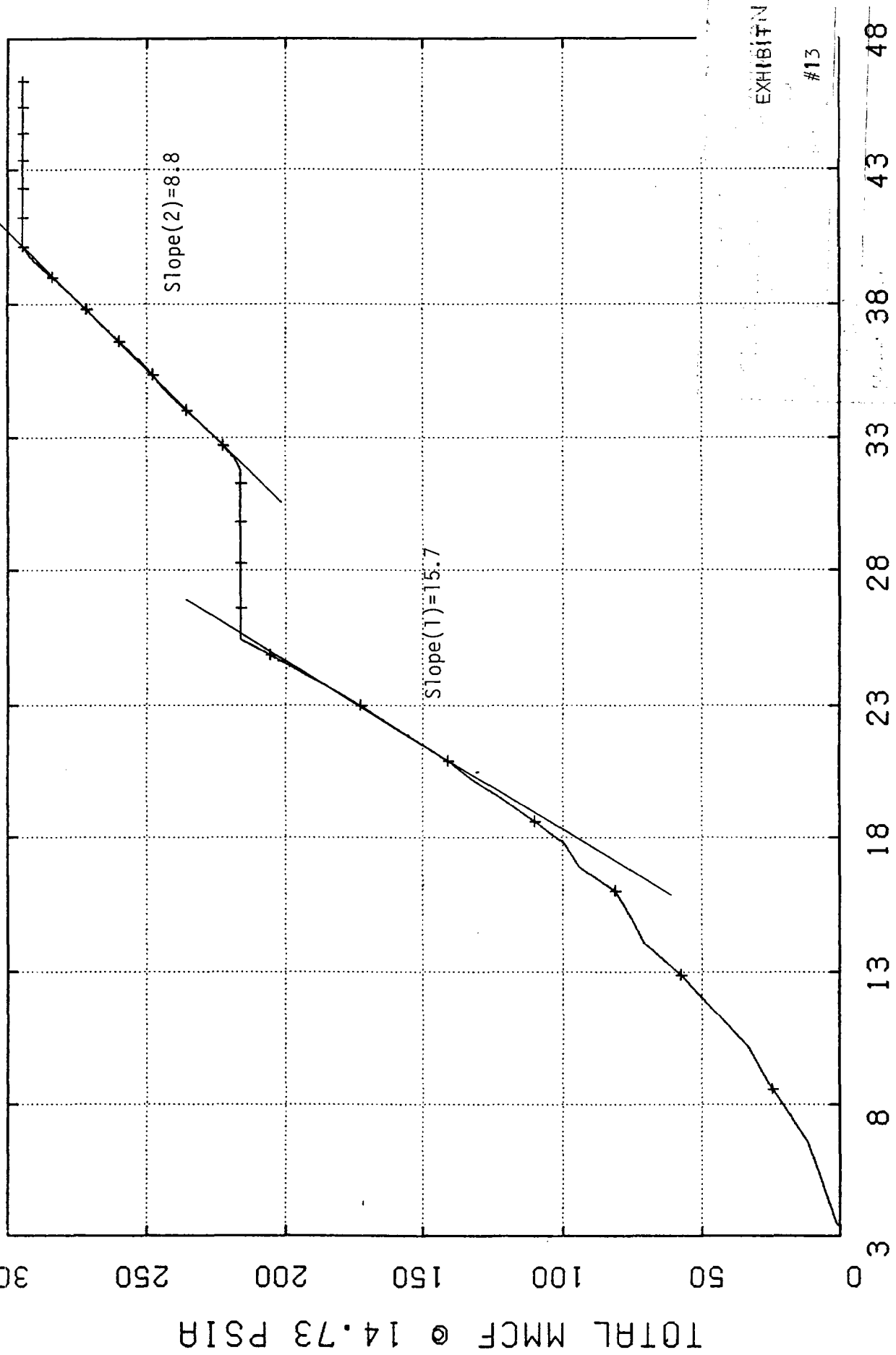
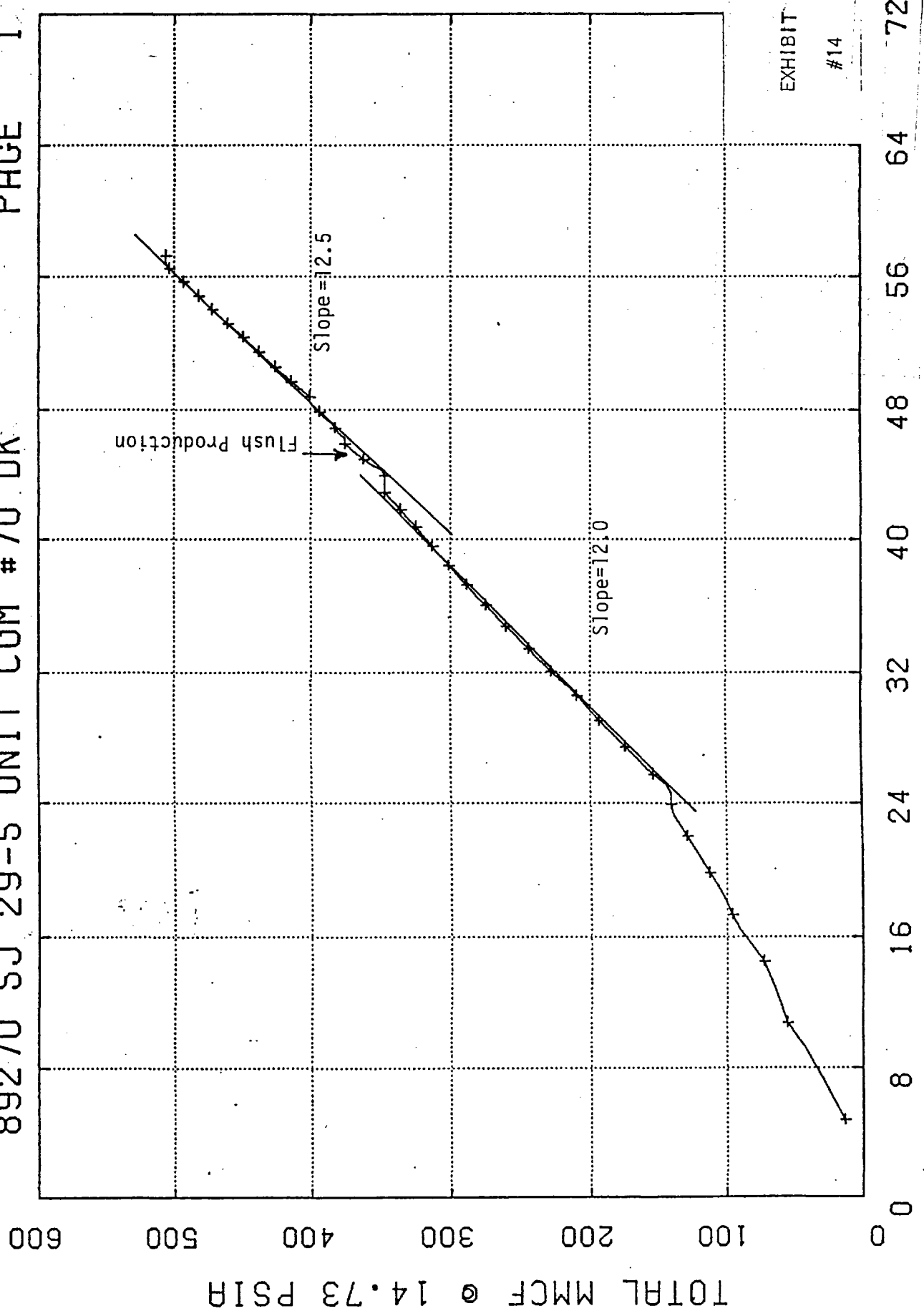


EXHIBIT
SECTION
#12

CALENDAR DAYS**0.5



CALENDAR DAYS**0.5



SAN JUAN 29-5 UNIT #91 DK

$$Q_t = Q_i \cdot e^{-D \cdot T} \quad (1)$$

$$-D = 1/T \cdot \ln(Q_t/Q_i)$$

$$1980 \ Q_i = 754 \text{ MCF/D}$$

$$1984 \ Q_t = 245 \text{ MCF/D}$$

$$T = 4$$

$$\ln(Q_t/Q_i) = -1.12$$

$$-D = -0.28$$

WHERE: Q_t = PRODUCING RATE AT TIME = T (MCF/D)
 Q_i = INITIAL PRODUCING RATE (MCF/D)
 e = EXPONENTIAL FUNCTION
 $-D$ = % DECLINE (decimal)
 T = TIME PERIOD (years)

ESTIMATED RESERVES LOST FROM THE #91 LOGGING

$$N_p = \frac{Q_i - Q_t}{D} \cdot 365 \quad (1)$$

WHERE: N_p = RESERVES REMAINING (MMCF)
 Q_i = INITIAL PRODUCING RATE (MCF/D)
 Q_t = PRODUCING RATE AT ABANDONMENT (MCF/D)
 D = % DECLINE (decimal)

RESERVES BEFORE LOGGING:

$$Q_i = 245.00 \text{ MCF/D}$$

$$Q_t = 0.00 \text{ MCF/D}$$

$$D = 0.28$$

$$N_p = 319.37 \text{ MMCF}$$

RESERVES AFTER LOGGING:

$$Q_i = 146 \text{ MCF/D}$$

$$Q_t = 0.00$$

$$D = 0.28$$

$$N_p = 190.32$$

$$\text{LOST RESERVES} = 129.05$$

ESTIMATED RESERVES LOST
FROM PREMATURE ABANDONMENT

$$Q_i = 49.00$$

$$Q_t = 0.00$$

$$D = 0.28$$

$$N_p = 64.0 \text{ MMCF}$$

① ARPS, J.J.: ESTIMATION OF PRIMARY OIL AND GAS RESERVES, PETROLEUM PRODUCTION HANDBOOK, VOL. II; RESERVOIR ENGINEERING, SPE OF AIME, 1962, P. 37-43