L

RESPONSE TO FRAC TREATMENT

Treated well: Dugan Tapacitos 4 (Sec. 31, T-26N, R-2W)

Observation well: Canada Ojitos Unit E-6 (Sec. 6, T-25N, R-1W)

Date: February 13, 1986

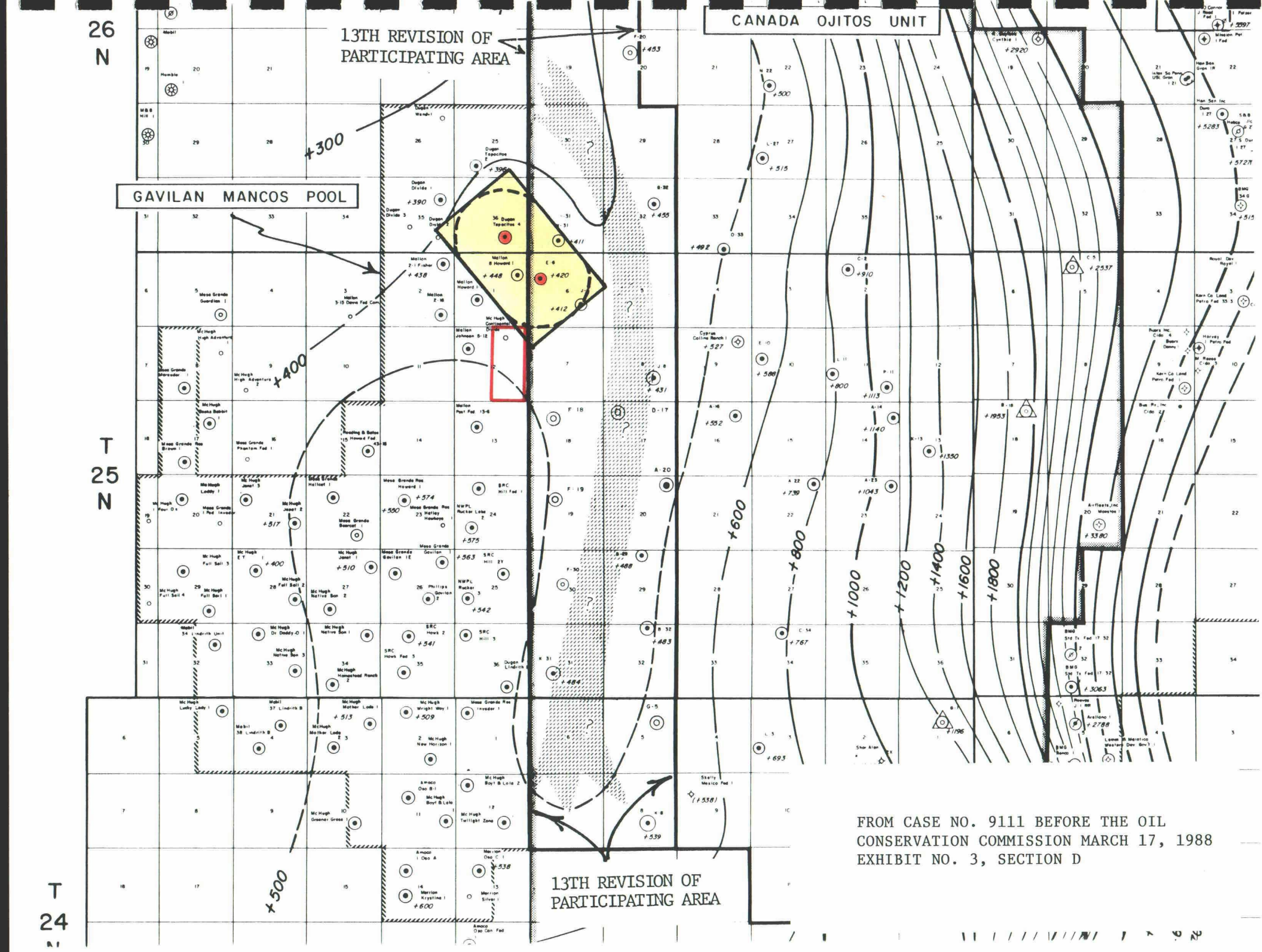
See plat on facing page.

Because of the relatively short observation time (.7 day) and small pressure differential of .6#, the calculated pore space, ϕh, is probably not as definitive of average reservoir conditions as for some of the other tests, although it may more accurately reflect the properties of the high capacity system.

Test Summary of Area and Pore Space:

Area of Investigation at .7 days: approximately 1,200 acres.
Pore space, ϕh = .47 or 2800 stock tank barrels per acre.
A, B and C zones open.

FROM CASE NO. 9111 BEFORE THE OIL
CONSERVATION COMMISSION MARCH 17, 1988
EXHIBIT NO. 3, SECTION D

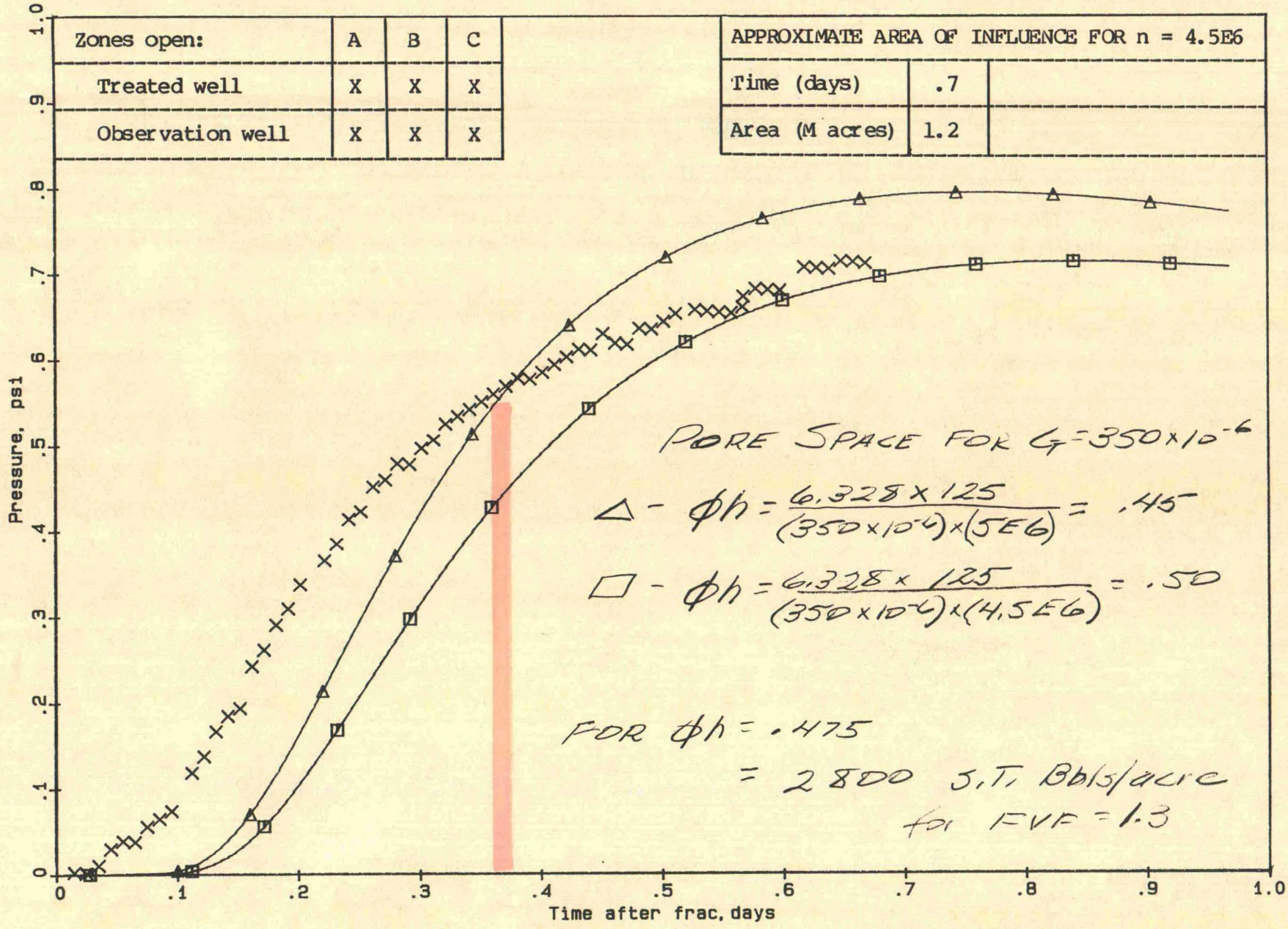

26 N
T 25 N
T 24 N
13TH REVISION OF PARTICIPATING AREA
CANADA OJITOS UNIT
GAVILAN MANCOS POOL
13TH REVISION OF PARTICIPATING AREA
+300
+400
+500
+600
+800
+1000
+1200
+1400
+1600
+1800
FROM CASE NO. 9111 BEFORE THE OIL CONSERVATION COMMISSION MARCH 17, 1988
EXHIBIT NO. 3, SECTION D

RESPONSE TO TAPACITOS 4 FRAC

X COU E-6 (FILE COUE6)
□ Kh/u=125, n=4.5E6 (FILE 185)
△ Kh/u=125, n=5E6 (FILE 186)

Zones open:	A	B	C
Treated well	X	X	X
Observation well	X	X	X

APPROXIMATE AREA OF INFLUENCE FOR n = 4.5E6		
Time (days)	.7	
Area (M acres)	1.2	



PORE SPACE FOR $G = 350 \times 10^{-6}$

$\triangle - \phi h = \frac{6.328 \times 125}{(350 \times 10^{-4}) \times (5E6)} = .45$

$\square - \phi h = \frac{6.328 \times 125}{(350 \times 10^{-4}) \times (4.5E6)} = .50$

FOR $\phi h = .475$

= 2800 S.T. Bbls/acre

for FVF = 1.3

FROM CASE NO. 9111 BEFORE THE OIL CONSERVATION COMMISSION MARCH 17, 1988
EXHIBIT NO. 3, SECTION D

M

RESPONSE TO FRAC TREATMENT

Treated well: Canada Ojitos Unit N-31 (Sec. 31, T-26N, R-1W)

Observation well: Canada Ojitos Unit E-6 (Sec. 6, T-25N, R-1W)

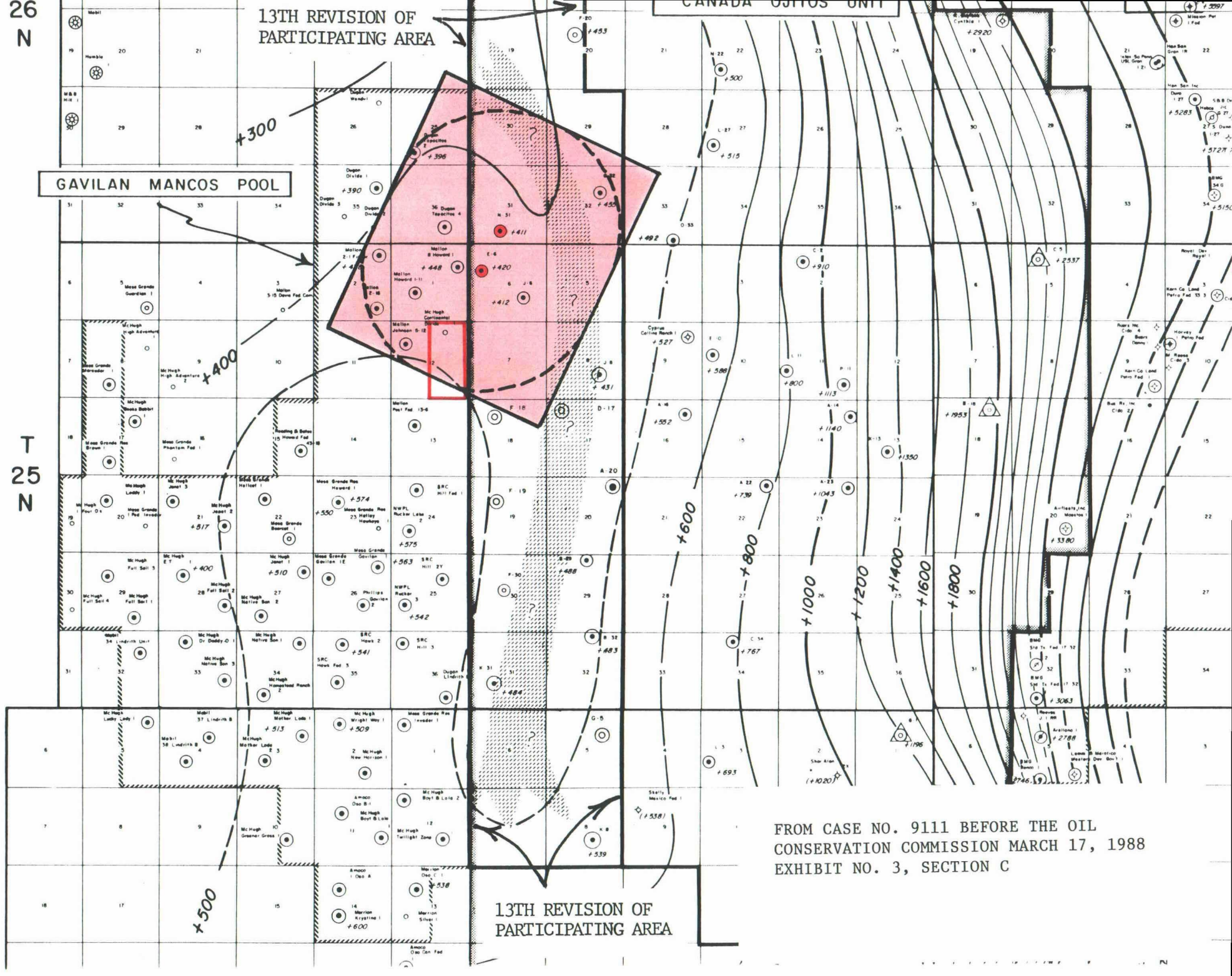
Date: April 1, 1986

See plat on facing page.

Test Summary of Area and Pore Space:

Area of Investigation at 4 days: approximately 5,000 acres
Pore space, ϕh = .25 or 1500 stock tank barrels per acre.
A, B and C zones open.

FROM CASE NO. 9111 BEFORE THE OIL
CONSERVATION COMMISSION MARCH 17, 1988
EXHIBIT NO. 3, SECTION C



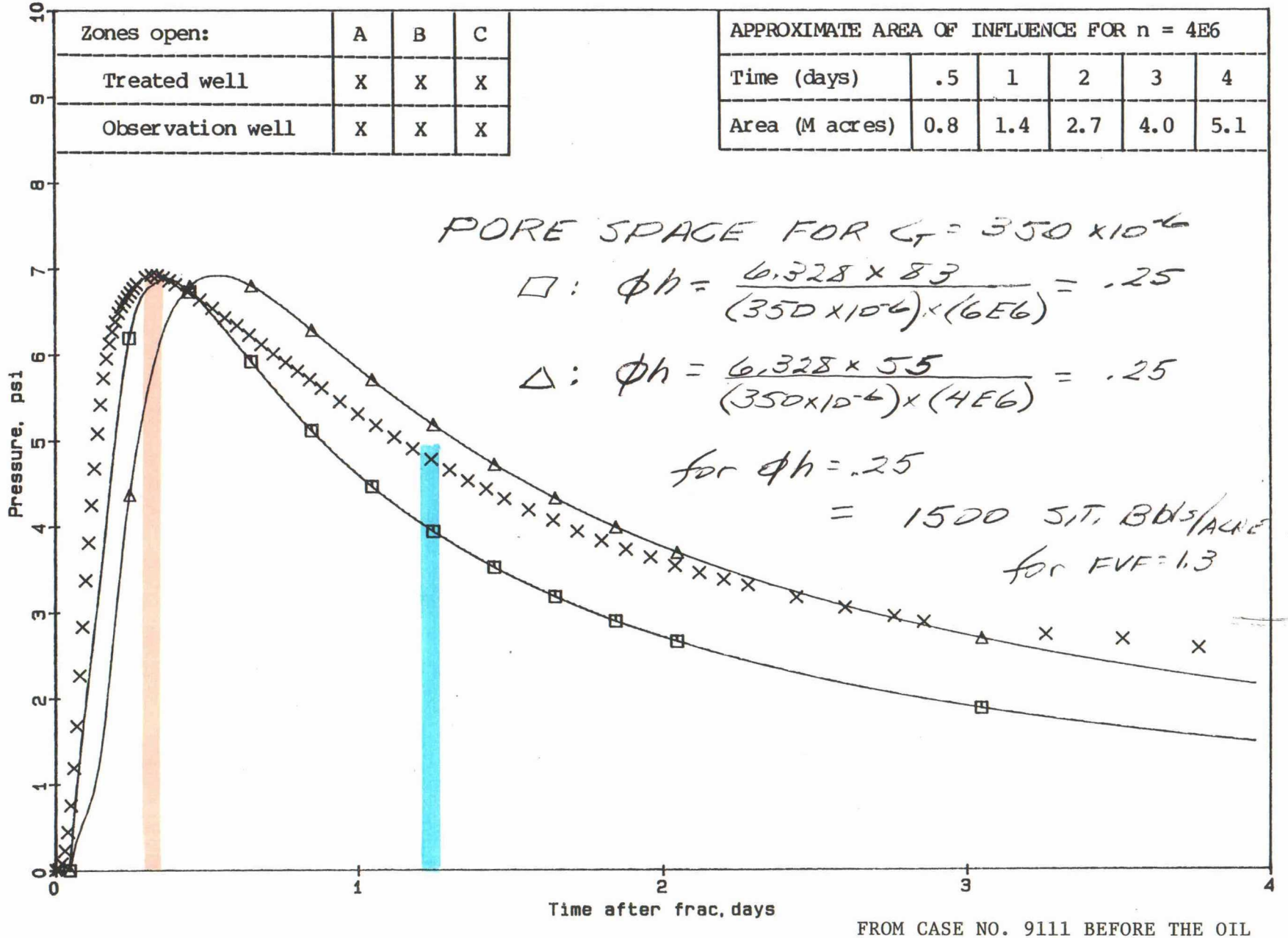
FROM CASE NO. 9111 BEFORE THE OIL CONSERVATION COMMISSION MARCH 17, 1988
EXHIBIT NO. 3, SECTION C

RESPONSE TO N-31 FRAC 4/1/86

× COU E-6 (FILE COUN31)
△ Kh/u = 55, n = 4E6 (FILE 146)
□ Kh/u = 83, n = 6E6 (FILE 189)

Zones open:	A	B	C
Treated well	X	X	X
Observation well	X	X	X

APPROXIMATE AREA OF INFLUENCE FOR n = 4E6					
Time (days)	.5	1	2	3	4
Area (M acres)	0.8	1.4	2.7	4.0	5.1



PORE SPACE FOR $C_T = 350 \times 10^{-6}$

□: $\phi h = \frac{6,328 \times 83}{(350 \times 10^{-6}) \times (6E6)} = .25$

△: $\phi h = \frac{6,328 \times 55}{(350 \times 10^{-6}) \times (4E6)} = .25$

for $\phi h = .25$

= 1500 S.T. BBLS/ACRE FT

for FVF = 1.3

FROM CASE NO. 9111 BEFORE THE OIL CONSERVATION COMMISSION MARCH 17, 1988
EXHIBIT NO. 3, SECTION C

N

MULTIPLE WELL INTERFERENCE TEST
SURROUNDING CANADA OJITOS UNIT D-17
(SECTION 17, TOWNSHIP 25 NORTH, RANGE 1 WEST)
CONDUCTED DURING OIL CONSERVATION COMMISSION ORDERED SHUT-IN PERIOD
NOVEMBER 1987

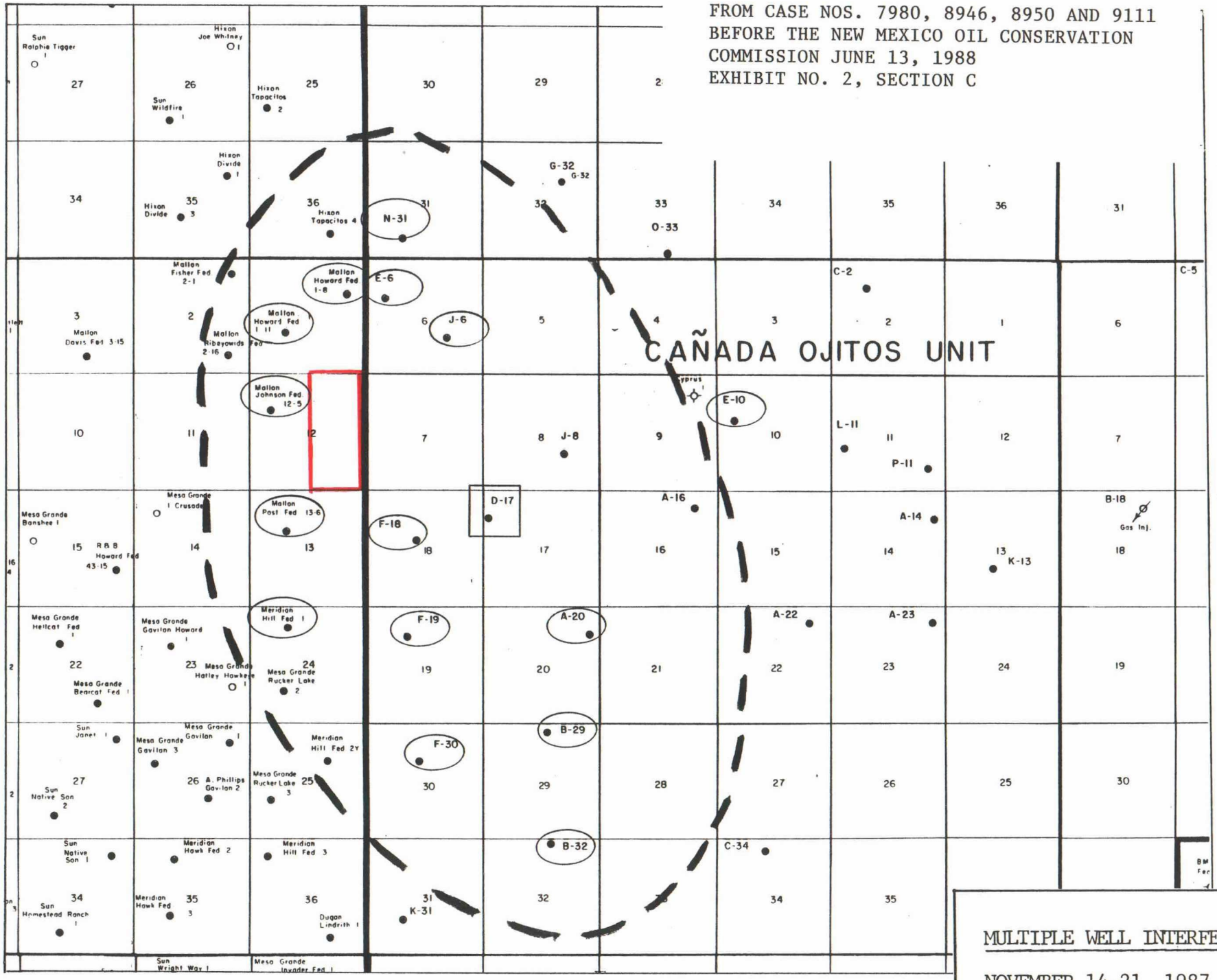
The circled wells on the facing page in the vicinity of the Canada Ojitos Unit D-17 were so located and producing at reservoir voidage rates high enough to influence the pressure in the vicinity of the D-17 observation well when these wells were shut in for the November 1987 Oil Conservation Commission ordered pressure survey.

The test indicates average values for Kh/u of 55 darcy feet and pore volume of approximately 1000 barrels per acre as shown on the following pages.

For GOR's of 1,000 to 8,000 the values for Koh range from 16 darcy feet to 2 darcy feet.

FROM CASE NOS. 7980, 8946, 8950 AND 9111
BEFORE THE NEW MEXICO OIL CONSERVATION
COMMISSION JUNE 13, 1988
EXHIBIT NO. 2, SECTION C

FROM CASE NOS. 7980, 8946, 8950 AND 9111
BEFORE THE NEW MEXICO OIL CONSERVATION
COMMISSION JUNE 13, 1988
EXHIBIT NO. 2, SECTION C



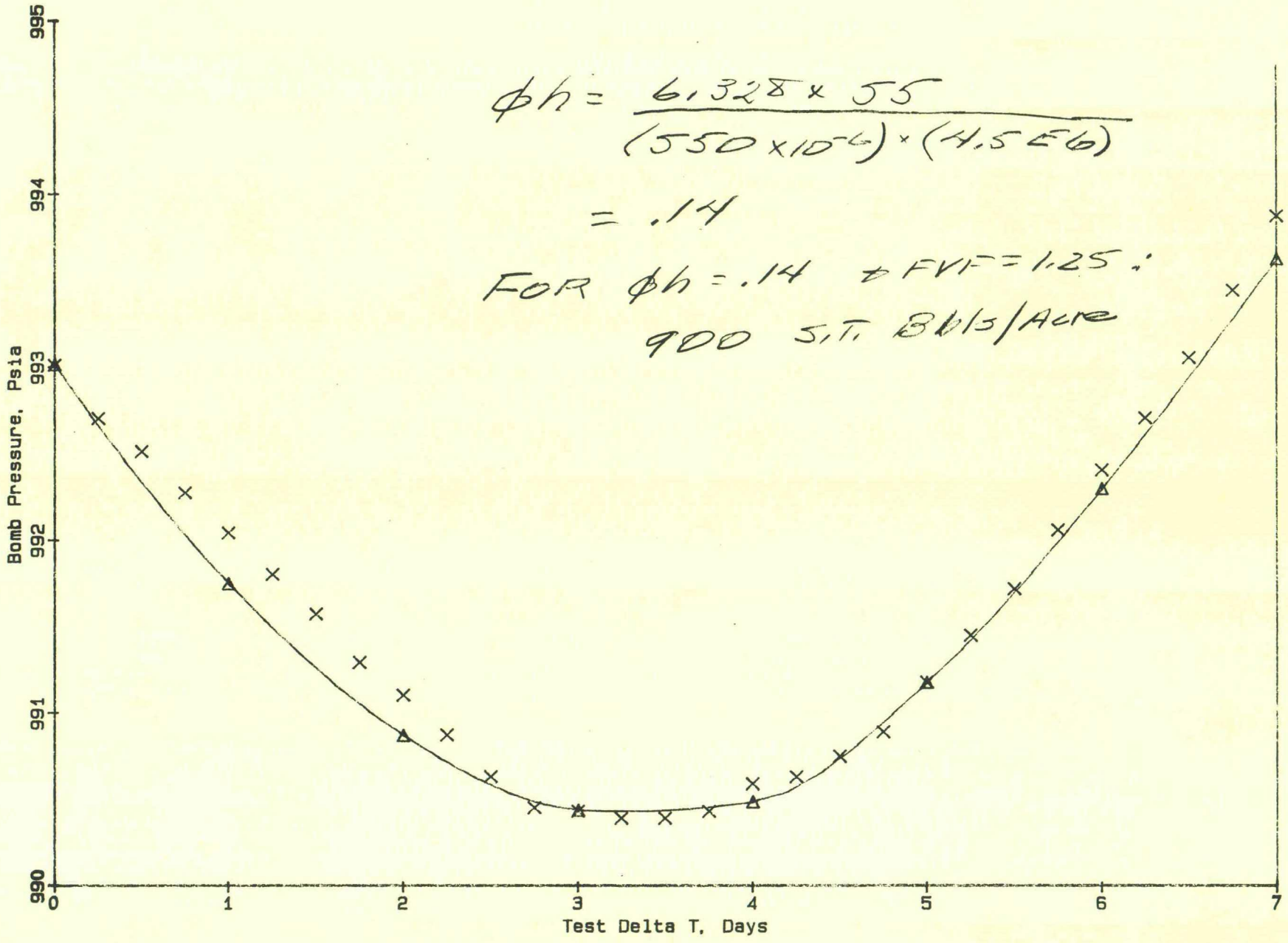
MULTIPLE WELL INTERFERENCE TEST

NOVEMBER 14-21, 1987
COU D-17 OBSERVATION WELL

COU D-17 INTERFERENCE TEST
NOVEMBER 11-21, 1987

× GRC RUN #1008. (FILE RUN1008)
△ Kh/u = 55. n = 4.5E6 (ITW91)

FROM CASE NOS. 7980, 8946, 8950 AND 9111
BEFORE THE NEW MEXICO OIL CONSERVATION
COMMISSION JUNE 13, 1988
EXHIBIT NO. 2, SECTION C



$$\phi h = \frac{6,328 \times 55}{(550 \times 10^{-6}) \times (4.5E6)}$$

$$= .14$$

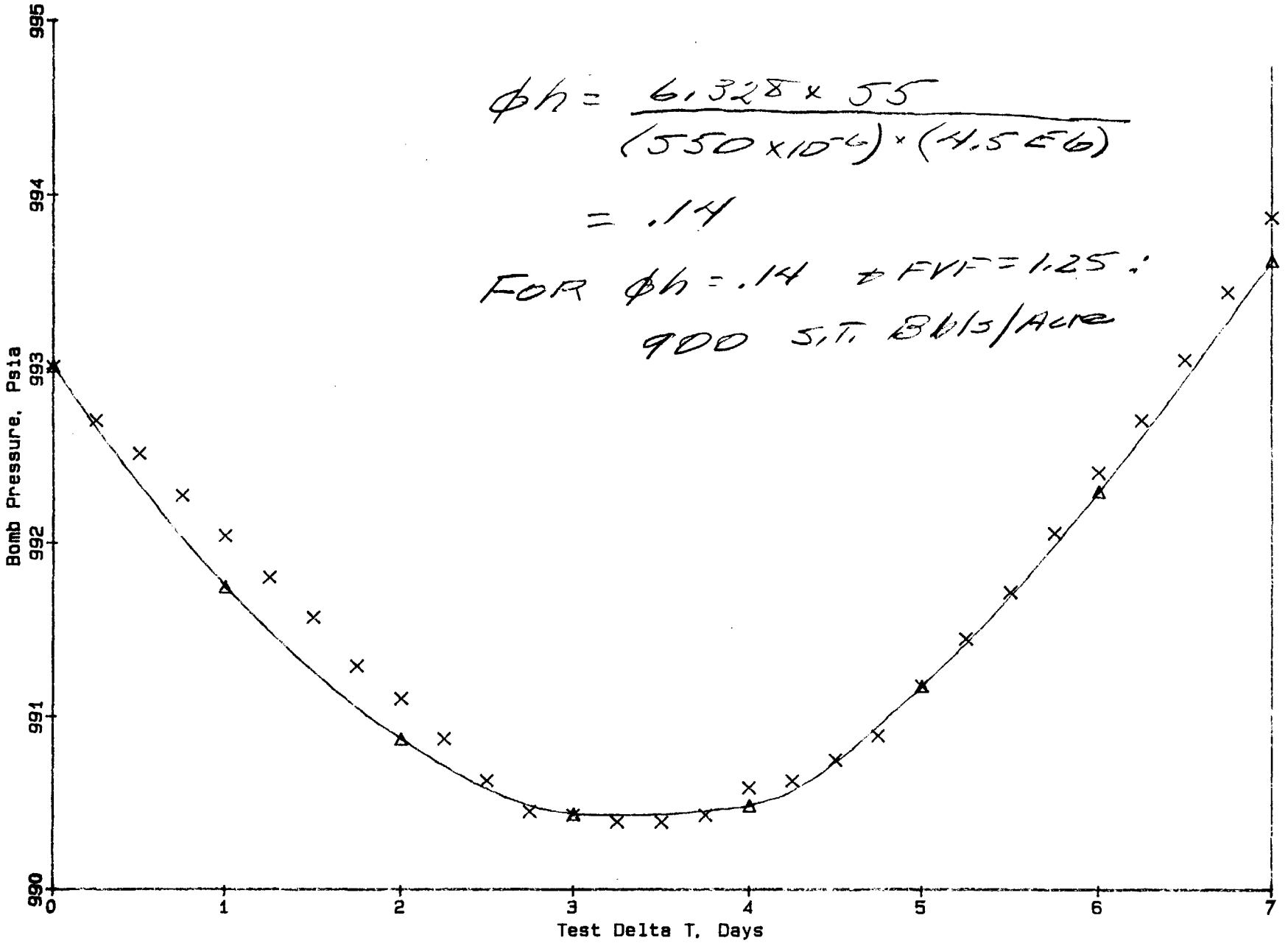
FOR $\phi h = .14$ & FVF = 1.25 :

900 S.T. Bbls/Acre

COU D-17 INTERFERENCE TEST
NOVEMBER 11-21, 1987

× GRC RUN #1008. (FILE RUN1008)
△ Kh/u = 55. n = 4.5E6 (ITW91)

FROM CASE NOS. 7980, 8946, 8950 AND 9111
BEFORE THE NEW MEXICO OIL CONSERVATION
COMMISSION JUNE 13, 1988
EXHIBIT NO. 2, SECTION C



$$\phi h = \frac{6,328 \times 55}{(550 \times 10^{-6}) \times (4.5E6)}$$

$$= .14$$

FOR $\phi h = .14$ → FVF = 1.25 :

900 S.T. Bbls/Acre

o

MULTIPLE WELL INTERFERENCE TEST
MALLON WELLS ADJOINING CANADA OJITOS UNIT E-6
(SECTION 6, TOWNSHIP 25 NORTH, RANGE 1 WEST)
CONDUCTED DURING MAY, 1986

The circled wells on the facing page in the vicinity of the Canada Ojitos Unit E-6 were so located and producing at reservoir voidage rates high enough to influence the pressure in the vicinity of the E-6 observation well.

The test indicates average values for Kh/u of 35 darcy feet; which for a GOR of 1300 cubic feet per barrel (dominant well in the test) shows a value of Koh of 10 darcy feet.

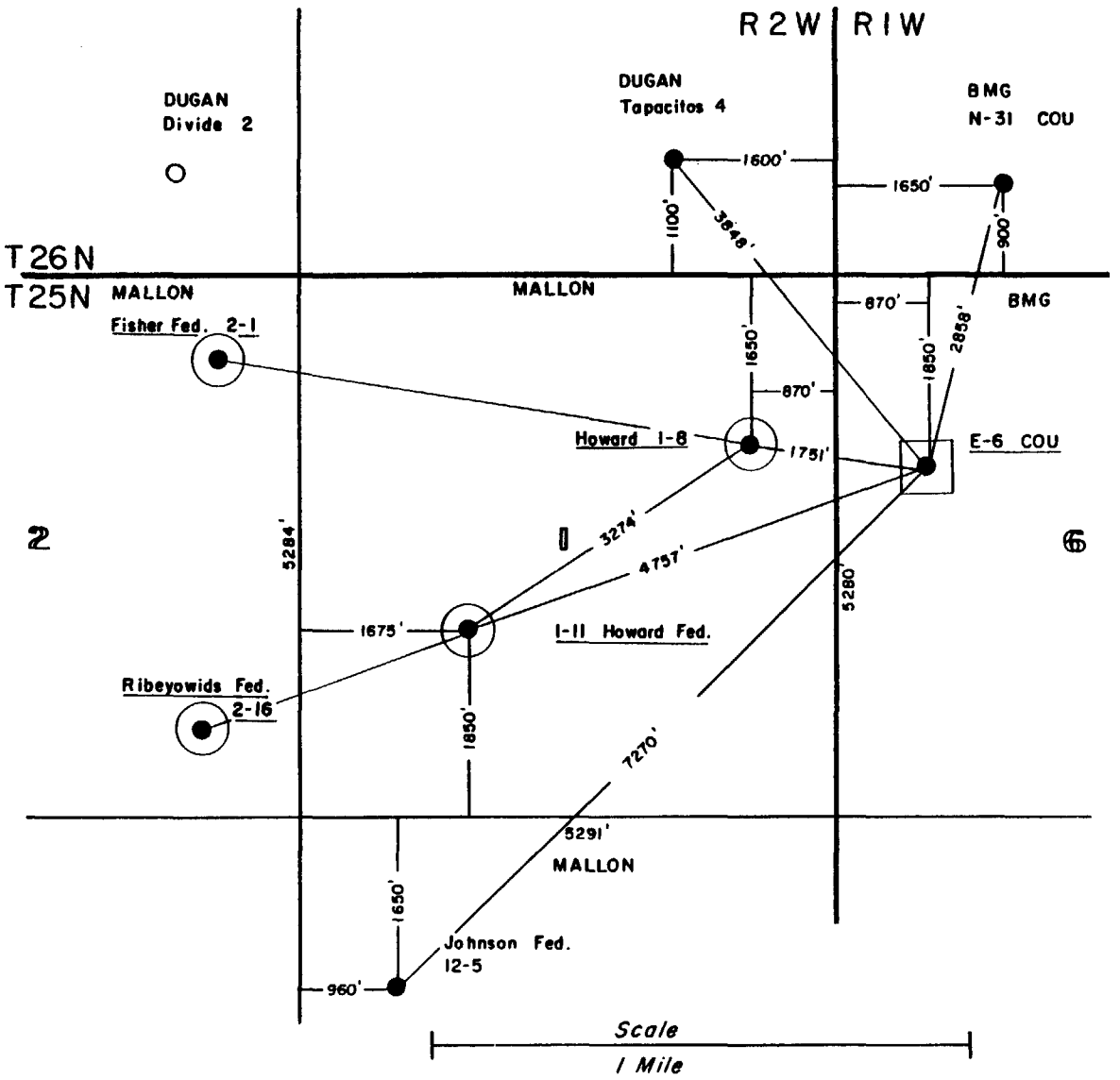
Pore volume approxmates 1700 stock tank barrels per acre.

This test was conducted while the Gavilan Engineering Committee was in existence; and copies of the pressure response in the E-6 were provided members of the committee. The committee as a group did not analyze the interference test.

FROM CASE NOS. 7980, 8946, 8950 & 9111
BEFORE THE NEW MEXICO OIL CONSERVATION
COMMISSION JUNE 13, 1988
EXHIBIT NO. 2, SECTION E

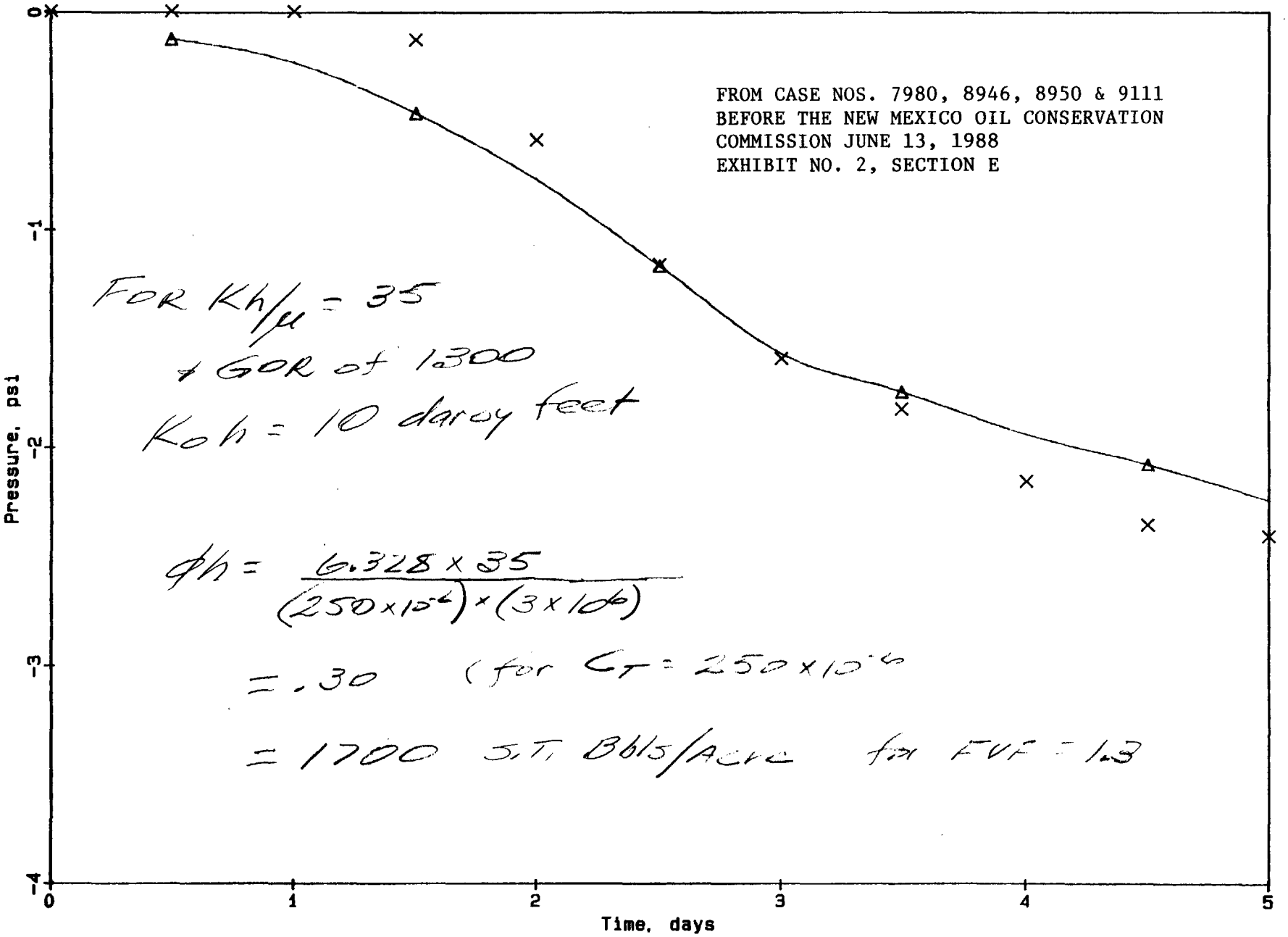
FROM CASE NOS. 7980, 8946, 8950 & 911
BEFORE THE NEW MEXICO OIL CONSERVATIO
COMMISSION JUNE 13, 1988
EXHIBIT NO. 2, SECTION E

PLAT OF INTERFERENCE TEST
MALLON WELLS
AND
BENSON-MONTIN-GREER DRILLING CORP. CANADA OJITOS UNIT E-6
MAY 1986



MALLON/E-6 INTERFERENCE TEST
MAY 1986

× GRC RUN 27 (FILE RUN27)
Δ Kh/u = 35. n = 3E6 (ITW108)



FROM CASE NOS. 7980, 8946, 8950 & 9111
BEFORE THE NEW MEXICO OIL CONSERVATION
COMMISSION JUNE 13, 1988
EXHIBIT NO. 2, SECTION E

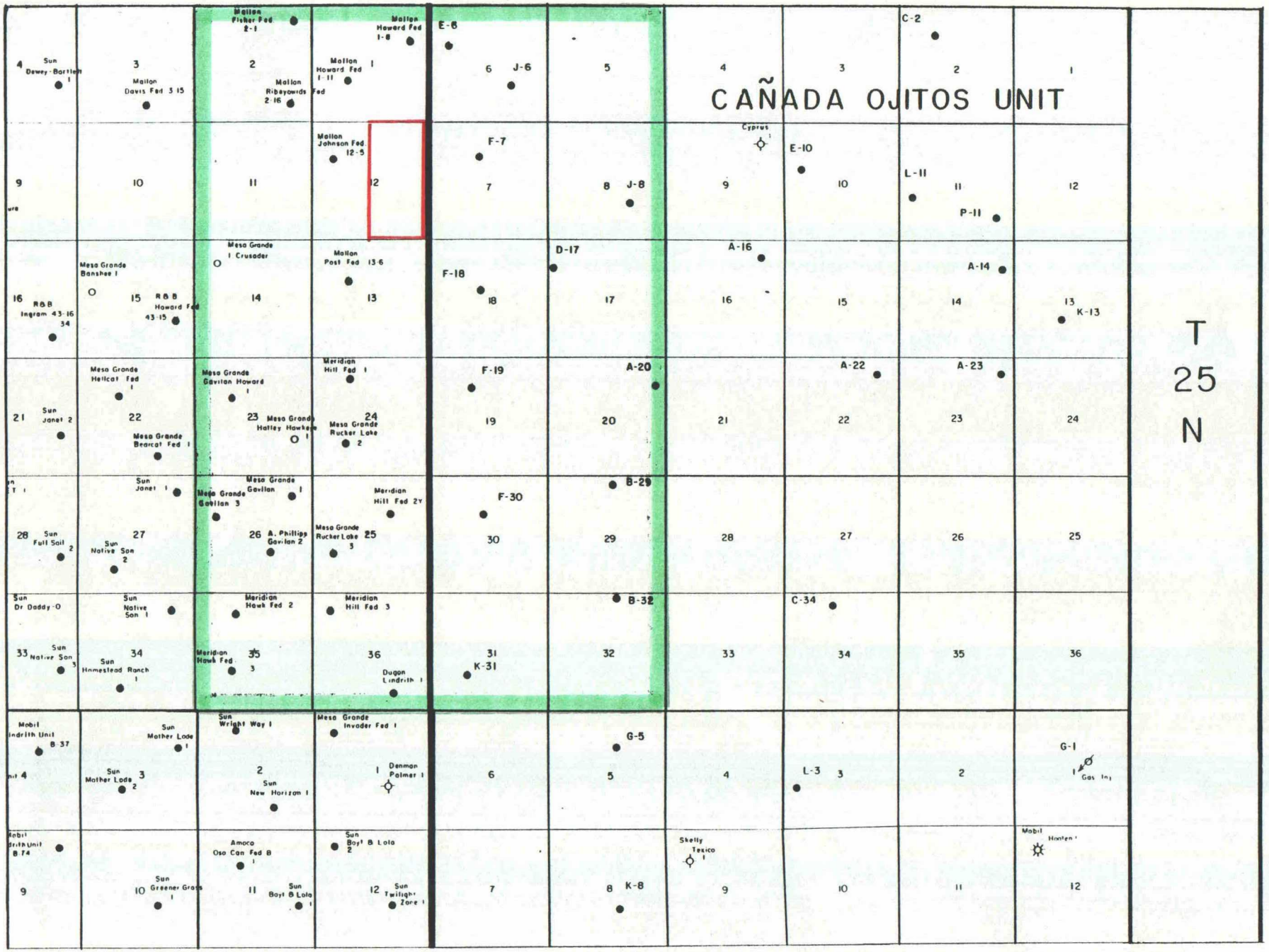
FOR $Kh/\mu = 35$
+ GOR of 1,300
Koh = 10 darcy feet

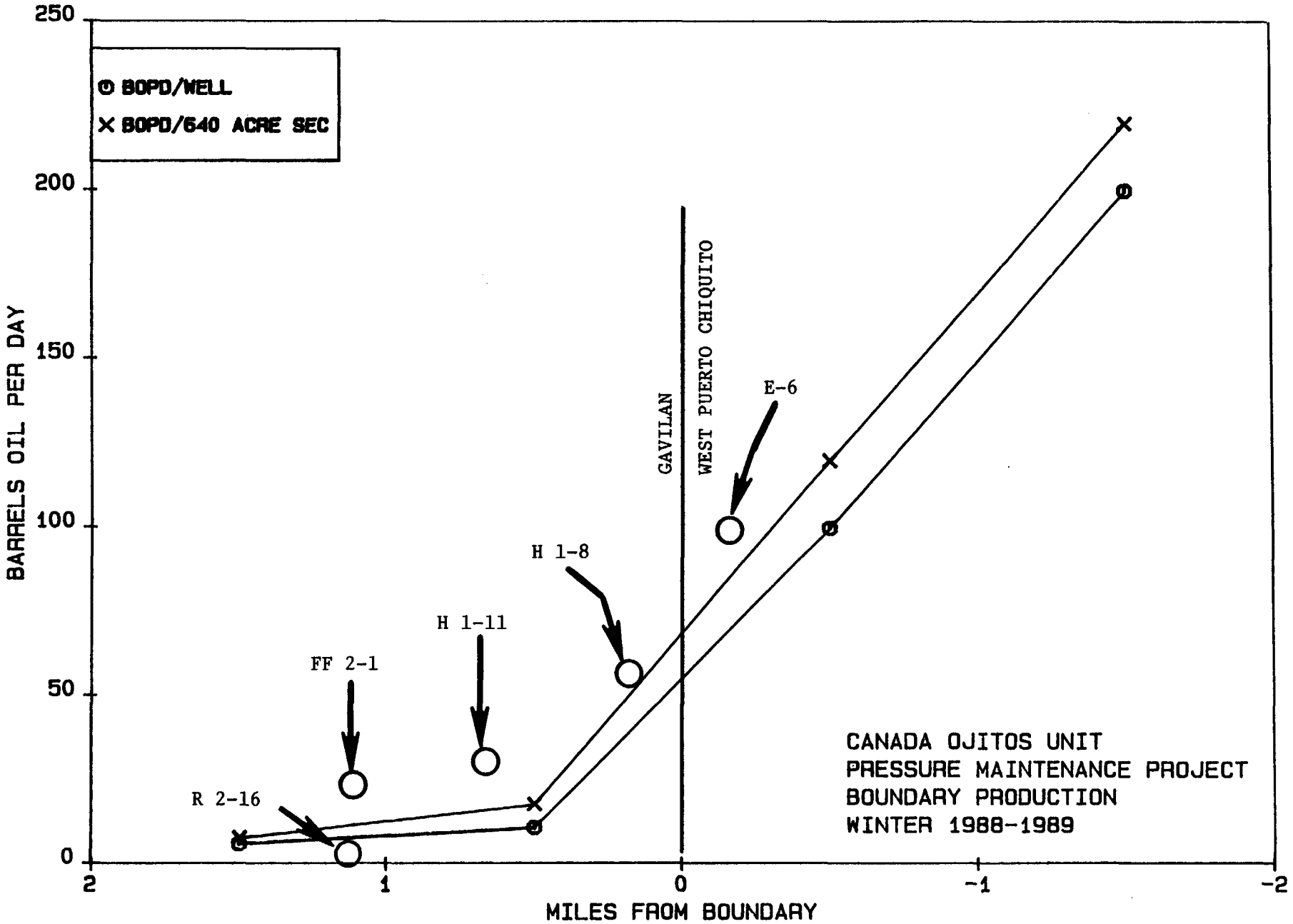
$$\phi h = \frac{6.328 \times 35}{(250 \times 10^{-6}) \times (3 \times 10^{6})}$$

= .30 (for $C_T = 250 \times 10^{-6}$

= 1700 S.T. Bbls/Acre for FVF = 1.3

P


CAÑADA OJITOS UNIT
T 25 N
R 2 W
R 1 W
Mallon Fisher Fed 2-1
Mallon Howard Fed 1-8
Mallon Howard Fed 1-11
Mallon Ribayowids Fed 2-16
Mallon Davis Fed 3-15
Sun Dewey-Bartlett 1
Mallon Johnson Fed 12-5
Mesa Grande 1 Crusader
Mallon Post Fed 13-6
Mesa Grande Banshee 1
R&B Howard Fed 43-15
R&B Ingram 43-16 34
Meridian Hill Fed 1
Mesa Grande Gavilan Howard 1
Mesa Grande Hellcat Fed 1
Mesa Grande Bearcat Fed 1
Mesa Grande Hatley Hawkeye 1
Mesa Grande Rucker Lake 2
Sun Janet 2
Sun Janet 1
Mesa Grande Gavilan 1
Mesa Grande Gavilan 3
A. Phillips Gavilan 2
Meridian Hill Fed 2Y
Mesa Grande Rucker Lake 3
Sun Full Sail 2
Sun Native Son 2
Meridian Hawk Fed 2
Meridian Hill Fed 3
Sun Native Son 1
Sun Native Son 3
Sun Homestead Ranch 1
Dugan Lindrith 1
Sun Wright Way 1
Sun New Horizon 1
Sun Mother Lode 1
Sun Mother Lode 2
Mesa Grande Invader Fed 1
Denman Palmer 1
Amoco Oso Can Fed 8 1
Sun Boyt & Lola 2
Sun Boyt & Lola 1
Sun Greener Grass 1
Sun Twilight Zone 1
Mobil Lindrith Unit B-37
Mobil Lindrith Unit B-74
Cyprus 1
Skelly Texico 1
Mobil Hanten 1
Gas Inj
E-6
J-6
F-7
J-8
D-17
F-18
A-16
A-14
K-13
F-19
A-20
A-22
A-23
F-30
B-29
K-31
B-32
C-34
G-5
G-1
L-3
K-8
E-10
L-11
P-11
C-2


250
200
150
100
50
0
BARRELS OIL PER DAY
⊙ BOPD/WELL
× BOPD/640 ACRE SEC
GAVILAN
WEST PUERTO CHIQUITO
E-6
H 1-8
H 1-11
FF 2-1
R 2-16
2
1
0
-1
-2
MILES FROM BOUNDARY
CANADA OJITOS UNIT
PRESSURE MAINTENANCE PROJECT
BOUNDARY PRODUCTION
WINTER 1988-1989