PLAT OF THE FOUR PHASES

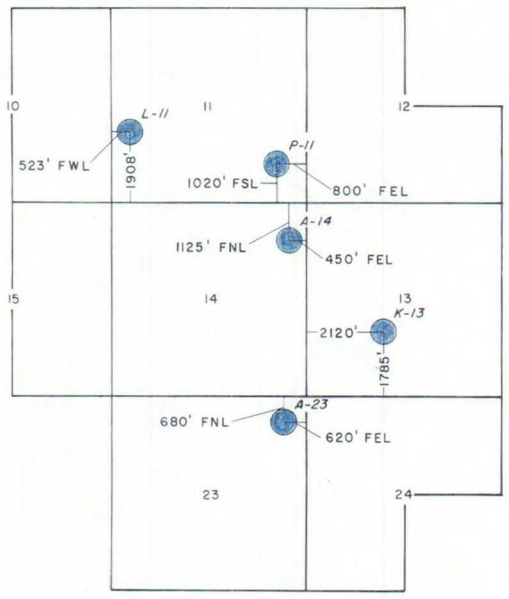
OF THE

1965 - 66 INTERFERENCE TEST

NIOBRARA - GREENHORN PARTICIPATING AREA

CANADA OJITOS UNIT

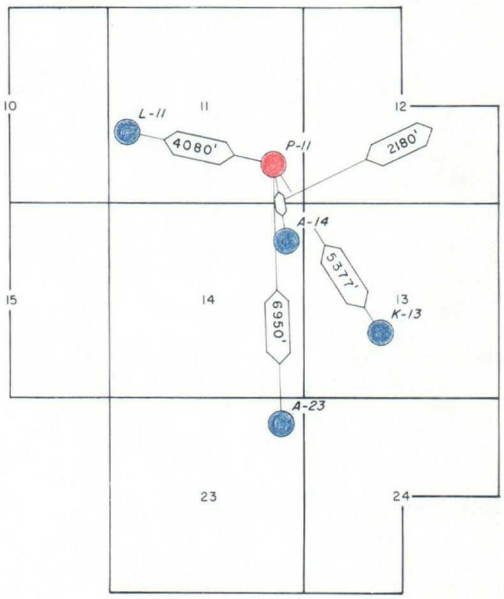
FOOTAGE LOCATIONS OF WELLS



ALL WELLS SHUT-IN

PHASE I

DISTANCES FROM P-11 TO SHUT-IN WELLS

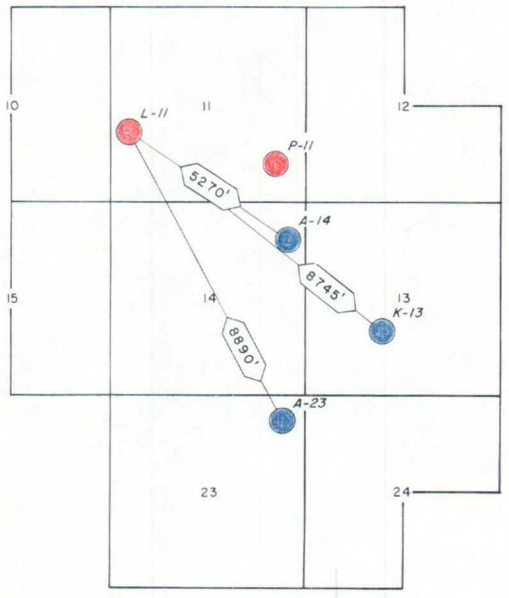


PRODUCING WELL.

SHUT-IN WELL

PHASE II

DISTANCES FROM L-11 TO SHUT-IN WELLS

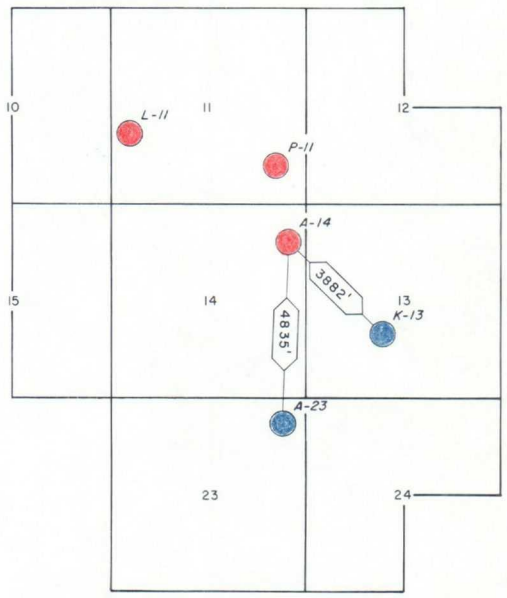


PRODUCING WELL

SHUT-IN WELL

PHASE III

DISTANCES FROM A-14 TO SHUT-IN WELLS

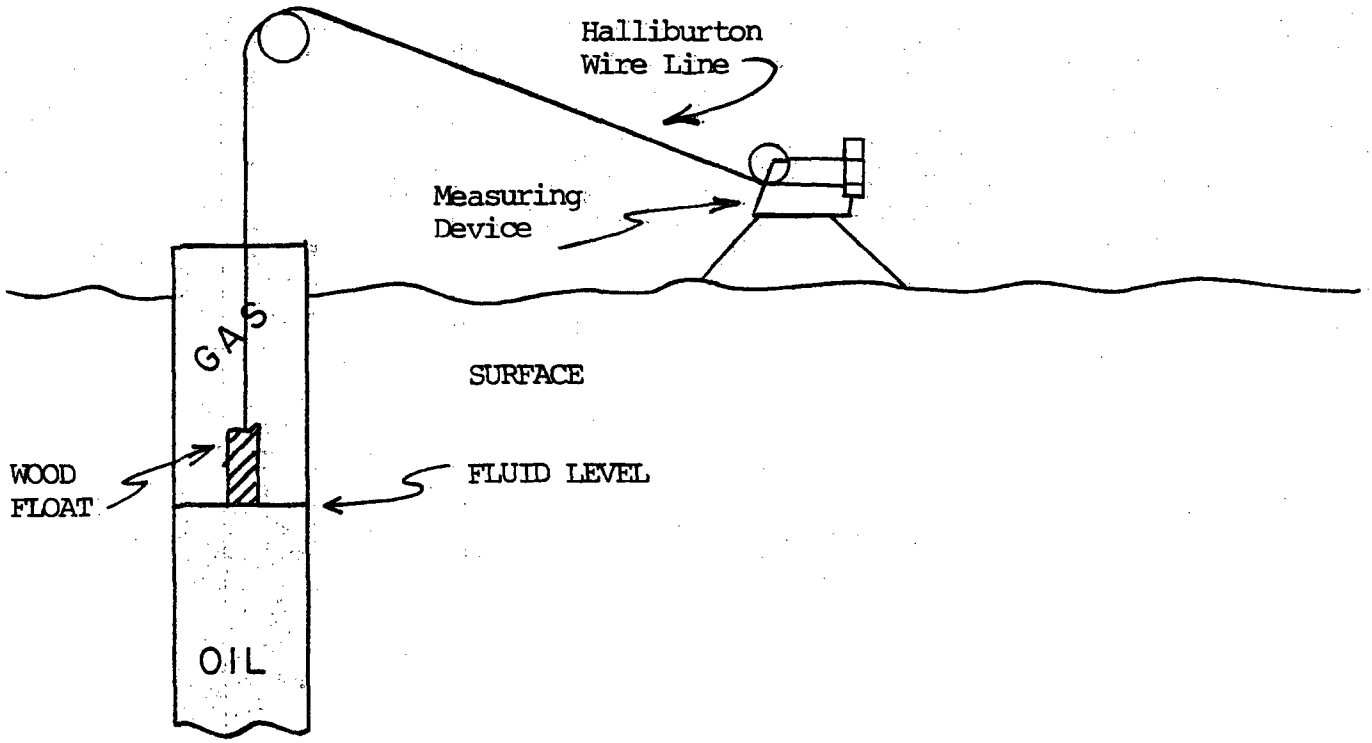


PRODUCING WELL

SHUT-IN WELL

PHASE IV

SKETCH OF FLUID LEVEL
MEASURING EQUIPMENT

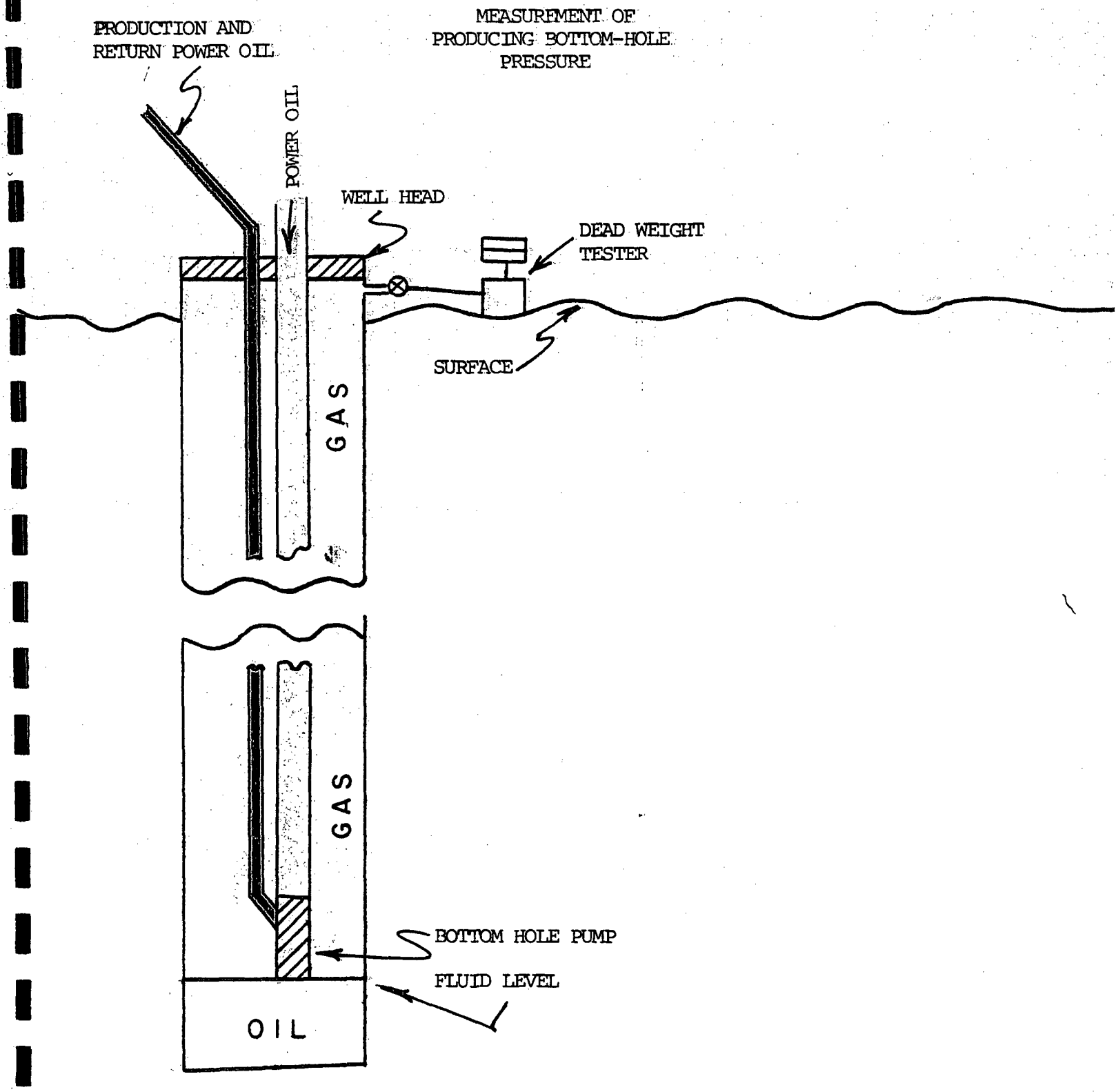


SENSITIVITY:

1/2 FT. OF FLUID LEVEL =

(1/2 FT) (.34#/LIN^2/FT) =

.17#/IN^2


MEASUREMENT OF
PRODUCING BOTTOM-HOLE
PRESSURE
PRODUCTION AND
RETURN POWER OIL
POWER OIL
WELL HEAD
DEAD WEIGHT
TESTER
SURFACE
GAS
GAS
BOTTOM HOLE PUMP
FLUID LEVEL
OIL

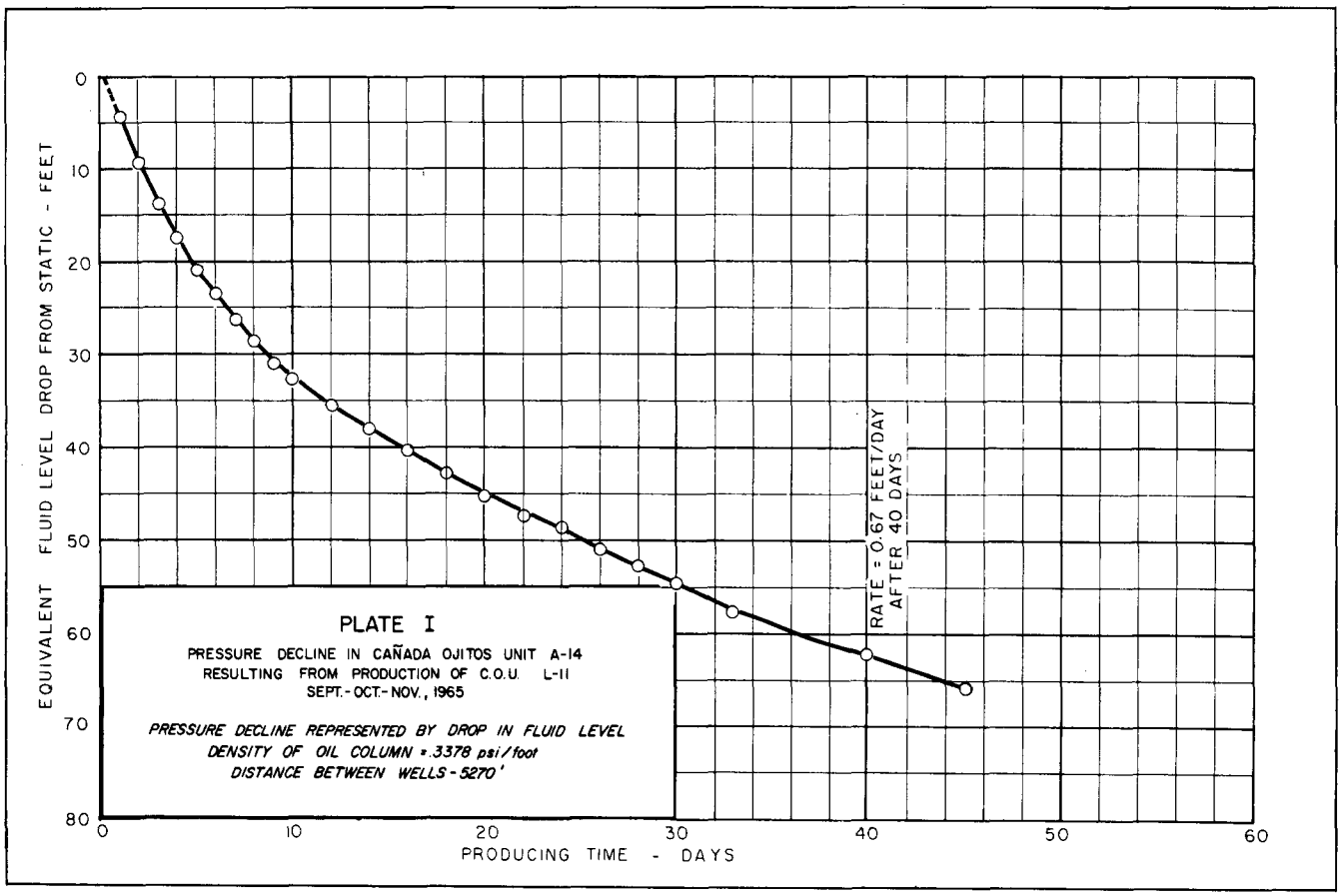
PER-ACRE OIL IN PLACE
CANADA OJITOS UNIT NIOBRARA PARTICIPATING AREA
DETERMINED FROM INTERFERENCE TEST
SEPTEMBER-OCTOBER. 1965
L-11 PRODUCING, A-14 OBSERVATION WELL

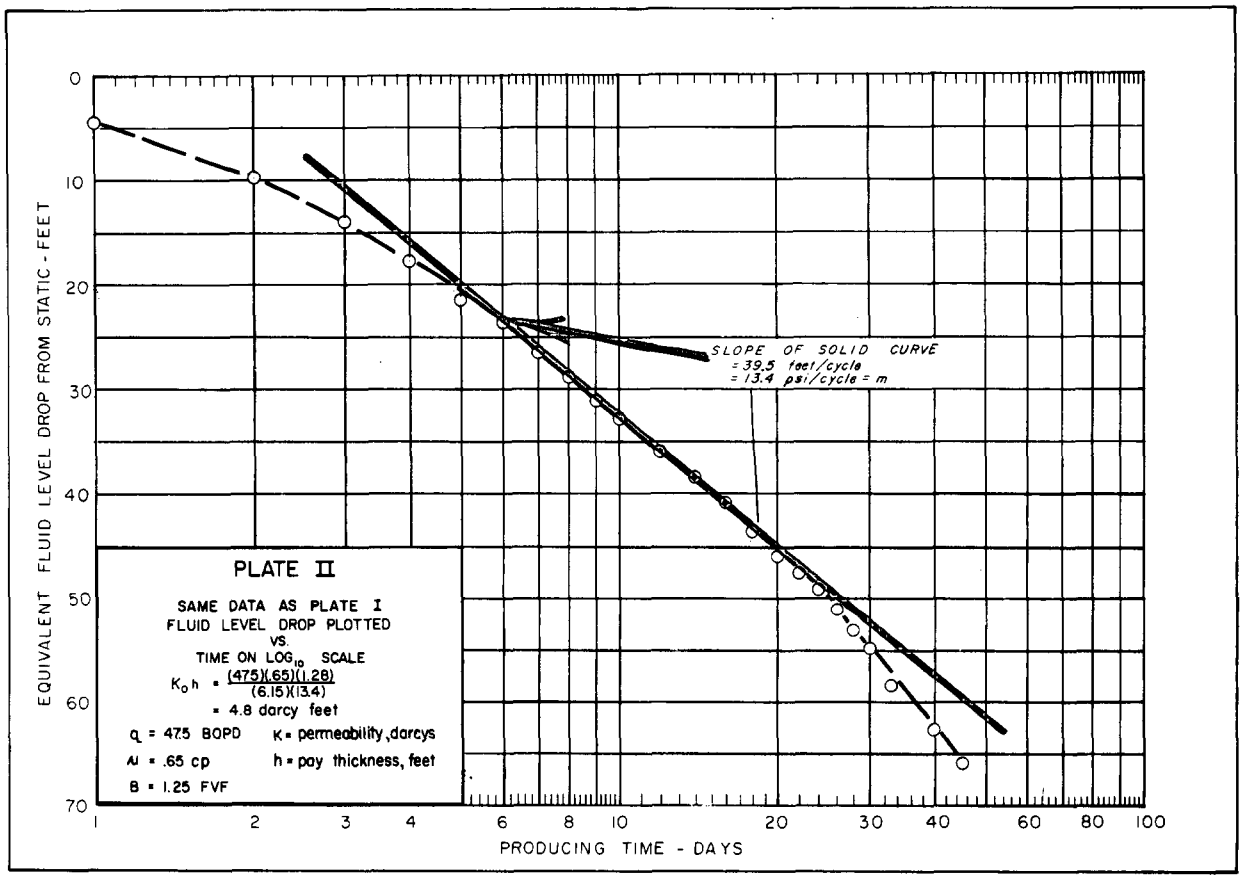
TIME AFTER START OF TEST AT WHICH INTERFERENCE PRESSURE DROP MEASURED	OIL IN PLACE (STOCK TANK BARRELS/ACRE FOR ASSUMED EFFECTIVE COMPRESSIBILITY INDICATED) For $C_e = 20 \times 10^{-6}$	For $C_e = 50 \times 10^{-6}$
1 day	2250	890
2 days	2520	1010
3 days	2670	1070
4 days	2740	1090
5 days	2660	1050
6 days	2600	1030
8 days	2520	1010
10 days	2460	980
12 days	2420	960
14 days	2440	970

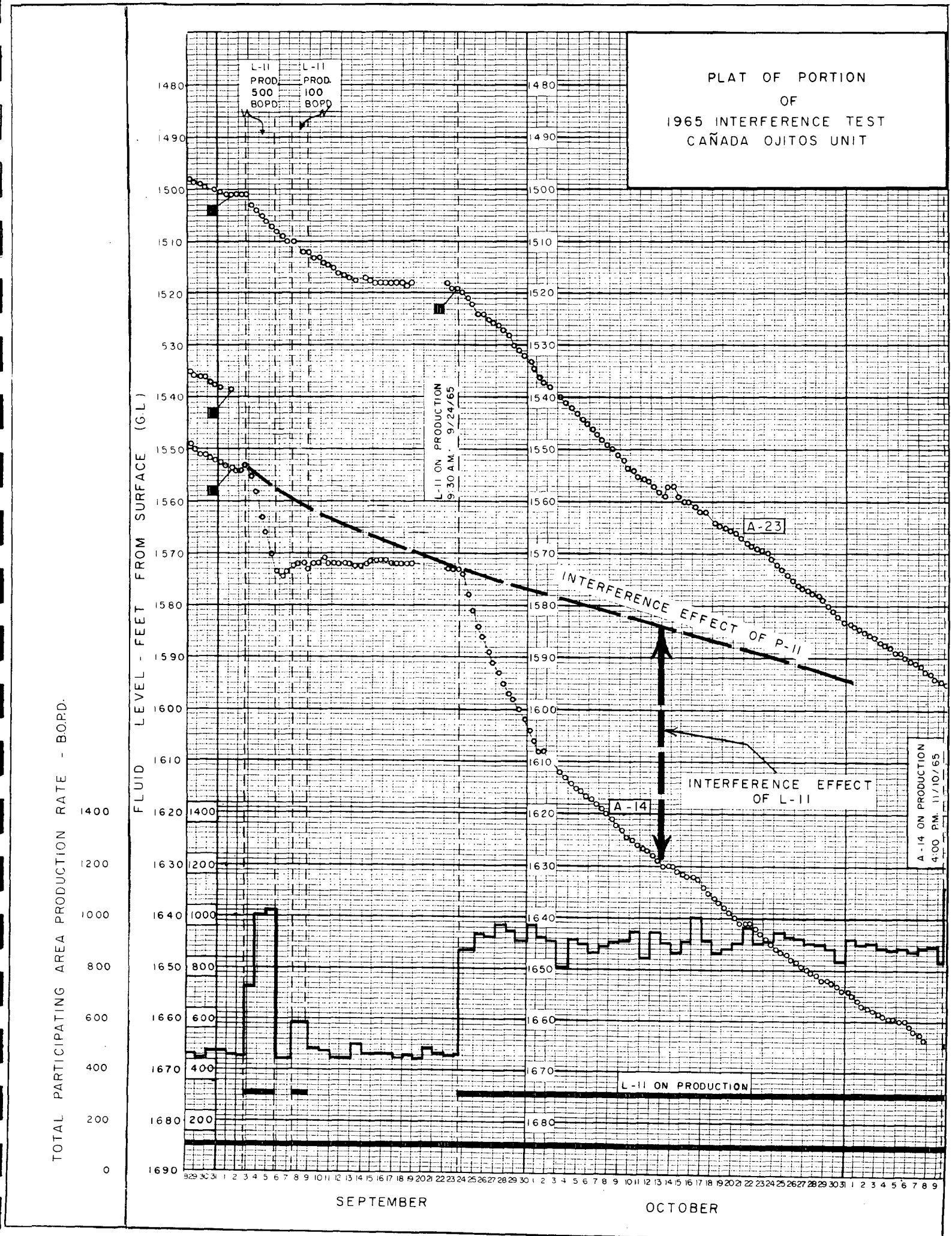
NOTE: (1) $C_e = 20 \times 10^{-6}$ results from assumed undersaturated compressibility of 10.5×10^{-6}, connate water 3.3×10^{-6}, formation compressibility of 6.7×10^{-6} and saturation as follows:

Undersaturated oil 75% of pore space
Saturated oil - 0
Connate water 25% of pore space

(2) $C_e = 50 \times 10^{-6}$ results from same values of fluid compressibilities but with formation compressibility of 23×10^{-6} and connate water saturation of 40% (assumed also no saturated oil in reservoir)


EQUIVALENT FLUID LEVEL DROP FROM STATIC - FEET
0
10
20
30
40
50
60
70
80
0
10
20
30
40
50
60
PRODUCING TIME - DAYS
RATE = 0.67 FEET/DAY
AFTER 40 DAYS
PLATE I
PRESSURE DECLINE IN CAÑADA OJITOS UNIT A-14
RESULTING FROM PRODUCTION OF C.O.U. L-11
SEPT.-OCT.-NOV., 1965
PRESSURE DECLINE REPRESENTED BY DROP IN FLUID LEVEL
DENSITY OF OIL COLUMN = .3378 psi/foot
DISTANCE BETWEEN WELLS - 5270'

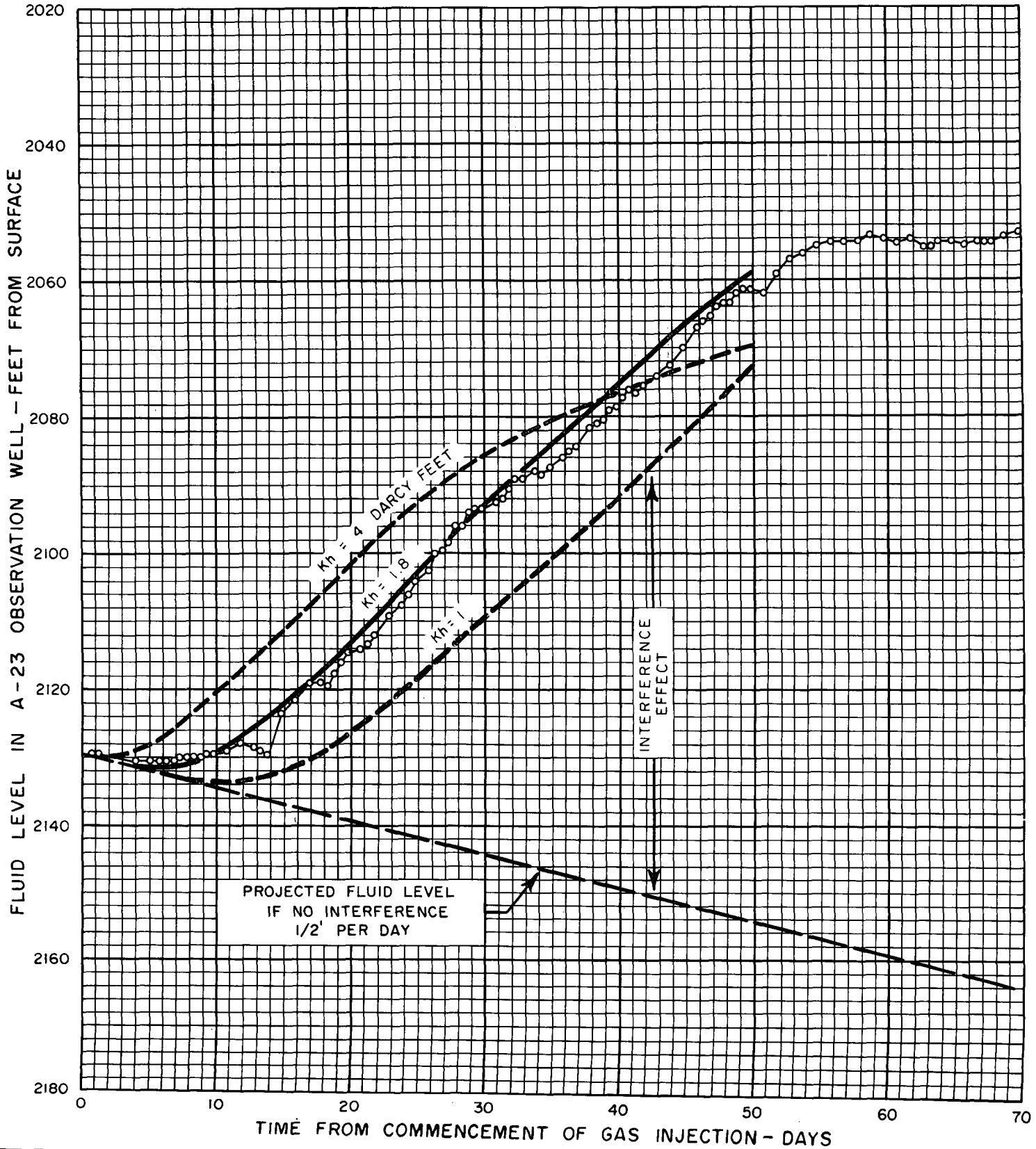

EQUIVALENT FLUID LEVEL DROP FROM STATIC - FEET
0
10
20
30
40
50
60
70
1
2
3
4
6
8
10
20
30
40
60
80
100
PRODUCING TIME - DAYS
SLOPE OF SOLID CURVE
= 39.5 feet/cycle
= 13.4 psi/cycle = m
PLATE II
SAME DATA AS PLATE I
FLUID LEVEL DROP PLOTTED
VS.
TIME ON LOG10 SCALE
$K_o h = \frac{(475)(.65)(1.28)}{(6.15)(13.4)}$
= 4.8 darcy feet
q = 475 BOPD
μ = .65 cp
B = 1.25 FVF
K = permeability, darcys
h = pay thickness, feet



APPENDIX I FIGURE NO. I-6

COMPARISON OF ACTUAL INTERFERENCE EFFECT OF INITIAL GAS INJECTION ON FLUID LEVEL OF A-23 OBSERVATION WELL WITH CALCULATED EFFECTS

FOR CONDITIONS OF:
$C_e = 415 \times 10^{-6}$ F.V.F. = 1.28
ϕh = 1600 BBLS/ACRE STOCK TANK OIL
AND TRANSMISSIBILITIES AS SHOWN
o – MEASURED FLUID LEVELS



APPENDIX I FIGURE NO. I-8

COMPARISON OF ACTUAL INTERFERENCE EFFECT OF INITIAL GAS INJECTION ON FLUID LEVEL OF A-23 OBSERVATION WELL WITH CALCULATED EFFECTS

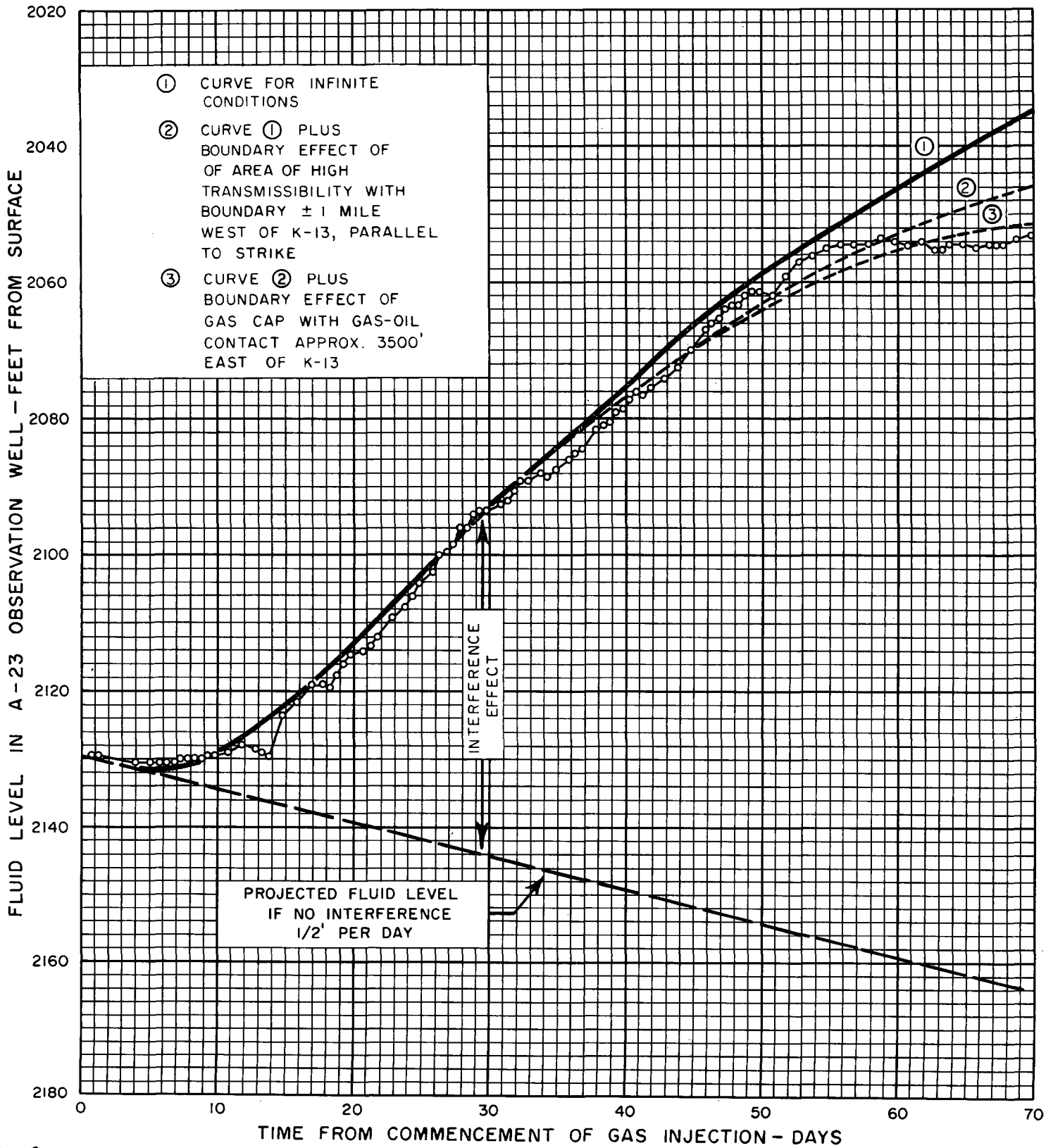
FOR CONDITIONS OF:

$C_e = 415 \times 10^{-6}$ F.V.F. = 1.28

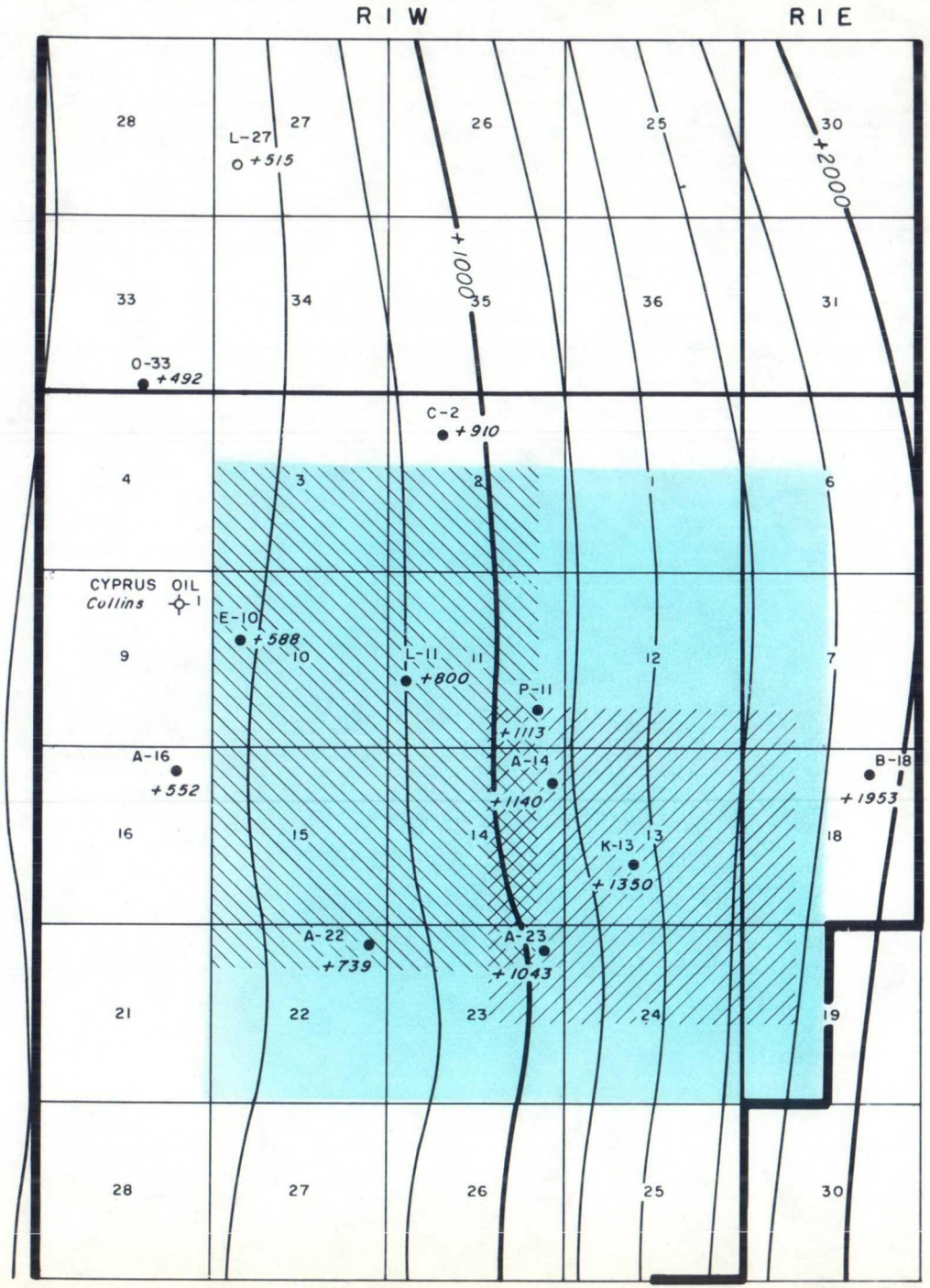
ϕh = 1600 BBLS/ACRE STOCK TANK OIL

TRANSMISSIBILITY = 1.8 DARCY FEET

o - MEASURED FLUID LEVELS



APPENDIX I FIGURE NO. I-13



PLAT OF PART
OF
CAÑADA OJITOS UNIT
SHOWING ESTIMATED
RESERVOIR TRANSMISSIBILITY
BY AREAS OF TESTS

- 2.5 TO 3.5 DARCY FEET
- 10 TO 12 DARCY FEET
- 5 TO 10 DARCY FEET

CONTOURED ON TOP OF "A" MARKER
C. I. 200'
NOVEMBER, 1969
BOUNDARY OF CAÑADA OJITOS UNIT

APPENDIX I FIGURE NO. I-16