AMOCO C-1 POINTED MOUNTAIN P-24

(60° 30' N, 123° 45' W)

1981 PRESSURE FALL OFF TEST

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SUMMARY

From 81-07-14 to 81-07-30, a pressure fall off test was conducted on Amoco C-1 Pointed Mountain P-24 (60° 30' N, 123° 45' W).

The pressure drop, due to skin, has shown an increase from -1 804 kPa (1980) to +538 kPa (1981) indicating wellbore plugging has occurred. As a result of the plugging the injectivity index has decreased from 0.0196 m3/kPa (1980) to 0.0178 m3/kPa (1981). This reduction in well performance however, will not at this time affect the water disposal capability of the field as the water production averages 44.5 m3/d and during this year injection rates as high as 151.0 m3/d were reached. Well stimulation is therefore not required at this time.

I INTRODUCTION

From 81-07-14 to 81-07-30 a pressure fall off test (surface deadweight recording) was conducted on the Pointed Mountain C-1 water disposal well. The test was conducted to evaluate current reservoir behaviour and compare it to previous year's test results. From this data, the need for a well stimulation could be evaluated.

This report presents the 1981 fall off test data.

II DISCUSSION OF RESULTS

Table 1 lists the results of the 1977, 1980 and 1981 fall off tests.

TABLE 1	1977	1980	1981
ΔP , psi	+24.43	-261.65	+78.00
k_w, md	1.56	2.72	5.20
II, BWPD/psi	0.47	0.85	0.77
L_f, ft	241.60	163.51	294.00
R_f, ft	628.00	1 580.00	1 724.00
P_s , psia	2 500.00	2 506.00	2 388.00
μ_w, cp	0.70	0.70	1.06

The pressure drop, due to skin, has shown a marked increase over the 1980 value. The 1980 value of -261.65 psi is indicative of a stimulated well whereas the 1981 value of +78.0 psi indicates well bore plugging. As expected, the injectivity index (II) decreased with the increase of ΔPs. These reductions in the well performance (ΔPs and II) are of no major concern at present. Given that the field's water production averages 280 BPD, and during this year injection rates of 950 BPD were reached, well stimulation is not required at the present time.

The static bottom hole pressure decreased from 2 506 psia (1980) to 2 388 psia (1981). This 5% decrease is attributed to accuracy error in the deadweight gauge as there is no reason to expect a pressure decrease from year to year in an injection disposal well.

The increase in the relative permeability of the formation to water (k_W) is a result of the changing water quality and as an increase was shown this year the result is considered to be satisfactory.

APPENDIX

RESULTS

Figure 1 is a graph of log time versus BHP. From figure 1, the slope of the line, from the intermediate time data, is 155 psi/cycle and BHP @ time, t = 1 hour, is 3 000 psia.

Figure 2 is a graph of square root time versus BHP. The slope of the line, from the intermediate time data, is 86 psi/hour$^{1/2}$ (the slope of 346 psi/hour$^{1/2}$ indicated on the graph will be ignored as it reflects storage effects in the wellbore).

The following reservoir/wellbore constants were used in subsequent calculations:

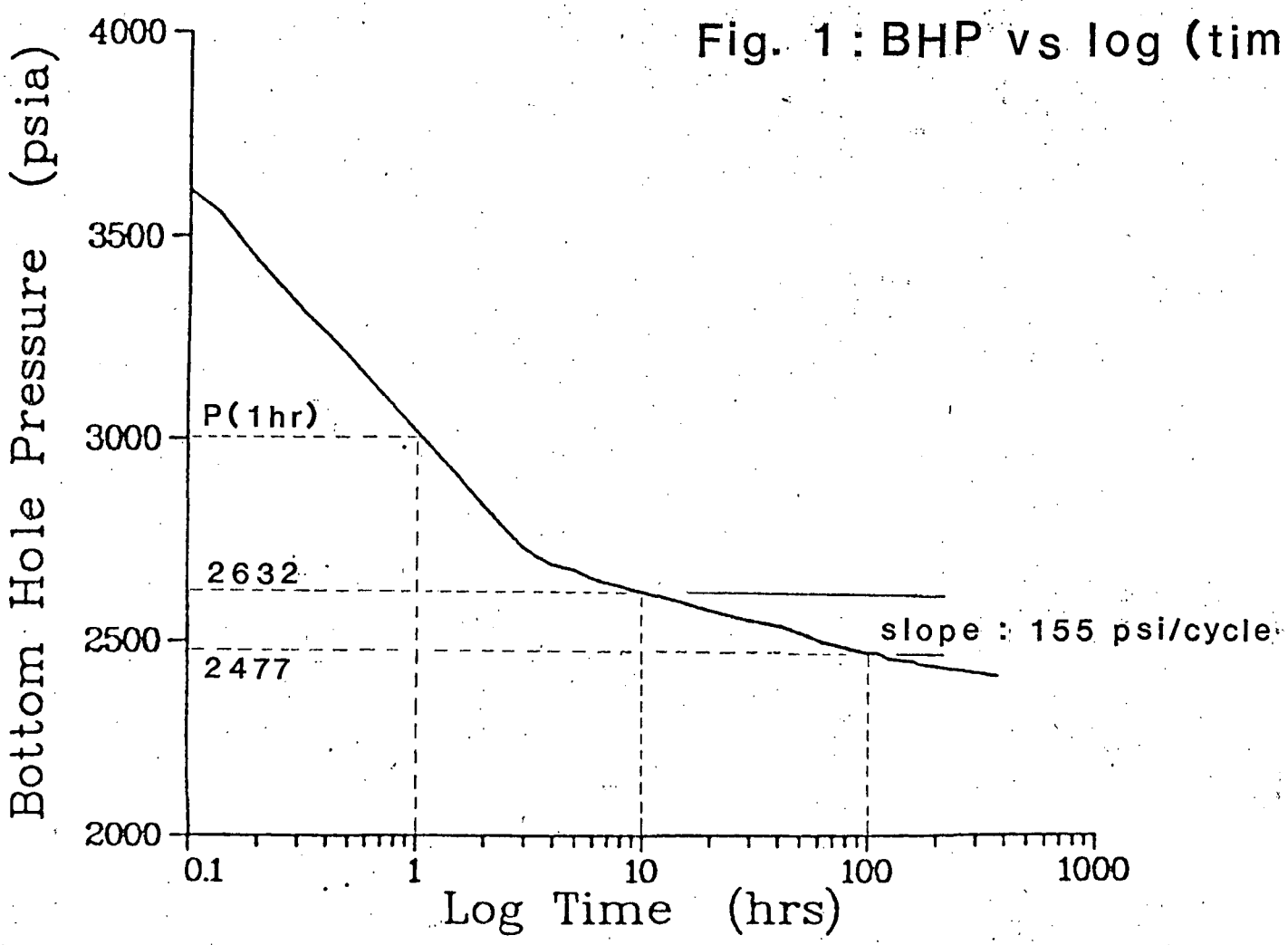
R_W = 0.23 ft. , P_{WI} = 3 876 psia; Q = 1 152 BWPD, h = 246 ft.
C_t = 9.25 x 10^{-6} psi^{-1}, ϕ = 5% and uw = 1.06 cp @ 118°F
(from analysis at BHT).

The following reservoir behaviour variables are then calculated to be:

ΔPs = 78 psi, k_W = 5.2 md, II = .77 BWPD/psi, L_F = 117.2 ft.,
R_F = 1 724 ft. and P_S = 2 388 psia (from Muskat Method).

Pointed Mountain 1981 C-1 Falloff Test Data

Fig. 1 : BHP vs log (time)



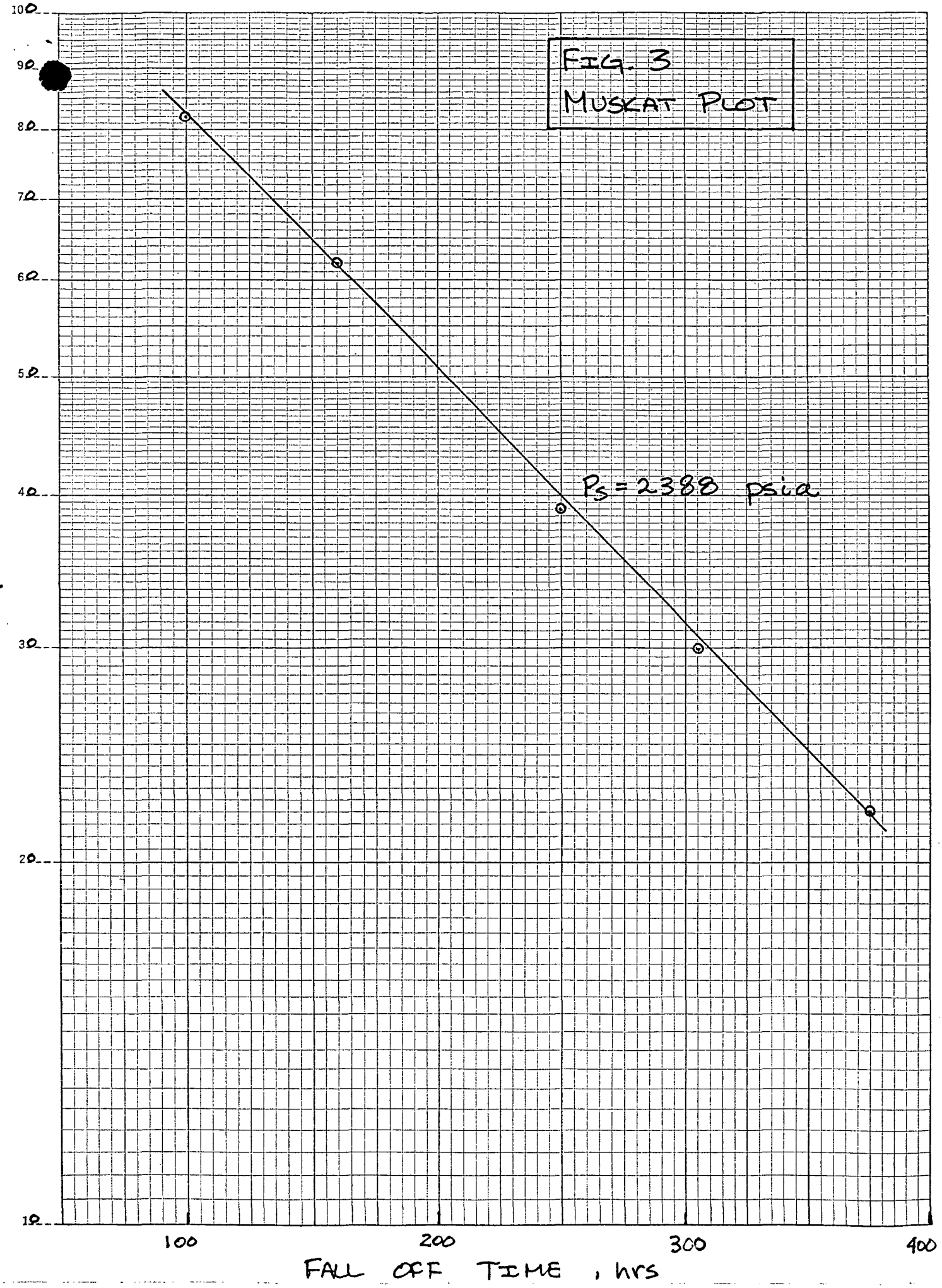


FIG. 3
MUSKAT PLOT
$P_s = 2388$ psia
$(P_3 - P_s)$, psia
10
9
8
7
6
5
4
3
2
1
100
200
300
400
FALL OFF TIME, hrs