

FOSTER TESTERS, INC., Odessa, Texas

# DRILL STEM TEST CALCULATIONS AND ANALYSIS OIL RESERVOIR

COMPANY HARDING OIL COMPANY COUNTY LEA STATE N. MEX.  
LEASE SHAW WELL 1 TEST NO. 1

TEST DEPTHS	PRESSURE DATA	RECOVERY AND FLUID DATA	
FORMATION <u>STRAWN</u>	INITIAL HYDROSTATIC PRESS. IHP <u>5227</u> psig	DC SIZE <u>4 1/2 XH4H90</u> in.	WATER RECOVERY <u>1500</u> ft.
ELEVATION _____ ft.	FINAL HYDROSTATIC PRESS. FHP <u>5202</u> psig	DC LENGTH <u>414</u> ft.	OIL GRAV. <u>42</u> °API @ _____ °F
TOTAL DEPTH <u>11,480</u> ft.	INITIAL SHUT IN PRESS. ISIP <u>3877</u> psig	DP SIZE <u>4"EH</u> in.	TEMP. <u>165</u> °F @ <u>11,476</u> ft.
INTERVAL <u>11,318-480</u>	INITIAL FLOWING PRESS. IFP <u>837</u> psig	SURFACE _____	MUD WT. <u>8.9</u> #/gal.
DATUM DEPTH, <u>11,476</u>	FINAL FLOWING PRESS. FFP <u>1579</u> psig	OIL PROD. _____ bbls.	OIL VISC. EST. <u>0.7</u> cp.
RECORDER NO. <u>2837</u>	FINAL SHUT IN PRESS. FSIP <u>3876</u> psig	OIL RECOVERY <u>2000</u> ft.	GOR _____ Bo <u>1.2</u> v/v.
		GAS RECOVERY <u>40,000</u>	

## CALCULATIONS AND ANALYSIS

CALCULATIONS	FORMULA	RESULTS
1. EXTRAPOLATED STATIC PRESSURE Initial Final	P <sub>oi</sub> P <sub>oi</sub>	3880 psig 3880 psig
2. RESERVOIR PRESSURE GRADIENT	$G = \frac{P_{oi}}{L}$	0.338 psi/ft.
3. CALCULATED HYDROSTATIC PRESSURE	$CHP = L \frac{MW}{8.33} (.433)$	5311 psig
4. PRESSURE ELEMENT. ACCURACY	$E = \frac{IHP (100)}{CHP}$	98.4 %
5. SLOPE OF FSIP (Horner Plot)	M	23 psi/cycle
6. OIL PRODUCTION RATE	$Q_o = 24 \frac{Rec.}{T}$	201.67 bopd
7. TRANSMISSABILITY	$\frac{K_{oh}}{\mu} = \frac{162.6 Q_o B_o}{M}$	1710.86 md-ft. cp
8. PERMEABILITY CAPACITY	$K_{oh} = \frac{K_{oh}}{\mu_o} \mu_o$	1197.60 md-ft.
9. EFFECTIVE OIL PERMEABILITY	$K_o = \frac{K_{oh}}{h}$ , h = _____	7.39 md.
10. DAMAGE RATIO	$DR = .183 \frac{P_{oi} - P_f}{M}$	18.31
11. PRODUCTIVITY INDEX	$PI = \frac{Q_o}{P_{oi} - P_f}$	0.09 bopd psi
12. PRODUCTION WITH DAMAGE REMOVED	$Q_{o,} = Q_o DR$	3692.56 bopd
13. APPROX. RADIUS OF INVESTIGATION	$a \approx \sqrt{K_o T}$	31 ft.

REMARKS: THIS IS A SUCCESSFUL TEST OF AN OIL BEARING ZONE WITH VERY GOOD PERMEABILITY AND NO APPARENT DEPLETION. BASED UPON TEST DATA, THE ZONE CALCULATED TO HAVE A HIGH WELL BORE DAMAGE FACTOR. PRODUCTIVITY SHOULD BE SUBSTANTIALLY IMPROVED WITH A SUCCESSFUL STIMULATION TREATMENT TO REMOVE DAMAGE. THIS ZONE SHOULD PRODUCE AT COMMERCIAL RATES.

**NOTICE:** These calculations and all remarks are designed to furnish you with the facts of the Drill Stem Test, and as such are

FOSTER TESTERS, INC. opinion only