

FOSTER TESTERS, INC.

Odessa, Texas

DRILL STEM TEST CALCULATIONS AND ANALYSIS GAS RESERVOIR

COMPANY TS. INT'L PET. COUNTY LEA STATE NEW MEX. LEASE AZTEC STWELL 1 TEST NO. 3

TEST DEPTHS	PRESSURE DATA	RECOVERY AND FLUID DATA	
FORMATION _____	IHP _____ psig	DC ID _____	HOLE SIZE <u>6 1/2</u> in.
ELEVATION _____ ft.	FHP _____ psig	DC LENGTH _____ ft.	MUD WT., MW <u>11.8</u> lb/gal
TOTAL DEPTH _____ ft.	ISIP _____ psig	DP ID _____	GAS GRAVITY EST. <u>0.7</u>
INTERVAL _____ ft.	IFP _____ psig	GTS in _____ min.	RES. TEMP., T° EST. <u>190</u> °F
DATUM DEPTH, L _____ ft.	FFP, Pf _____ psig	GAS RATE <u>T.S.T.M.</u> SCFPD	GAS COMP., z EST. <u>1.37</u>
RECORDER NO. _____	FSIP _____ psig	LIQUID REC. _____ ft.	GAS VISCOSITY, μ_g EST. <u>0.037</u>
INITIAL FLOW TIME _____ min.	FLOW TIME, T _____ min.	SURFACE LIQ. REC. <u>0</u> bbls.	GOR _____ scf/bbl

CALCULATIONS AND ANALYSIS

CALCULATIONS	FORMULA	RESULTS
1. EXTRAPOLATED STATIC PRESSURE (HORNER PLOT)	Initial P_{oi} Final P_{oi}	9176 psig 9171 psig
2. RESERVOIR PRESSURE GRADIENT	$G = \frac{P_{oi}}{L}$	0.642 $\frac{\text{psi}}{\text{ft}}$
3. CALCULATED HYDROSTATIC PRESSURE	$CHP = L \frac{MW}{8.33} (.433)$	8767 psig
4. PRESSURE ELEMENT ACCURACY	$E = \frac{IHP}{CHP} (100)$	106 %
5. SLOPE OF P^2 versus $\frac{t + \Delta t}{\Delta t}$	m'	3.2 $\frac{\text{psi}}{\text{cycle}} \times 10^6$
6. GAS PRODUCTION RATE	$Q_g = \frac{\text{Rec.}}{T} (24)$	T.S.T.M. scfpd
7. TRANSMISSIBILITY	$\frac{k_{gh}}{\mu_g} = \frac{1.637 Q_g Z T^\circ}{m'}$	EST ≤ 20 $\frac{\text{md-ft}}{\text{cp}}$
8. GAS PERMEABILITY CAPACITY	$K_{gh} = \frac{k_{gh}}{\mu_g} \mu_g$	EST 0.7 md-ft
9. EFFECTIVE GAS PERMEABILITY IN RESERVOIR	$K_g = \frac{K_{gh}}{h}, h = 32'$	EST 0.02 md
10. ACTUAL FLOWING CAPACITY (STEADY STATE PI METHOD)	$(K_{gh})_i = \frac{Q_g \mu_g T^\circ Z [2.3 \log(.472 \frac{b}{r_w})]}{.704 (P_{oi} - P_f)}$	EST 0.09 md-ft
11. DAMAGE RATIO = $1/CR$ (GLADFELTER ET AL)	$DR = \frac{K_{gh}}{(K_{gh})_i}$	HIGH (7 to 8)
12. PRODUCTION RATE IF DAMAGE REMOVED	$Q_{g_i} = DR Q_g$	EST LOW scfpd
13. APPROX. RADIUS OF INVESTIGATION	$b = \sqrt{K_g T P_o (0.0156)}$	EST 10 ft

REMARKS: THIS APPEARS TO BE A TEST OF A GAS PRODUCING ZONE WITH LOW PERMEABILITY AND NO APPARENT OR REAL DEPLETION ON THIS TEST. DUE TO A LEAK IN DRILL PIPE AND LOW, UNMEASURED GAS RECOVERY, VALUES CALCULATED ARE FOR COMPARISON ONLY AND DO NOT REFLECT ACTUAL VALUES FOR TRANSMISSIBILITY, PERMEABILITY, OR DAMAGE. RESERVOIR PRESSURE GRADIENT APPEARS HIGHER THAN NORMALLY ENCOUNTERED. DECLINE OF 5 P.S.I. IS NOT CONSIDERED A SIGNIFICANT DRAWDOWN.