BIG E TESTERS
A Division of Big E Industries, Inc.

DRILL STEM TEST CALCULATIONS AND ANALYSIS

GAS RESERVOIR

COMPANY GAS PRODUCTION ENTERPRISES COUNTY LEA STATE NEW MEXICO LEASE CHAMBERS WELL 1 TEST NO. 1

TEST DEPTHS		PRESSURE DATA		RECOVERY AND FLUID DATA			
FORMATION	WOLFCAMP-MORROW	IHP	5041 psig	DC ID	2½"	HOLE SIZE	7 7/8 in.
ELEVATION	- ft.	FHP	5025 psig	DC LENGTH	557 ft.	MUD WT., MW	lb/gal
TOTAL DEPTH	10,620 ft.	ISIP	3260 psig	DP ID	3.826	GAS GRAVITY	
INTERVAL	10,540-10,620 ft.	IFP	387 psig	GTS in	min.	RES. TEMP., T°	°F
DATUM DEPTH, L	- ft.	FFP, Pf	534 psig	GAS RATE	SCFPD	GAS COMP., Z	
RECORDER NO.	3355	FSIP	3214 psig	LIQUID REC.	ft.	GAS VISCOSITY, μ_g	cp
INITIAL FLOW TIME	5 min.	FLOW TIME, T	60 min.	SURFACE LIQ. REC.	bbls.	GOR	scf/bbl

CALCULATIONS AND ANALYSIS

CALCULATIONS		FORMULA	RESULTS
1. EXTRAPOLATED STATIC PRESSURE (HORNER PLOT)	Initial	P_{oi}	3280 psig
	Final	P_{oi}	3275 psig
2. RESERVOIR PRESSURE GRADIENT		$G = \frac{P_{oi}}{L}$	.3112 psi/ft
3. CALCULATED HYDROSTATIC PRESSURE		$CHP = L \frac{MW}{8.33} (.433)$	5025 psig
4. PRESSURE ELEMENT ACCURACY		$E = \frac{IHP}{CHP} (100)$	100 %
5. SLOPE OF P^2 versus $\frac{t+\Delta t}{\Delta t}$		m'	355 psi/cycle
6. GAS PRODUCTION RATE		$Q_g = \frac{Rec.}{T} (24)$	355,000 scfpd
7. TRANSMISSIBILITY		$\frac{kgh}{\mu g} = \frac{1.637\, Q_g \bar{Z} T°}{m'}$	230.5 md-ft/cp
8. GAS PERMEABILITY CAPACITY		$K_gh = \frac{K_gh}{\mu g} \mu g$	3.572 md-ft
9. EFFECTIVE GAS PERMEABILITY IN RESERVOIR		$K_g = \frac{K_gh}{h}$, h = 10'	.3572 md
10. ACTUAL FLOWING CAPACITY (STEADY STATE PI METHOD)		$(K_gh)_1 = \frac{Q_g \mu_g T° \bar{Z} [2.3 Log(.472 \frac{b}{r_w})]}{.704 (P_{oi} - P_f^2)}$	md-ft
11. DAMAGE RATIO = 1/CR (GLADFELTER ET AL)		$DR = \frac{K_gh}{(K_gh)_1}$	
12. PRODUCTION RATE IF DAMAGE REMOVED		$Q_{g'} = DR\, Q_g$	6,638,500 scfpd
13. APPROX. RADIUS OF INVESTIGATION		$b = \sqrt{K_g T P_o (0.0156)}$	110 ft

REMARKS: THIS TEST WAS A GOOD MECHANICAL TEST, IN WHICH ALL TOOLS FUNCTIONED PROPERLY. THE FORMATION PRODUCED ENOUGH RESERVOIR FLUID FOR PROPER INDENTIFICATION AND ADEQUATE BUILD UPS OCCURED FOR A REASONABLE EVALUATION OF RESERVOIR PARAMETERS. EXTRAPOLATED RESERVOIR PRESSURE WAS #3290 P.S.I. THIS PLOT AS WELL AS THE MCKINLEY PLOT INDICATED FORMATION DAMAGE DUE TO FLUID INVASION. ESTIMATED PRESSURE LOSS 1400 P.S.I.
A HIGH RESERVOIR PERMEABILITY IS INDICATED AS EVIDENCED BY THE RAPID PRESSURE BUILD UP AND VERY LITTLE DEPLETION IS INDICATED. DELIVERABILITY FOR THIS WELL IS ESTIMATED TO BE 6.5 MMCF/DAY.