

OIL CONSERVATION DIVISION

P.O. Box 2088
Santa Fe, New Mexico 87504-2088

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Operator PENWELL ENERGY				Lease or Unit Name F.H. STATE 28 COM			
Type Test ☒ Initial ☐ Annual ☐ Special				Test Date 3/17/97		Well No. 1	
Completion Date		Total Depth 11,985		Plug Back TD 11,940		Elevation	
Csg. Size 4 1/2	Wt. 13.5	d 3.920	Set At 10561 to 11983	Perforations: From: 11m713 To: 11,724		Unit Ltr. Sec. TWP - Rge. C 28 23S 26E	
Tbg. Size 2-3/8	Wt. 4.7	d 1,995	Set At 11529	Perforations: From: To:		Country EDDY	
Type Well - Single - Bradenhead - G.G. or G.O. Multiple DUAL				Packer Set At 11529		Pool SOUTH	
Producing Thru TBG		Reservoir Temp. °F 199.2		Mean Annual Temp. °F 60°		Formation MORROW	
Baro. Press - P _a 13.2		DIST. 2		Connection SALES		Meter Run 4.026	
L 11547	H 11547	Gg .580	% CO ₂ 1.30	% N ₂ .16	% H ₂ S	Prover -0-	Taps FLG

RECEIVED

APR 04 1997

OIL CON. DIV.

FLOW DATA						TUBING DATA		CASING DATA		Duration of Flow
NO.	Prover Line Size	Orifice Size	Press. p.s.i.g.	Diff. h _w	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	
SI						3265		PKR		72 hr
1.	4.026 X 2.250		380	1.2	91	3140	57°	"		60 min
2.	4.026 X 2.250		400	4.0	91	2930	58°	"		60 min
3.	4.026 X 2.250		400	9.0	91	2640	61°	"		60 min
4.	4.026 X 2.250		435	13.7	91	2220	63°	"		60 min
5.										

RATE OF FLOW CALCULATIONS

NO.	COEFFICIENT (24 HOUR)	$\sqrt{h_w P_m}$	Pressure P _m	Flow Temp. Factor Ft.	Gravity Factor Fg.	Super Compress. Factor, F pv.	Rate of Flow Q, Mcfd
1.	25.64	21.72	393.2	.9715	1.313	1.024	727
2.	25.64	40.65	413.2	.9715	1.313	1.030	1369
3.	25.64	60.98	413.2	.9715	1.313	1.030	2054
4.	25.64	78.36	448.2	.9715	1.313	1.027	2632
5.							

NO.	F _r	Temp. °R	T _r	Z	Gas Liquid Hydrocarbon Ratio	Mcf/bbl
1.	.582	551	1.59	.954	N/A	
2.	.749	551	1.59	.943	A.P. L Gravity of Liquid Hydrocarbons N/A	Deg.
3.	.749	551	1.59	.943	Specific Gravity Separator Gas .580	XXXXXXXXXX
4.	.664	551	1.59	.948	Specific Gravity Flowing Fluid N/A	XXXXXX N/A
5.					Critical Pressure 675 P.S.I.A.	P.S.I.A.
					Critical Temperature 346 R	R

P_c 3276.6 P_w 10736.1

NO.	P ²	P _w	P _w ²	P ² - P _w ²	1) $\frac{P_c^2}{P_c^2 - P_w^2} = 1.88$	2) $\left[\frac{P_c^2}{P_c^2 - P_w^2} \right]^n = 1.52$
1.	3147.3	9905.4	830.7			
2.	2936.2	8621.2	2114.9			
3.	2639.4	6966.4	3769.7			
4.	2245.1	5040.4	5695.7			
5.						

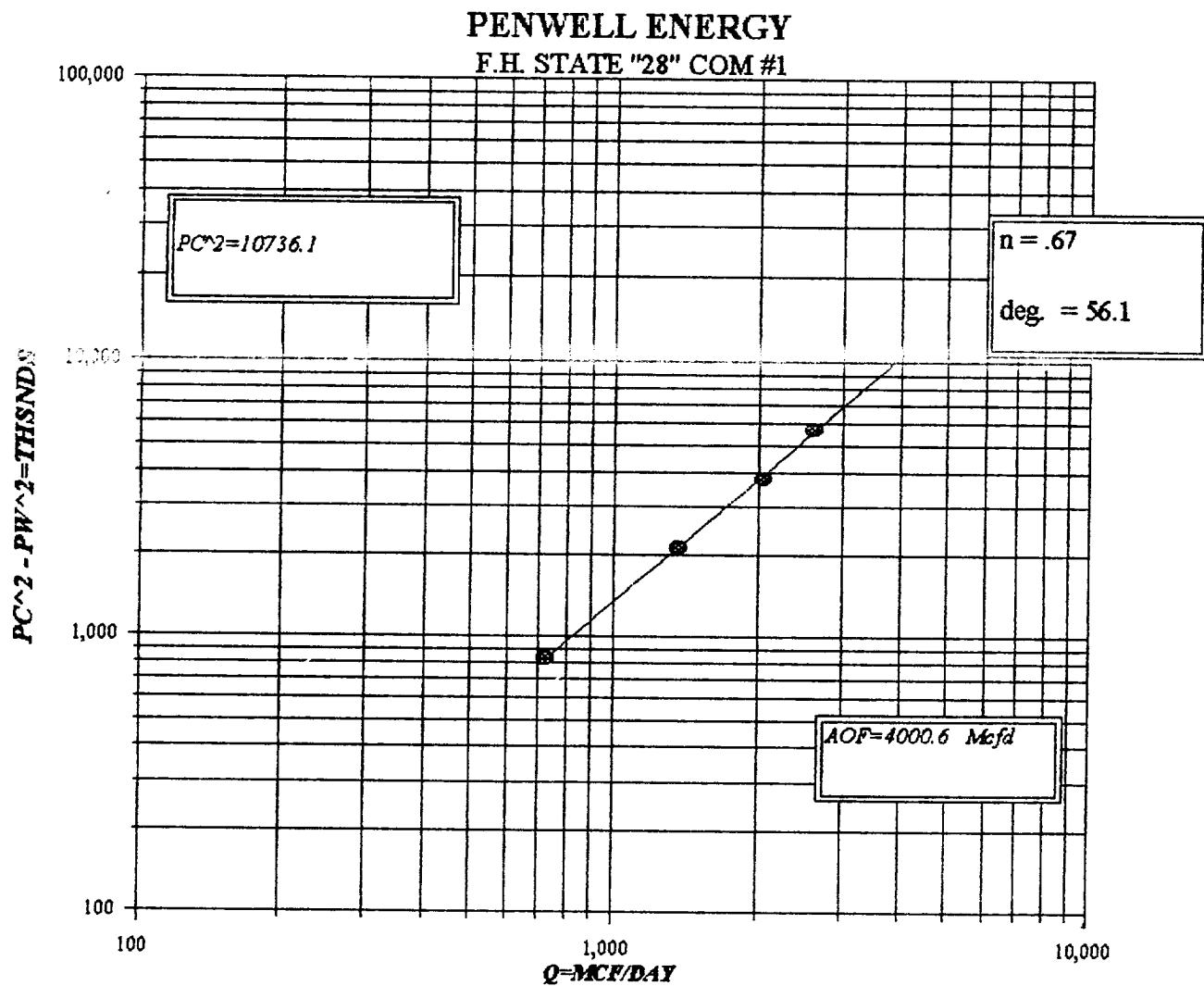
AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2} \right]^n = 4000.6$

Absolute Open Flow 4000.6 Mcfd @ 15.025 Angle of Slope θ 56.1 Slope, n .67

Remarks: *CALCULATED FROM KNOWN BOTTOM HOLE PRESSURES

Approved By Division	Conducted By: PRO WELL TESTER	Calculated By: MB	Checked By: BM
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MORROW



WORK SHEET FOR CALCULATION OF WELLHEAD PRESSURE (Pc or Pw)
FROM KNOWN BOTTOM HOLE PRESSURE (Pf or Ps)

FORM C-122F

COMPANY PENWELL ENERGY LEASE : F.H.COM.28WELL NO. : 1 DATE 3/17/97
UNIT SECTION : TWNSHP : RANGE :
L 11547 H : 11547 L/H : 1 G/GMIX : 0.5800
CO2 : 1.3 N2 : 0.16 H2S :
GH : 6697.3 PCR : 675 TCR : 346

LINE		1	2	3	4	5	6	7	8
1	TW(W.H. R)	534	534	534	534	534	534	534	534
2	Ts(B.H. R)	649.5	649.5	649.5	649.5	649.5	649.5	649.5	649.5
3	T=(Tw+Ts/2)	591.7	591.7	591.7	591.7	591.7	591.7	591.7	591.7
4	Z (EST.)	0.976	0.886	ERR	ERR	ERR	ERR	ERR	ERR
5	TZ	578	525	ERR	ERR	ERR	ERR	ERR	ERR
6	GH/TZ	11.596	12.768	ERR	ERR	ERR	ERR	ERR	ERR
7	eS(TABLE XIV)	1.545	1.614	ERR	ERR	ERR	ERR	ERR	ERR
8	Pf or Ps	4162.9	4162.9	0	0	0	0	0	0
9	Pf2 or Ps2	17329.7	17329.7	0.0	0.0	0.0	0.0	0.0	0.0
10	Pc2=Pf/eS or Pw2=Ps2/eS	11218.5	10736.1	ERR	ERR	ERR	ERR	ERR	ERR
11	Pc or Pw	3349	3277	ERR	ERR	ERR	ERR	ERR	ERR
12	P=(Pw+Ps/2)or(Pc+Pf/2)	3756	3720	ERR	ERR	ERR	ERR	ERR	ERR
13	Pr=(P/Pcr)	5.56	5.51	ERR	ERR	ERR	ERR	ERR	ERR
14	Tr(T/Tcr)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
15	Z (TABLE XI)	0.886	0.885	ERR	ERR	ERR	ERR	ERR	ERR

PC PW 1 : 3276.6 PW 2 : ERR PW 3 : ERR PW 4 : ERR

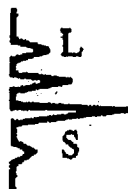
WORK SHEET FOR CALCULATION OF WELL PRESSURE (P_c or P_w)
FROM KNOWN BOTTOM HOLE PRESSURE (P_f or P_s)

FORM C-122F

COMPANY PENWELL ENERGY LEASE : F.H.COM.28WELL NO. : 1 DATE 3/17/97
UNIT C SECTION : 28 TOWNSHIP : 23 RANGE : 26
L 11547 H : 11547 L/H : 1 G/GMIX : 0.5800
CO2 : 1.3 N2 : 0.16 H2S :
GH : 6697.3 PCR : 675 TCR : 346

LINE		1	2	3	4	5	6	7	8
1	TW(W.H. R)	534	534	534	534	534	534	534	534
2	Ts(B.H. R)	649.5	649.5	649.5	649.5	649.5	649.5	649.5	649.5
3	$T=(T_w+T_s/2)$	591.7	591.7	591.7	591.7	591.7	591.7	591.7	591.7
4	Z (EST.)	0.966	0.879	0.886	0.867	0.869	0.856	0.852	0.846
5	TZ	572	520	524	513	514	506	504	501
6	GH/TZ	11.715	12.874	12.773	13.047	13.027	13.228	13.282	13.370
7	eS(TABLE XIV)	1.552	1.621	1.614	1.631	1.630	1.642	1.646	1.651
8	P_f or P_s	4006.5	4006.5	3750	3750	3382.3	3382.3	2884.8	2884.8
9	P_{f2} or P_{s2}	16052.0	16052.0	14062.5	14062.5	11440.0	11440.0	8322.1	8322.1
10	$P_{c2}=P_f/eS$ or $P_{w2}=P_{s2}/eS$	10345.1	9905.3	8710.5	8621.5	7018.8	6966.3	5057.2	5040.6
11	P_c or P_w	3216	3147	2951	2936	2649	2639	2249	2245
12	$P=(P_w+P_s/2)$ or $(P_c+P_f/2)$	3611	3577	3351	3343	3016	3011	2567	2565
13	$P_r=(P/P_{cr})$	5.35	5.30	4.96	4.95	4.47	4.46	3.80	3.80
14	$T_r(T/T_{cr})$	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
15	Z (TABLE XI)	0.879	0.877	0.867	0.867	0.856	0.855	0.846	0.846

PW 1 : 3147.3 PW 2 : 2936.2 PW 3 : 2639.4 PW 4 : 2245.1



Laboratory Services, Inc.

1331 Tasker Drive
Hobbs, New Mexico 88240
Telephone: (505) 397-3713

FOR: Pro Well Testing & Wireline
Attention: Mr. Ray Ables
P. O. Box 791
Hobbs, New Mexico 88241

SAMPLE MORROW Formation
IDENTIFICATION: F.H. State Com 28 #1
COMPANY: Penwell Energy
LEASE:
PLANT:

SAMPLE DATA: DATE SAMPLED: 3/17/97 1:00 PM
ANALYSIS DATE: 3/17/97
PRESSURE - PSIG 400
SAMPLE TEMP. °F 78
ATMOS. TEMP. °F

GAS (XX) LIQUID ()
SAMPLED BY: Ray Ables
ANALYSIS BY: Vickie Walker

REMARKS: Sample taken @ the meter.

COMPONENT ANALYSIS

COMPONENT	MOL PERCENT	GPM
Hydrogen Sulfide (H2S)		
Nitrogen (N2)	0.16	
Carbon Dioxide (CO2)	1.30	
Methane (C1)	96.45	
Ethane (C2)	1.78	0.474
Propane (C3)	0.17	0.047
I-Butane (IC4)	0.03	0.009
N-Butane (NC4)	0.02	0.008
I-Pentane (IC5)	0.03	0.011
N-Pentane (NC5)	0.01	0.004
Hexane Plus (C6+)	0.05	0.019
	100.00	0.572

BTU/CU.FT. - DRY 1015
AT 14.650 DRY 1012
AT 14.650 WET 995
AT 14.73 DRY 1018
AT 14.73 WET 1000

MOLECULAR WT. 16.7986

SPECIFIC GRAVITY -
CALCULATED 0.580
MEASURED