

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Type Test ☒ Initial ☐ Annual ☐ Special					Test Date 5/16/90				
Company Santa Fe Energy Resources, Inc.				Connection Enron Pipeline Corp.					
Well Bilbrey				Formation Morrow				Unit	
Completion Date 3/24/90		Total Depth 14,800'		Plug Back TD 14,790'		Elevation 3709' KB		Farm or Lease Name Bilbrey 28A Fed.	
Coq. Size 4 1/2	Wt. 13.5	d 3.920	Set At 14,800	Perforations: From 13,902 To 13,912		Well No. 1			
Trg. Size 2 3/8	Wt. 4.7	d 1.995	Set At 13,699	Perforations: From Open To Ended		Unit Sec. Twp. Rge. K 28 21s 32e			
Type Well - Single - Bradenhead - G.C. or G.O. Multiple Single					Packer Set At 13,699		County Lea		
Producing Thru Tbg		Reservoir Temp. °F 190 @ 13,644		Mean Annual Temp. °F 60		Baro. Press. - P _a 13.2		State New Mexico	
L -	H -	Cg 0.627	% CO ₂ 0.54	% N ₂ 0.61	% H ₂ S -	Prover -	Meter Run 3.068	Tups FLG	

FLOW DATA						TUBING DATA		CASING DATA		Duration of Flow	
NO.	Prover Line Size	X	Orifice Size	Press. p.s.i.g.	Diff. h _w	Temp. °F	Press. p.s.i.g. DWT	Temp. °F	Press. p.s.i.g.		Temp. °F
SI							6500		Packer		14 days
1.	3.068	4/64	1.750	630	5"	111	6245				1.0 hr.
2.	3.068	7/64	1.750	640	14"	99	5900				1.0 hr.
3.	3.068	10/64	1.750	660	29"	100	5570				1.0 hr.
4.	3.068	13/64	1.750	660	56"	81	4720				1.0 hr.
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, Mscf/d
1	15.61	56.71	643.2	0.9543	1.263	1.044	1114
2	15.61	95.63	653.2	0.9645	1.263	1.048	1906
3	15.61	139.72	673.2	0.9636	1.263	1.049	2784
4	15.61	194.16	673.2	0.9804	1.263	1.056	3963
5							

NO.	R _f	Temp. °R	T _f	Z	Gas Liquid Hydrocarbon Ratio	A.P.I. Gravity of Liquid Hydrocarbons	Specific Gravity Separator Gas	Specific Gravity Flowing Fluid	Critical Pressure	Critical Temperature
1	0.96	571	1.56	0.918	70.17	55 @ 60	0.627		671	365
2	0.97	559	1.53	0.910						
3	1.00	560	1.53	0.908						
4	1.00	541	1.48	0.897						
5										

NO.	P _i ²	P _w ²	P _e ²	P _i ² - P _w ²
1		8214.2	67473.1	4440.7
2		7983.2	63731.5	8182.3
3		7477.2	55908.5	16005.8
4		6672.2	44518.3	27395.5
5				

(1) $\frac{P_e^2}{P_i^2 - P_w^2} = 2.625$

(2) $\left[\frac{P_e^2}{P_i^2 - P_w^2} \right]^n = 1.793$

AOF = 0 $\left[\frac{P_e^2}{P_i^2 - P_w^2} \right]^n = 7106$

Gas Liquid Hydrocarbon Ratio 70.17 Mscf/gal.

A.P.I. Gravity of Liquid Hydrocarbons 55 @ 60 Deg.

Specific Gravity Separator Gas 0.627 XXXXXXXXX

Specific Gravity Flowing Fluid XXXXXX

Critical Pressure 671 P.S.I.A. P.S.I.A.

Critical Temperature 365 °R °R

Absolute Open Flow <u>7106</u> Mscf/d @ 15.025	Angle of Slope @ <u>58° 50'</u>	Slope, n <u>0.605</u>
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Remarks: *Bottom hole pressures @ 13907' (-10198) used for pressure calculations
Well produced 5.8 BBLs condensate in 4 hours

Approved By: <u>Eddie W. Seay</u>	Conducted By: <u>Jarrel Services, Inc.</u>	Calculated By: <u>D. Dickerson</u>	Checked By: <u>D. Dickerson</u>
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