



COLEMAN PETROLEUM ENGINEERING COMPANY

PHONE EXPRESS 3-3813

611 GRIMES

P. O. BOX 1829

HOBBS, NEW MEXICO

DECEMBER 30, 1968

PENNZOIL UNITED, INC.
P. O. DRAWER 1828
MIDLAND, TEXAS

RE: HUDSON 29 FEDERAL No.2
UNDESIGNATED MORROW GAS
4-POINT BACK PRESSURE TEST
AND GAS SAMPLE & ANALYSIS

GENTLEMEN:

IN COMPLIANCE WITH YOUR INSTRUCTIONS A 4-POINT BACK PRESSURE TEST WAS CONDUCTED AND A SAMPLE TAKEN DURING THE FLOW PERIOD. THE ABSOLUTE OPEN FLOW WAS CALCULATED TO BE 7100 MCF/D. THE AVERAGE GAS PRODUCTION WAS RECORDED AS 1956.4 MCF/D WITH 22.80 BQ/D AND THE SAMPLE YIELDED COMPONENT PERCENTAGES AS FOLLOWS:

CARBON DIOXIDE	0.56
NITROGEN	0.44
OXYGEN	0.00
HYDROGEN SULFIDE	0.00
HYDROGEN	0.00
METHANE	86.48
ETHANE	8.47
PROPANE	2.98
ISO-BUTANE	0.29
NORMAL BUTANE	0.53
ISO-PENTANE	0.09
NORMAL PENTANE	0.08
HEXANES PLUS	0.08

TOTAL 100.00

CALCULATED SP. GR.	0.6481
CALCULATED BTU SAT DRY	1136
CALCULATED BTU SAT WET	1116

VERY TRULY YOURS

COLEMAN PETROLEUM ENG. CO.

Joe A. Coleman
JOE A. COLEMAN

NEW MEXICO OIL CONSERVATION COMMISS. J
MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

Type Test ☒ Initial ☐ Annual ☐ Special				Test Date 12-26-66	
Company PENNZOIL UNITED, INC.				Connection NONE	
Pool UNDESIGNATED				Formation MORROW GAS	
Completion Date 12-22-66		Total Depth 13575'		Plug Back TD 13540'	
				Elevation 3783' KB	
Farm or Lease Name HUDSON 29 FEDERAL				Unit 320	
Csg. Size 4 1/2"	Wt. 11.6	d 3.875	Set At 13575'	Perforations: From 13283' To 13515'	
Tbg. Size 2 3/8"	Wt. 13.5	d 3.795	Set At 13199'	Perforations: From OPEN To ENDED	
Type Well - Single - Bradenhead - G.G. or G.O. Multiple SINGLE				Packer Set At 12254'	
Producing Thru TUBING		Reservoir Temp. °F 192 @ 13149		Mean Annual Temp. °F 60	
				Baro. Press. - P _a 13.2	
State NEW MEXICO					
L 13399	H -	G _g 0.648	% CO ₂ 0.56	% N ₂ 0.44	% H ₂ S 0.00
Prover -		Meter Run X		Taps FLANGE	

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. W.T.	Temp. °F	Press. p.s.i.g.	Temp. °F	of Flow
SI							4660		PACKER	-	63.0
1.	3"	12/64	2"	560	25	40	3478	72	-	-	3.0
2.	3"	10/64	2"	510	13	42	3815	72	-	-	1.0
3.	3"	9/64	2"	490	6	46	4260	72	-	-	1.0
4.	3"	7/64	2"	450	3	50	4391	72	-	-	1.0
5.											

RATE OF FLOW CALCULATIONS							
NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P _m	Flow Temp. Factor F _t	Gravity Factor F _g	Super Compress. Factor F _{pv}	Rate of Flow Q, Mcfd
1	19.81	119.71	573.2	1.020	1.242	1.067	3205.7
2	19.81	82.48	523.2	1.018	1.242	1.061	2191.0
3	19.81	54.94	503.2	1.014	1.242	1.055	1416.1
4	19.81	37.68	473.2	1.010	1.242	1.049	982.2
5.							

NO.	P _t	Temp. °R	T _t	Z	Gas Liquid Hydrocarbon Ratio 65807 Mcf/bbl.
1.	0.65	500	1.36	.879	A.P.I. Gravity of Liquid Hydrocarbons 58.2 Deg.
2.	0.78	502	1.36	.889	Specific Gravity Separator Gas 0.648 XXXXXXXXXX
3.	0.75	506	1.38	.890	Specific Gravity Flowing Fluid XXXXX
4.	0.70	510	1.39	.908	Critical Pressure 673 P.S.I.A. P.S.I.A.
5.					Critical Temperature 368 R R

P _c 6418.2 P _c ² 41192.3				(1) $\frac{P_c^2}{P_c^2 - R_w^2} = 4.052$		(2) $\left[\frac{P_c^2}{P_c^2 - R_w^2} \right]^n = 3.245$	
NO.	P _t ²	P _w ²	R _w ²	P _c ² - R _w ²	AOF = Q $\left[\frac{P_c^2}{P_c^2 - R_w^2} \right]^n = 7113$		
1	-	6179.2	23824.1	14359.2			
2	-	5570.2	31027.1	10166.2			
3	-	5922.2	35072.5	120.8			
4	-	6105.2	37273.5	3919.8			
5							

Absolute Open Flow 7100 Mcfd @ 15.025	Angle of Slope @ 40° 56'	Slope, n .841
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Remarks: * DHP @ (-9616') 13399' Used For Pressure Calculations

Approved By Commission:	Conducted By: COLEMAN PET. ENG.	Calculated By: JOE A. COLEMAN	Checked By: JOE A. COLEMAN
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COLEMAN PETROLEUM ENGINEERING COMPANY

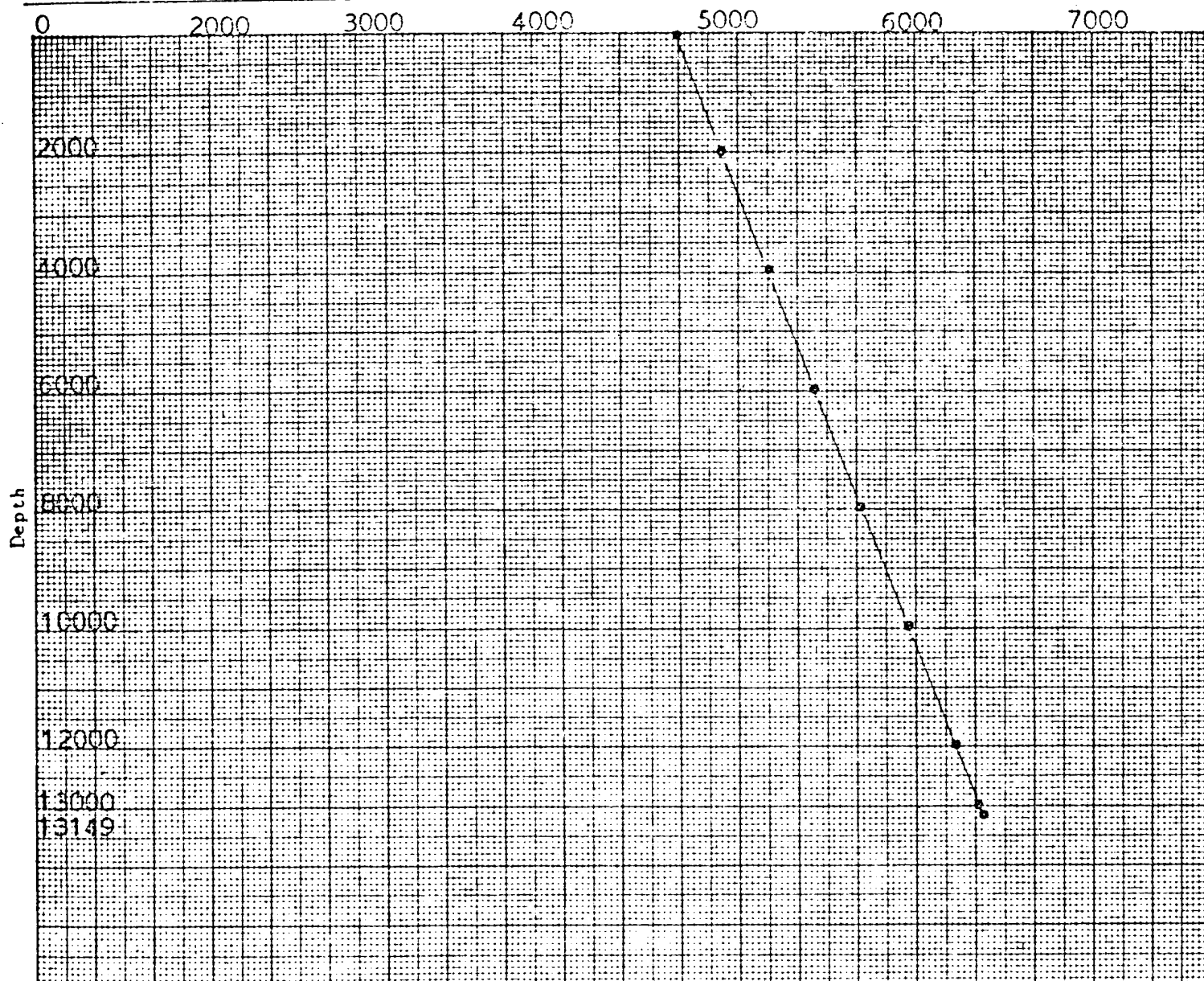
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611 GRIMES
P O BOX 1829
HOBBS, NEW MEXICO

BOTTOM HOLE PRESSURE RECORD

OPERATOR PENNZOIL UNITED, INC.
FIELD UNDESIGNATED FORMATION MORROW GAS
LEASE HUDSON 29 FEDERAL WELL No. 2
COUNTY LEA STATE NEW MEXICO
DATE 12-26-68 TIME 9:15 AM
Status SHUT IN Test depth 13149'
Time S. 63.0 HRS Last test date INITIAL
Tub Pres. 4660 DWT BHP last test -
Cas. Pres. PKR BHP change -
Elev. 3783' KB Fluid top NONE
Datum (-9616') ** Water top NONE
Temp. @ 192°F Run by WEAVER
Cal. No. A3131N Chart No. 1

Depth	Pressure	Gradient
0	4660	-
2000	4907	.124
4000	5157	.130
6000	5429	.131
8000	5691	.131
10000	5955	.132
12000	6219	.132
13000	6351	.132
13149	6371	.134
13399(-9616)	6405* **	(.134)

* EXTRAPOLATED PRESSURE
** MID POINT OF CASING PERFORATIONS





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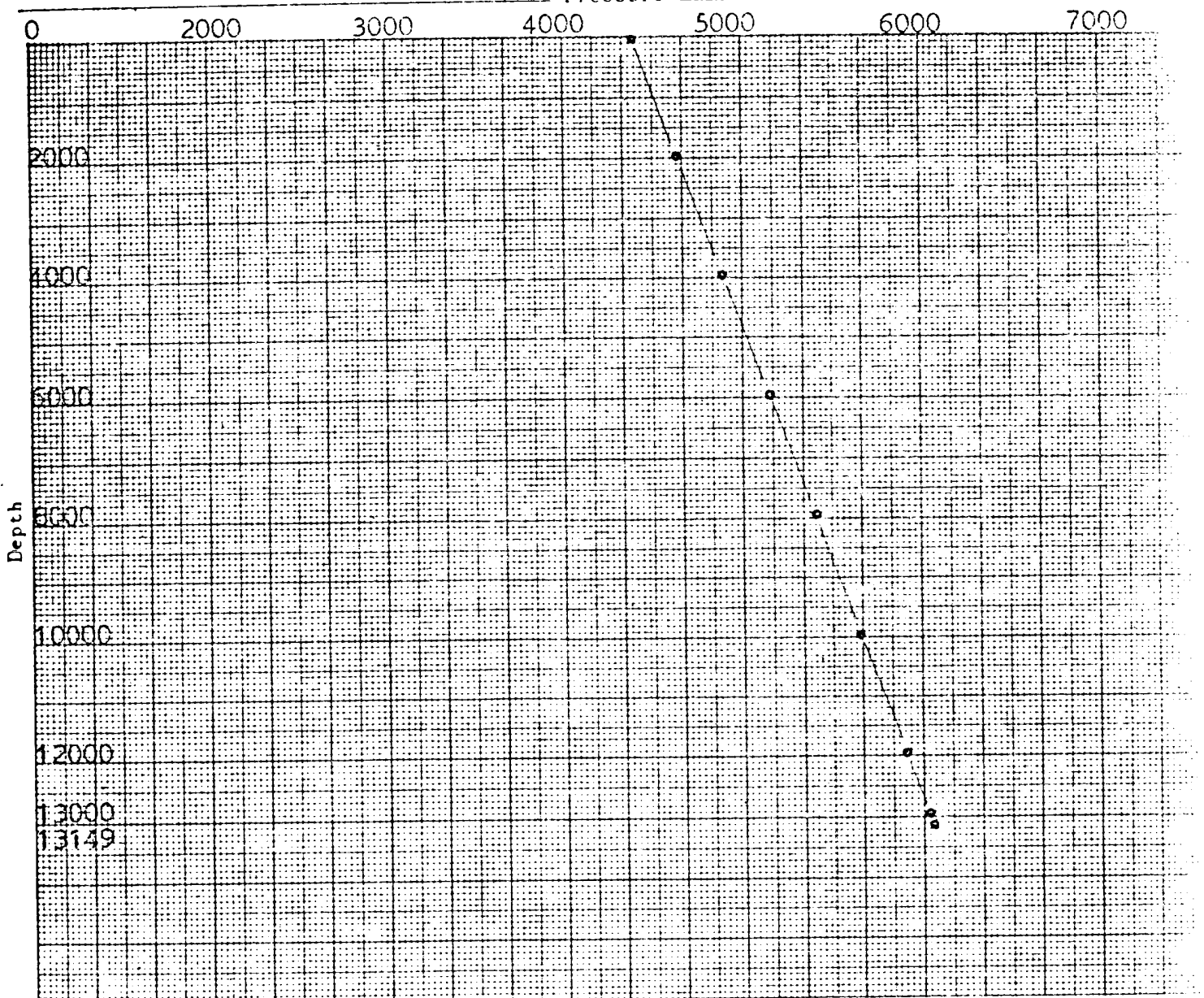
PHONE EXPRESS 3 381
611 GRIMES
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HOBBS, NEW MEX.

BOTTOM HOLE PRESSURE RECORD

OPERATOR PENNZOIL UNITED, INC.
FIELD UNDESIGNATED FORMATION MORROW GAS
LEASE HUDSON 29 FEDERAL WELL No. 2
COUNTY LEA STATE NEW MEXICO
DATE 12-26-68 TIME 5:00 PM
Status FLOWING ON Test depth 13149'
XXXXX 7/64" CH Last test date -
Tub Pres. 4395 BHP last test -
Cas. Pres. PKR BHP change -
Elev. 3783' KB Fluid top. FLOWING
Datum (-9616') ** Water top. NONE
Temp. @ 1920F Run by WEAVER
Cal. No. A3131N Chart No. 2

Depth	Pressure	Gradient
0	4395	-
2000	4646	.126
4000	4898	.126
6000	5152	.127
8000	5404	.126
10000	5658	.127
12000	5914	.128
13000	6041	.127
13149	6060	.128
13399(-9616)	6092* **	(.128)

* EXTRAPOLATED PRESSURE
** MID POINT OF CASING PERFORATIONS



COMPANY PENNZOIL UNITED, INC.
 WELL HUDSON 29 FEDERAL No. 2
 LOCATION K 29 18 S 33 E
 COUNTY LEA NEW MEXICO
 DATE 12-26-68

$P_e^2 = 41193.3$

ABSOLUTE OPEN FLOW
 = 7100 MCFD

$Q_1 = 3050 \text{ MCFD}, \text{ LOG} = 3.48430$

$Q_2 = 440 \text{ MCFD}, \text{ LOG} = 2.64345$

$n = 0.84085 = 0.841$

Q_2

Q_1

LOGARITHMIC SCALE CROSS SECTION