

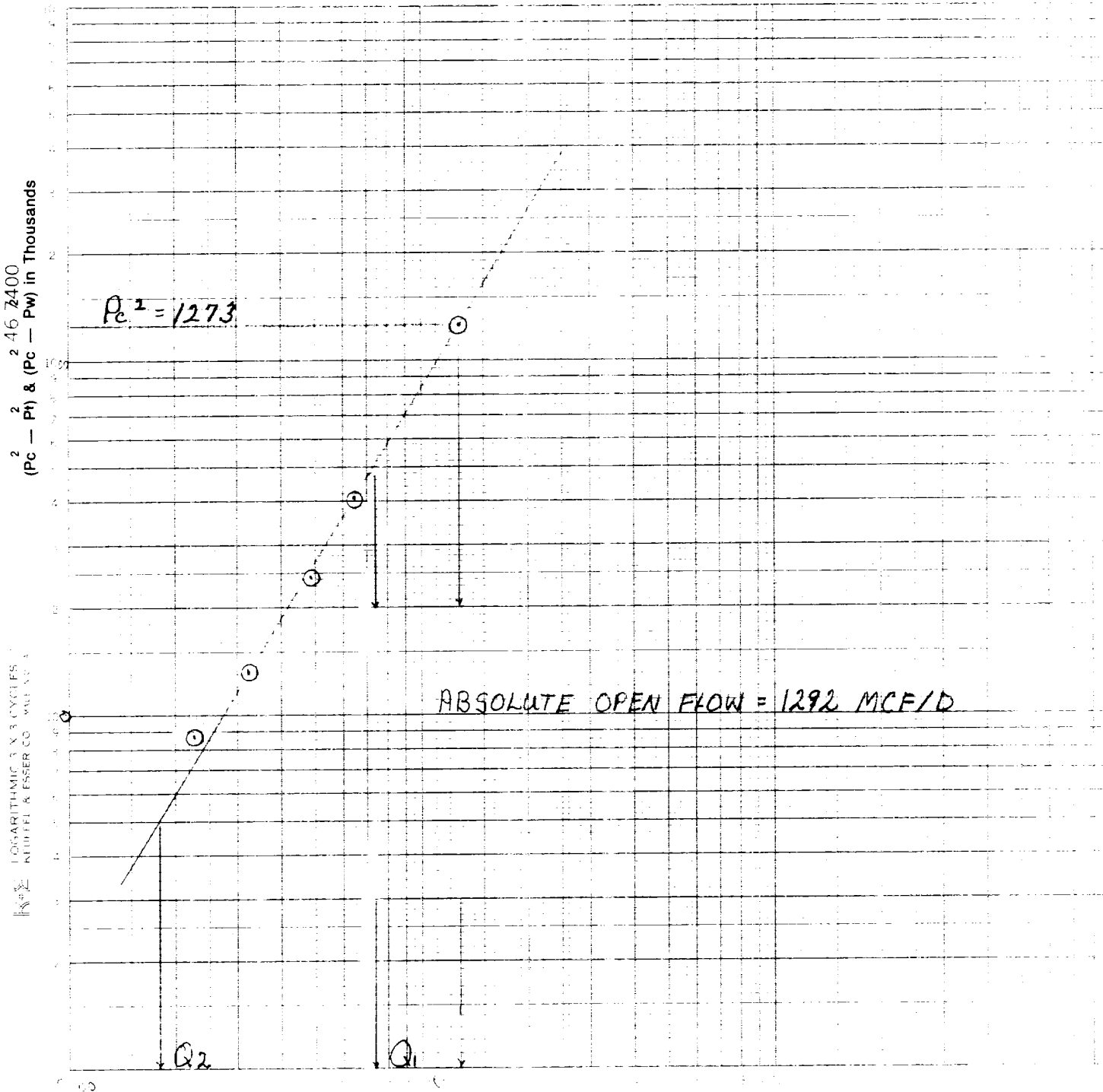
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File

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL RECEIVED

Type Test <input checked="" type="checkbox"/> Initial <input type="checkbox"/> Annual <input type="checkbox"/> Special				Test Date 2-10-89		FEB 17 '89					
Company TERRA RESOURCES				Connection AIR				Unit O. C. D.			
Pool Footwall (Pre-Permian)				Formation Pre-Cambrian				Unit ARTESIA, OFFICE			
Completion Date 2-2-89		Total Depth 6331		Plug Back TD 5725		Elevation		Farm or Lease Name TERRA STATE 35 ST.			
Coq. Size 5.5	Wt. 15.5	d 4.950	Set At 5725	Perforations: From 5320 To 5330		Well No. 1					
Tbg. Size 2.375	Wt. 4.7	d 1.995	Set At 5218	Perforations: From To		Unit H		Sec. 35	Twp. 9S	Range 26E	
Type Well - Single - Bradenhead - G.C. or G.O. Multiple SINGLE-GAS						Packer Set At 5218		County CHAVES			
Producing Thru TUBING		Reservoir Temp. °F 135 @ 5325		Mean Annual Temp. °F 60		Buro. Press. - P <sub>c</sub> 13.2		State NEW MEXICO			
L 5325	H 5325	G <sub>g</sub> .671	% CO <sub>2</sub> 0	% N <sub>2</sub> 2.32	% H <sub>2</sub> S 0	Prover 0	Meter Run 2.067	Tups FLANGE			
FLOW DATA						TUBING DATA		CASING DATA		Duration of Flow	
NO.	Prover Line Size	X	Orifice Size	Press. p.s.i.g.	Diff. h <sub>w</sub>	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	Duration of Flow
SI							1115	60			98
1.	2.067	X	1.375	80	3.5	60	1075	60			1
2.	2.067	X	1.375	80	7	60	1053	60			1
3.	2.067	X	1.375	80	15.8	60	998	60			1
4.	2.067	X	1.375	80	28.3	60	910	60			1
5.											
RATE OF FLOW CALCULATIONS											
NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P <sub>m</sub>	Flow Temp. Factor F <sub>t</sub>	Gravity Factor F <sub>g</sub>	Super Compress. Factor, F <sub>pv</sub>	Rate of Flow Q, M <sup>3</sup> /d				
1	10.20	18.06	93.2	1.0000	1.2208	1.0094	227				
2	10.20	25.34	93.2	1.0000	1.2208	1.0094	321				
3	10.20	38.31	93.2	1.0000	1.2208	1.0094	482				
4	10.20	51.31	93.2	1.0000	1.2208	1.0094	645				
5											
NO.	r <sub>f</sub>	Temp. °R	T <sub>f</sub>	Z	Gas Liquid Hydrocarbon Ratio	Mcf/hbl.					
1	.14	520	1.39	.982	NA	NA					
2	.14	520	1.39	.982	A.P.I. Gravity of Liquid Hydrocarbons	NA					
3	.14	520	1.39	.982	Specific Gravity Separator Gas	.671					
4	.14	520	1.39	.982	Specific Gravity Flowing Fluid	X X X X X					
5					Critical Pressure	665 P.S.I.A.					
					Critical Temperature	374 R					
r <sub>c</sub> 1128.2    r <sub>c</sub> <sup>2</sup> 1273					$(1) \frac{P_c^2}{P_c^2 - P_w^2} = 3.0823$ $(2) \left[ \frac{P_c^2}{P_c^2 - P_w^2} \right]^n = 2.0028$						
NO.	P <sub>c</sub> <sup>2</sup>	P <sub>w</sub> <sup>2</sup>	P <sub>c</sub> <sup>2</sup> - P <sub>w</sub> <sup>2</sup>	P <sub>c</sub> <sup>2</sup> - P <sub>w</sub> <sup>2</sup>	$AOI = Q \left[ \frac{P_c^2}{P_c^2 - P_w^2} \right]^n = 1292$						
1	1184	1089	1186	87	Post ID-2 5-26-89 comp + BK						
2	1137	1067	1139	133							
3	1023	1014	1027	245							
4	852	927	860	413							
5											
Absolute Open Flow				1292	Mcf @ 15.025	Angle of Slope @	58.3	Slope, n	.617		
Remarks: CHOKE SIZES 1ST RATE 5/64 2ND RATE 6.5/64 3RD RATE 8.5/64 4TH RATE 10.5/64											
Approved By Division			Conducted By: RICKY HATCHETT			Calculated By: MATT LEE			Checked By:		

# BENNETT & CATHEY PRODUCTION TESTING BACK PRESSURE CURVE

Operator TERRA RESOURCES Lease STATE 35 Well No. 1  
 County CHAUVES Field \_\_\_\_\_ Location \_\_\_\_\_  
 Date of Test 2-10-89 Slope "n" .617 Angle of Slope 58.3  
 Calc. Abs. Potential 1292 MCF/D



$\overline{\Delta P}_1^2 \quad P_c^2 - P_w^2 = 500$   
 $\overline{\Delta P}_2^2 \quad P_c^2 - P_w^2 = 50$   
 $Q_1 = 745$   
 $Q_2 = 180$

Q, Mcfd

LOG  $Q_1 = 2.872$   
 LOG  $Q_2 = 2.255$   
 $n = 0.617$

your Interest in Measurement be our Concern



PRECISION SERVICE INC.  
Flow Measurement Engineers  
Analysis Results Summary  
Casper, WY 82601

Run No. 206-1  
Date Run 02/06/89  
Date Sampled 02/04/89

Analysis For: BENNETT & CATHEY WRLN.  
Lease: TERRA STATE #35-1 Producer: TERRA RESOURCES  
Location: RITTER LAKES County: CHAVES State: NEW MEXICO  
Purpose: WELL TEST Sampled By: B & C WRLN.  
Sampling Temp. 60 °F Atmos Temp. \_\_\_\_\_ °F  
Volume/day: 400 MCF Formation: \_\_\_\_\_  
Pressure on Bomb: 80 PSIG; Line Pressure: 93.2 PSIA PSIG

Gas Component Analysis Press. Base: 14.73

	Mol. %	Liq. %	GPM Per MCF
Carbon Dioxide CO <sub>2</sub>			
Oxygen O <sub>2</sub>			
Nitrogen N <sub>2</sub>	2.322		
Hydrogen Sulfide H <sub>2</sub> S			
Methane C <sub>1</sub>	86.660		
Ethane C <sub>2</sub>	6.024		1.611
Propane C <sub>3</sub>	2.413		.665
Iso-Butane IC <sub>4</sub>	.371		.121
Nor-Butane NC <sub>4</sub>	.744		.235
Iso-Pentane IC <sub>5</sub>	.250		.091
Nor-Pentane NC <sub>5</sub>	.270		.098
Hexanes plus	.945		.436
Hexanes C <sub>6</sub>			
Heptanes			
Heptanes Plus C <sub>7</sub> +			
Total	100.000		3.257
Pentane + G.P.M.			.625
Propane + GPM			1.646
26-lb Gasoline			1.009

BTU Dry 1158  
BTU Wet 1138  
Calc. Specific Gravity .671

@ Std. Press. 14.696

BTU Dry 1155  
BTU Wet 1135

Calc. Vap. Press. #/Sq.In. \_\_\_\_\_  
Reid Vap. Press. #/Sq.In. \_\_\_\_\_

Z Factor .9972  
N Value 1.2923  
Ave Mol Wt 19.3996  
Ave Cu Ft/Gal \_\_\_\_\_

Run by JEFFREY A. PROPP

Calculated By JEFFREY A. PROPP

Remarks:

Distribution:

BENNETT-CATHEY

BOTTOM HOLE  
DRAWDOWN / BUILD UP  
REPORT

FOR:  
TERRA RESOURCES  
1/26/89

WELL INFORMATION :

LEASE :TERRA 35 STATE	WELL # 1	FIELD :
LOCATION :	FILE # TST1	
COUNTY :CHAVES	STATE :NM	
ELEVATION : 0.00	ZERO POINT :TH	
TUBING SIZE :2.375	DEPTH : 5852.0	
CASING SIZE :0	DEPTH : 0.0	
PACKER TYPE :0	@ 5852.00 feet	
PERFORATED 5964.0 to 6022.0 feet	TOTAL DEPTH :	0.0

TEST INFORMATION :

WELL CONDITION :SI	WELL TYPE :GAS
SURFACE TUBING PRESSURE 1895 psig by GAUGE	
SURFACE CASING PRESSURE psig by	
BOTTOM HOLE TEMPERATURE 118 deg. F. at 6000.0 feet	
BOTTOM HOLE PRESSURE 2281.9 psig at 6000.0 feet	
INSTRUMENT TYPE : RPG-3	NUMBER : 23882 RUN BY : STAGGS

REAL TIME	ELAPSED TIME	HORNER coef	PRESSURE psig	dPRESSURE psig
WELL FLOWING				
16:00:00	000:00:00	0.00	2030.7	0.0
WELL SHUT IN				
16:35:00	000:00:00	99999.90	2035.9	0.0
16:40:00	000:05:00	865.00	2072.5	36.6
16:45:00	000:10:00	433.00	2096.1	60.2
16:50:00	000:15:00	289.00	2112.0	76.1
16:55:00	000:20:00	217.00	2144.0	108.1
17:00:00	000:25:00	173.80	2158.3	122.3
17:05:00	000:30:00	145.00	2167.6	131.7
17:10:00	000:35:00	124.43	2178.0	142.1
17:15:00	000:40:00	109.00	2186.1	150.2
17:20:00	000:45:00	97.00	2193.2	157.3
17:25:00	000:50:00	87.40	2200.0	164.1
17:30:00	000:55:00	79.55	2203.9	168.0
17:35:00	001:00:00	73.00	2208.4	172.5
17:50:00	001:15:00	58.60	2217.2	181.2
18:05:00	001:30:00	49.00	2223.9	188.0
18:20:00	001:45:00	42.14	2230.1	194.2
18:35:00	002:00:00	37.00	2234.3	198.4
18:50:00	002:15:00	33.00	2236.6	200.6

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REAL TIME	ELAPSED TIME	HORNER coef	PRESSURE psig	dPRESSURE psig
19:05:00	002:30:00	29.80	2240.1	204.2
19:20:00	002:45:00	27.18	2242.1	206.1
19:35:00	003:00:00	25.00	2243.0	207.1
20:05:00	003:30:00	21.57	2246.9	211.0
20:35:00	004:00:00	19.00	2250.8	214.9
21:05:00	004:30:00	17.00	2253.4	217.5
21:35:00	005:00:00	15.40	2255.7	219.7
22:05:00	005:30:00	14.09	2257.3	221.4
22:35:00	006:00:00	13.00	2257.6	221.7
23:35:00	007:00:00	11.29	2260.5	224.6
00:35:00	008:00:00	10.00	2262.8	226.9
01:35:00	009:00:00	9.00	2263.8	227.8
02:35:00	010:00:00	8.20	2265.7	229.8
03:35:00	011:00:00	7.55	2266.7	230.7
04:35:00	012:00:00	7.00	2268.0	232.0
05:35:00	013:00:00	6.54	2268.6	232.7
06:35:00	014:00:00	6.14	2270.2	234.3
07:35:00	015:00:00	5.80	2270.9	235.0
08:35:00	016:00:00	5.50	2271.8	235.9
09:35:00	017:00:00	5.24	2272.8	236.9

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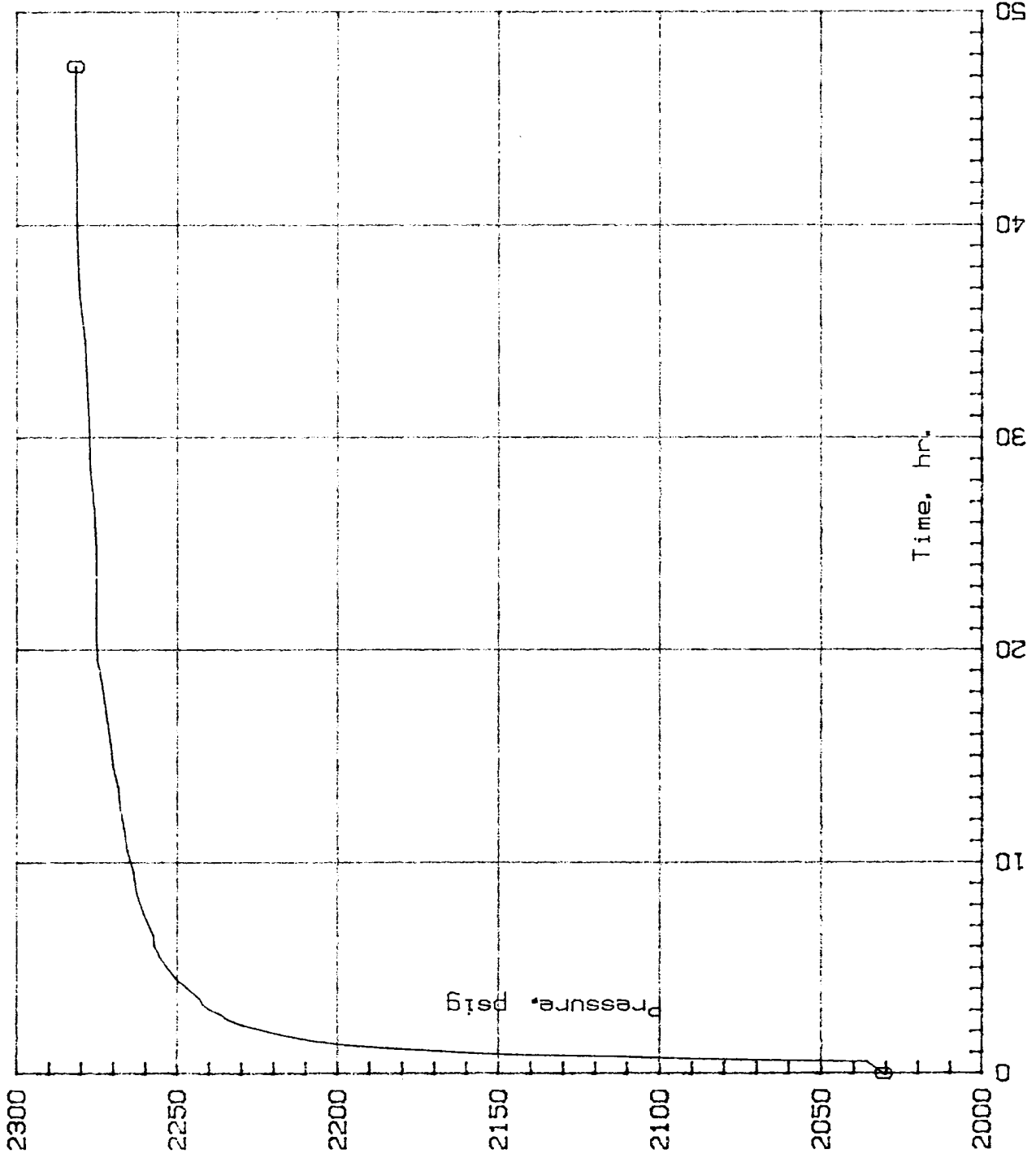
REAL TIME	ELAPSED TIME	HORNER coef	PRESSURE psig	dPRESSURE psig
10:35:00	018:00:00	5.00	2273.8	237.9
11:35:00	019:00:00	4.79	2275.1	239.2
12:35:00	020:00:00	4.60	2275.4	239.5
13:35:00	021:00:00	4.43	2275.4	239.5
14:35:00	022:00:00	4.27	2275.4	239.5
15:35:00	023:00:00	4.13	2275.4	239.5
16:35:00	024:00:00	4.00	2275.4	239.5
17:35:00	025:00:00	3.88	2275.7	239.8
18:35:00	026:00:00	3.77	2276.1	240.1
20:35:00	028:00:00	3.57	2277.3	241.4
22:35:00	030:00:00	3.40	2277.7	241.7
00:35:00	032:00:00	3.25	2278.3	242.4
02:35:00	034:00:00	3.12	2279.0	243.0
04:35:00	036:00:00	3.00	2280.6	244.7
06:35:00	038:00:00	2.89	2281.2	245.3
08:35:00	040:00:00	2.80	2281.6	245.6
10:35:00	042:00:00	2.71	2281.6	245.6
12:35:00	044:00:00	2.64	2281.9	246.0
14:35:00	046:00:00	2.57	2281.9	246.0
15:30:00	046:55:00	2.53	2281.9	246.0

END OF TEST

# LINEAR PLOT

TERRA RESOURCES  
Field :  
Well # 1  
Lease : TERRA 35 STATE  
County : CHAVES  
State : NM

Date of Run : 1/26/89  
Gauge # 23882  
Run by : STAGGS





BENNETT-CATHEY

BOTTOM HOLE  
PRESSURE / GRADIENT  
REPORT

FOR:  
TERRA RESOURCES  
1/28/89

WELL INFORMATION :

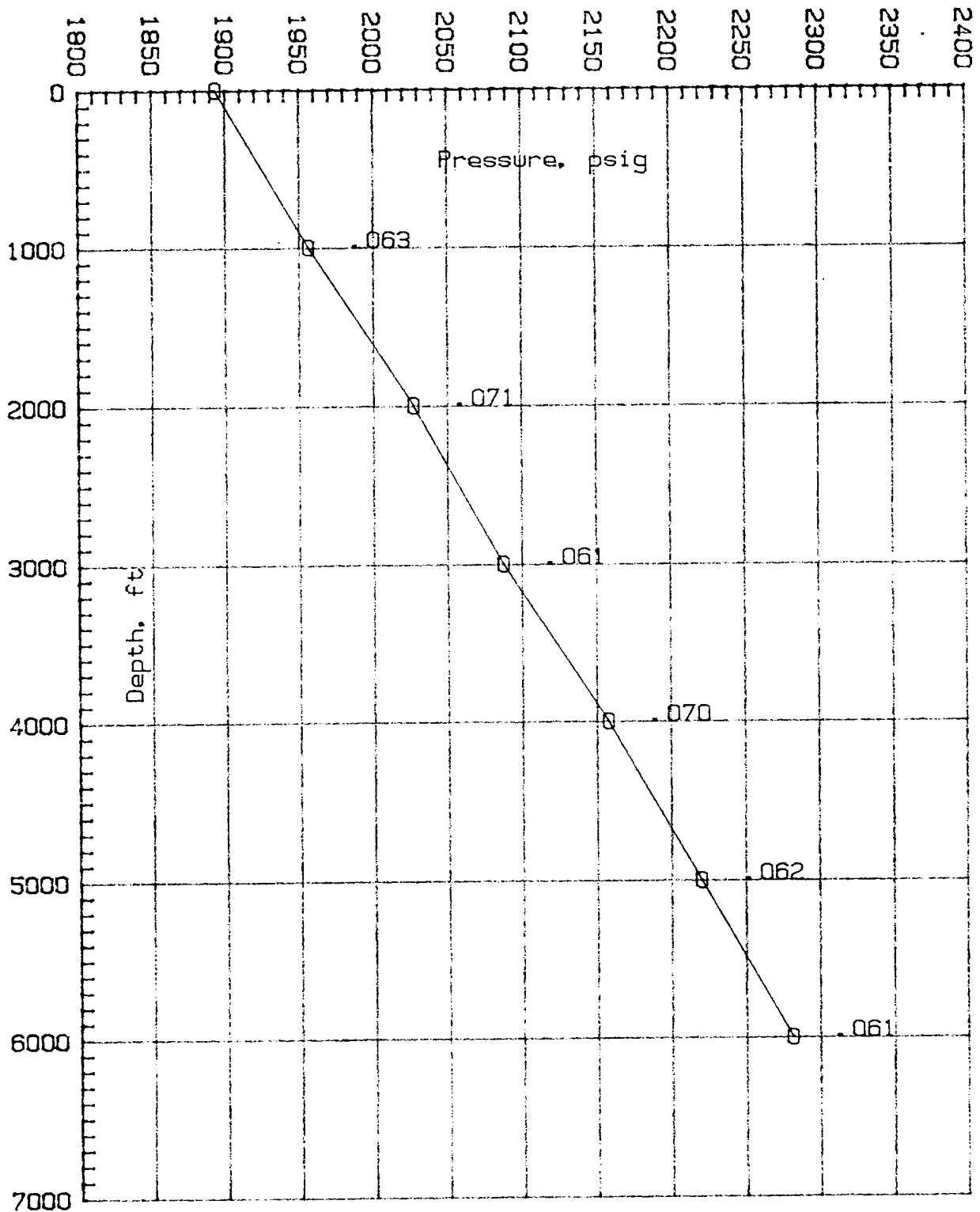
LEASE :35 STATE	WELL # 1	FIELD :
LOCATION :	FILE # 35ST	
COUNTY :CHAVES	STATE :NM	
ELEVATION : 0.00	ZERO POINT :TH	
TUBING SIZE :2.375	DEPTH : 5852.0	
CASING SIZE :0	DEPTH : 0.0	
PACKER TYPE :0	@ 5852.00 feet	
PERFORATED 5964.0 to 6022.0 feet	TOTAL DEPTH :	0.0

TEST INFORMATION :

WELL CONDITION :SI	WELL TYPE :GAS
SURFACE TUBING PRESSURE 1893 psig by GAUGE	
SURFACE CASING PRESSURE psig by	
BOTTOM HOLE TEMPERATURE 118 deg. F. at 6000.0 feet	
BOTTOM HOLE PRESSURE 2281.6 psig at 6000.0 feet	
INSTRUMENT TYPE : RPG-3	NUMBER : 23882 RUN BY : STAGGS

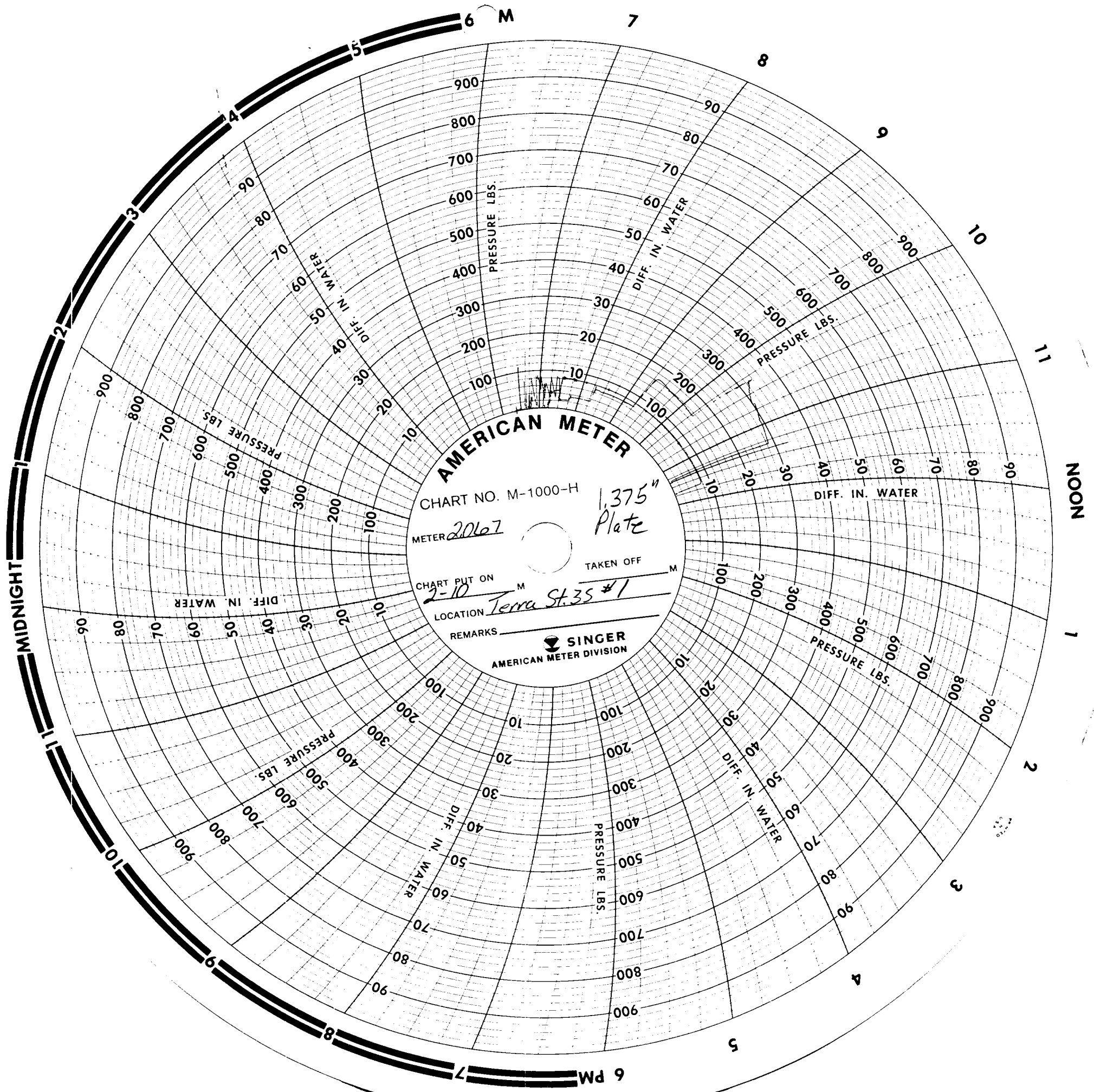
C&W WIRELINE dba BENNETT-CATHEY, P.O. BOX 787 ARTESIA, NM 88210

DEPTH ft	dDEPTH ft	PRESSURE psig	dPRESSURE psig	GRADIENT psig/ft
0		1893.5		
1000	1000	1956.5	62.9	.063
2000	1000	2027.2	70.7	.071
3000	1000	2087.7	60.5	.061
4000	1000	2157.9	70.2	.070
5000	1000	2220.1	62.1	.062
6000	1000	2281.6	61.5	.061
EXTRAPOLATION TO MIDPOINT OF PERFORATIONS ;				
5993		2281.1		.061



### GRADIENT SURVEY

TERRA RESOURCES      Field :      Well # 1  
 Lease : 35 STATE      County : CHAVES      State : NM  
 Date of Run : 1/28/89      Gauge # 23882      Run by : STAGGS



**AMERICAN METER**

CHART NO. M-1000-H

METER *2067*

*1,375<sup>m</sup>*  
*Plate*

CHART PUT ON  
*2-10* M

TAKEN OFF

LOCATION *Terra St. 35 #1*

REMARKS

 **SINGER**  
AMERICAN METER DIVISION

RECEIVED  
FEB 17 89  
O. C. D.  
ARTSIA OFFICE