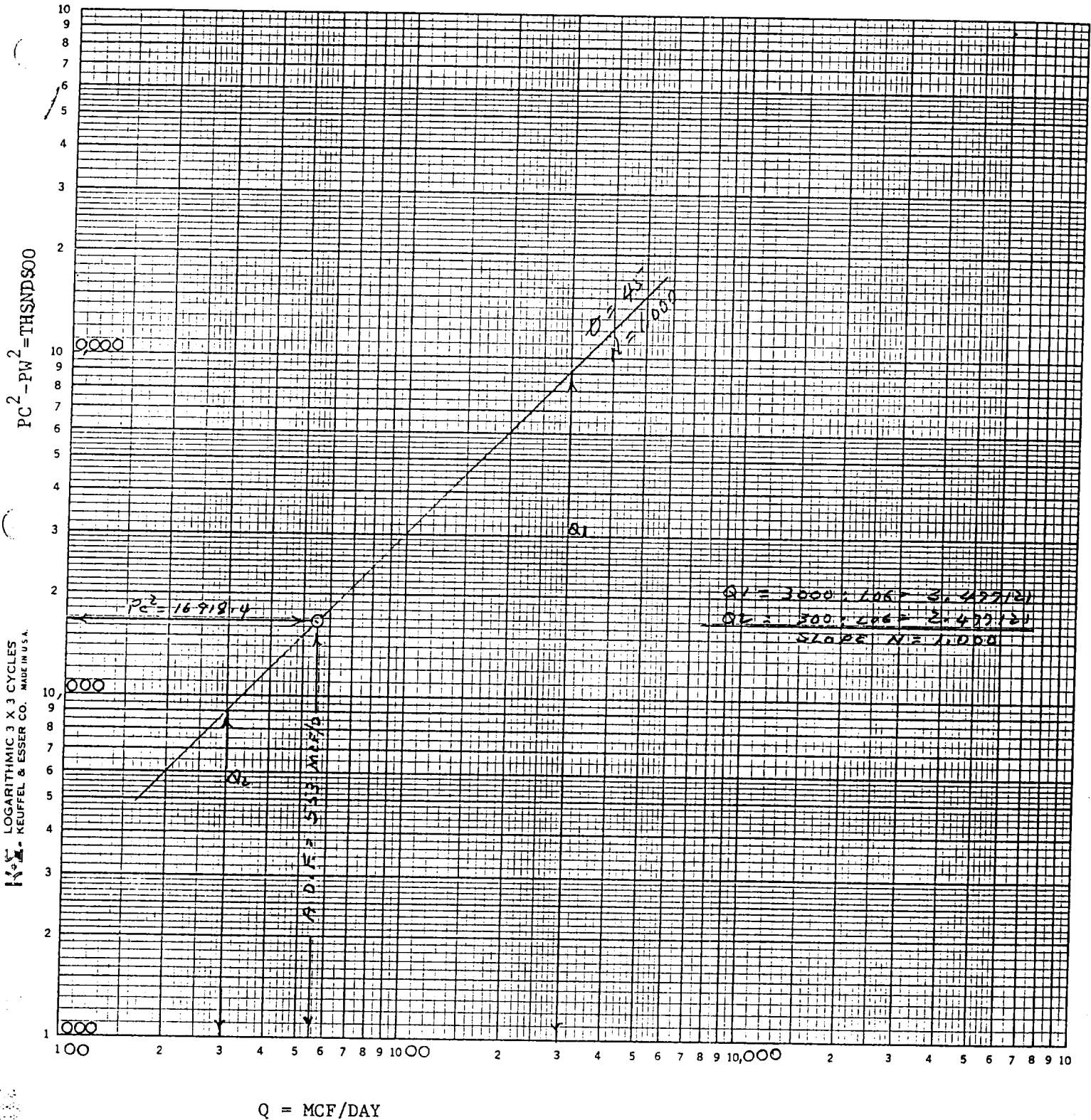


MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Type Test ☒ Initial ☐ Annual ☐ Special				Test Date 2/25/93							
Company COLLINS & WARE Inc.				Connection GAS CO. OF NEW MEXICO							
Pool Quail Ridge morrow BIG JAKE				Formation MORROW							
Completion Date 1/27/93		Total Depth 13,700		Elevation GL 3604							
Casing Size 5 1/2		Set At 17#		Perforations From 13468 To 13473							
Tubing Size 2 7/8		Set At 6.5#		Perforations From To							
Type Well - Single - Drilled - G.C. or G.O. Multiple SINGLE				Packer Set At 13018							
Producing thru TBG		Reservoir Temp. °F 204		Mean Annual Temp. °F 60							
L 13023		H 13023		Baro. Press. - P _a 13.2							
C _g .677		% CO ₂ .59		% H ₂ S .51							
Prorated 4.026		Meter Run 4,026		Taps FLG							
FLOW DATA TUBING DATA CASING DATA Duration of Flow											
NO.	Prorated Line Size	X	Orifice Size	Press. p.s.i.g.	Diff. h _g	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	Duration of Flow
51							4100				72 HRS
1.	4	X	2.000	491	1.0	99°	500				24 HRS
2.											
3.											
4.											
5.											
RATE OF FLOW CALCULATIONS											
NO.	Coefficient (24 Hour)	$\sqrt{h \cdot P_m}$	Pressure P _m	Flow Temp. Factor F _L	Gravity Factor F _g	Super Compress. Factor, F _{sp}	Rate of Flow Q, Mcfd				
1	19.81	22.45	504.2	.9636	1.215	1.045	544				
2.											
3.											
4.											
5.											
NO.	P _r	Temp. °R	T _r	Z	Gas Liquid Hydrocarbon Ratio DRY GAS Mcf/bbl.						
1.	.75	560	1.46	.916	A.P.L. Gravity of Liquid Hydrocarbons DRY Deg.						
2.					Specific Gravity Separator Gas .677 XXXXXXXXXX						
3.					Specific Gravity Flowing Fluid XXXXX						
4.					Critical Pressure 669 P.S.I.A. P.S.I.A.						
5.					Critical Temperature 382 °R °R						
P _r 4113.2 P _r ² 16918.4					(1) $\frac{P_c^2}{P_r^2 - P_w^2} = 1.016$ (2) $\left[\frac{P_c^2}{P_r^2 - P_w^2} \right]^n = 1.016$						
NO.	P _r ²	P _w	P _r ²	P _r ² - P _w ²	(3) $\frac{P_c^2}{P_r^2 - P_w^2} = .553$						
1		517.6	267.0	16650.4							
2											
3											
4											
5											
Absolute Open Flow 553 Mcfd @ 15.025					Angle of Slope 45°			Slope, n 1.000			
Remarks NO FLUID PRODUCED DURING TEST											
Approved By Division				Conducted By: JOHN WEST ENGINEERING				Calculated By: BM			
								Checked By: BM			

COLLINS AND WARE
 QUIET MAN FEDERAL
 UNIT "K" SEC. 6 TWP. 20S RGE. 34E
 LEA COUNTY, NEW MEXICO
 FEBRUARY 25, 1993



REPORT NO.

133023

PAGE NO. 1

TEST DATE:

11-Dec-1992

S T A R

Schlumberger Testing Data Report

Model Verified Interpretation

Schlumberger

COMPANY: Collins & Ware, Inc.

WELL: Quiet Man Federal #1

TEST IDENTIFICATION

Test Type OH-MFE-DST
 Test No. One
 Formation L Bone Springs
 Test Interval (ft) 10634 to 10701
 Depth Reference KB

WELL LOCATION

Field Big Jake
 County Lea
 State New Mexico
 Sec/Twp/Rng 6/20S/34E
 Elevation (ft) 3629

HOLE CONDITIONS

Total Depth (MD/TVD) (ft) 10701
 Hole Size (in) 8.50
 Casing/Liner I.D. (in) 9.625 @ 5150
 Perf'd Interval/Net Pay (ft) .. / 30
 Shot Density/Diameter (in) ...

MUD PROPERTIES

Mud Type Cut Brine
 Mud Weight (lb/gal) 9.1
 Mud Resistivity (ohm.m)09 @ 70F
 Filtrate Resistivity (ohm.m)..
 Filtrate Chlorides (ppm) 86000

INITIAL TEST CONDITIONS

Initial Hydrostatic (psi) 5047.42
 Gas Cushion Type
 Surface Pressure (psi)
 Liquid Cushion Type Water
 Cushion Length (ft) 825

TEST STRING CONFIGURATION

Pipe Length (ft)/I.D. (in) ... 9824 / 3.83
 Collar Length (ft)/I.D. (in) .. 767 / 2.372
 Packer Depth (ft) 10628.10634.
 Bottomhole Choke Size (in)94
 Gauge Depth (ft)/Type 10606/SB-20297

NET PIPE RECOVERY

Volume	Fluid Type	Properties
825 ft	Cushion	
225 ft	Oil	API 38@60F
3.19 bbl		

NET SAMPLE CHAMBER RECOVERY

Volume	Fluid Type	Properties
.97 cuft	Gas	
1600 cc	Oil	API 38@60F
Pressure: 400		GOR: 98
		GLR: 96

INTERPRETATION RESULTS

Model of Behavior Two Porosity
 Fluid Type Used for Analysis .. Oil
 Reservoir Pressure (psi) 2865 @ 10606'
 Transmissibility (md.ft/cp) .. 7.14
 Effective Permeability (md) .. 0.41
 Skin Factor/Damage Ratio 2.0
 Storativity Ratio, Omega 0.20
 Interporos. Flow Coef., Lambda .. 4.0e-4
 Distance to an Anomaly (ft) ..
 Radius of Investigation (ft) .. 61
 Potentiometric Surface (ft) ..

ROCK/FLUID/WELLBORE PROPERTIES

Oil Density (deg. API) 38
 Base Solids (%)
 Gas Gravity 0.65 (est.)
 GOR (scf/STB) 100
 Water Cut (%) 0
 Viscosity (cp) 1.72
 Total Compressibility (1/psi) .. 8.816e-6
 Porosity (%) 6
 Reservoir Temperature (F) 145
 Form. Vol. Factor (bbl/STB) 1.0692

LAST RATE DURING TEST: 18 bopd

COMMENTS:

This drill stem test was mechanically successful. The tested interval produced oil at a final rate at 18 bopd. This interpretation indicates a two porosity system with fair permeability to the produced fluid and significant wellbore damage. With a two porosity system the expected skin is negative 2 to 3 (not zero). Depletion is not indicated as the final shut-in did not see a closed system. Thank you for using Schlumberger. For questions about this analysis call Gil Hileman (915) 694-1866.