

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Type Test ☒ Initial FOUR POINT ☐ Annual ☐ Special		Test Date 5 REGENERED		1980 FNI	
Company EXXON		Connection AIR - NEW WELL		1980 FWI	
Pool WILDCAT		Formation MORROW		Unit F	
Completion Date 5-8-81		Total Length 8703		Plug Back TD 8499	
Casing Size 5.5		Set At 8702		Perforations From 8273 To 8281	
Well No. 1		Farm or Lease Name NEW MEXICO STATE		Well No. 1	
Type Well - Single - Brdenhead - G.G. or G.O. Multiple SINGLE		Packer Set At 8109		County EDDY	
Producing Thru TUBING		Reservoir Temp. °F 158° 8040		Mean Annual Temp. °F 60	
Baro. Press. - P _a 13.2		State NEW MEXICO		Meter Run 411	
L 8277		H 8277		Cg .5946	
% CO ₂ .775		% N ₂ 2.195		% H ₂ S 0	
Prover FLANGE		Meter Run 411		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.	Temp. °F	Press. BHPg.	Temp. °F	
1	4	X	1.5	420	2	90	2287	68	2799		136 HR
2	4	X	1.5	415	3.7	88	2112	70	2628		1
3	4	X	1.5	420	7.5	95	1840	70	2308		1
4	4	X	1.5	420	13.1	94	1508	71	1902		1

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 _{sp}	Rate of Flow O, Mcfd
1	11.12	29.43	433.2	.9723	1.2964	1.0271	424
2	11.12	39.80	428.2	.9741	1.2964	1.0276	574
3	11.12	57.00	433.2	.9680	1.2964	1.0265	816
4	11.12	75.33	433.2	.9688	1.2964	1.0265	1080

NO.	P _r	Temp. °R	T _r	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	.64	550	1.59	.948			.5946		672	347
2	.64	548	1.58	.947						
3	.64	555	1.60	.949						
4	.64	554	1.60	.949						

NO.	P ₁ ²	P _w ²	P _r ²	P _r ² - P _w ²
1	2812.2	7908.5	2423	
2	2641.2	6975.9	3355	
3	2321.2	5388.0	4943	
4	1915.2	3668.0	6663	

(1) $\frac{P_r^2}{P_r^2 - P_w^2} = 1.5505$

AOF = 0 $\left[\frac{P_r^2}{P_r^2 - P_w^2} \right]^n = 1618.3$

(2) $\left[\frac{P_r^2}{P_r^2 - P_w^2} \right]^n = 1.4985$

Absolute Open Flow 1618.3	Mcfd @ 15.025	Angle of Slope 47.3	Slope, n .922
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Re: KNOWN BOTTOM HOLE PRESSURE RECORDED WITH TANDEM AMERADA GAUGES.

Approved By Division	Conducted By	Calculated By	Checked By
		WILLIAM E. JENKINS	

Exxon USA
 New Mexico State Com. W' L No 1
 Unit F, Sec 7, Twp 19S, Rgc 24E
 Eddy County
 New Mexico

$$\overline{\Delta P}^1 \quad P_c^2 - P_w^2 = 20,000$$

$$\overline{\Delta P}^2 \quad P_c^2 - P_w^2 = 2,000$$

$$Q_1 = 3,055.0 \text{ Mcfd}$$

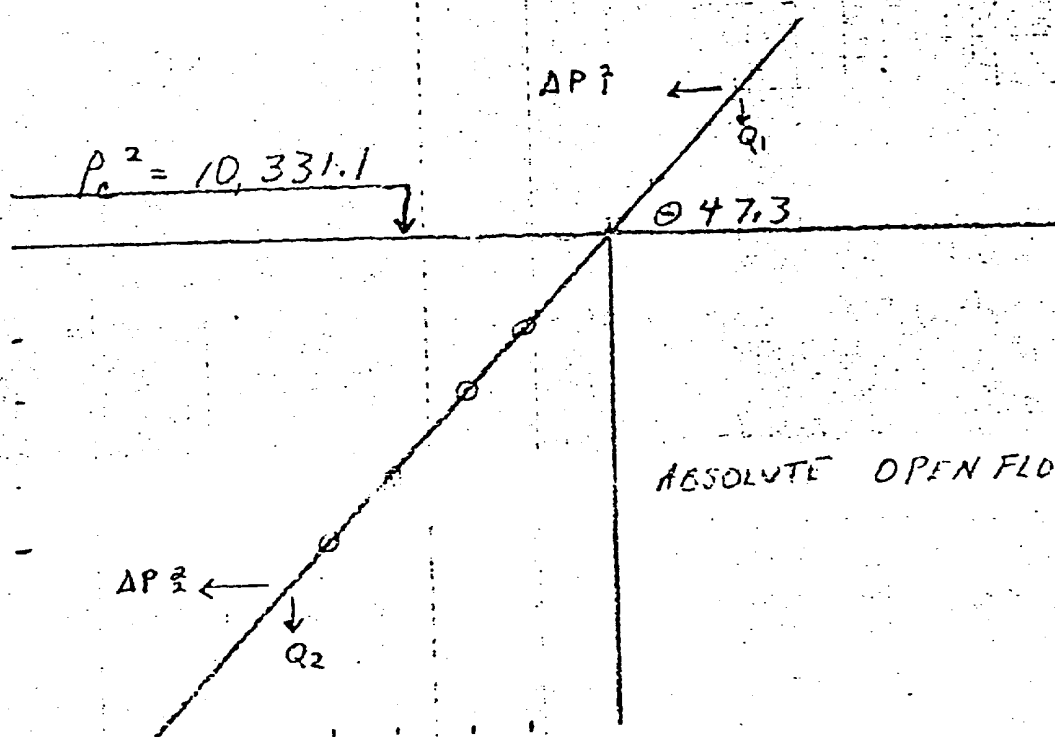
$$Q_2 = 365.5 \text{ Mcfd}$$

$$\log Q_1 = 3.4850$$

$$\log Q_2 = 2.5628$$

$$N = .9222$$

$P_c^2 - P_w^2$



ABSOLUTE OPEN FLOW 1,618.3 Mcfd

NEW-TEX
LAB

P. O. BOX 1161
HOBBS, N.M. 88240

RECEIVED

JUL 14 1981

No. 4971
Run No. _____
Date of Run 5-14-81
Date Secured 5-14-81

CERTIFICATE OF ANALYSIS

O. C. D.
ARTESIA, N.M.

Sample of Exxon Co. U.S.A. New Mexico State Comm #1
Secured from Fennett Wireline
At Box 787 Secured by _____ Date _____
Artesia, New Mexico 88210 Time _____
Sampling conditions _____ Press _____
Temp. _____

FRACTIONAL ANALYSIS

Percentage Composition

MOL % LIQ. % G.P.M.

Carbon Dioxide	.775	
Air	2.195	
Nitrogen		
Oxygen		
Hydrogen sulfide		
Hydrogen	93.521	
Methane	2.706	.722
Ethane	.450	.124
Propane		
Butanes	.103	.034
Iso-Butane	.085	.027
N-Butane		
Pentanes	.048	.018
Iso-Pentane	.028	.010
N-Pentane	.039	.016
Hexanes	.050	.023
Heptanes	Plus	
Octanes		
TOTAL	100.000	.974

Calc. Sp. Gr. 0.5946
Calc. A.P.I. _____
Calc. Vapor Press. _____ PSIA
Sp. Gr. _____
Mol. Wt. 17.21

LIQUID CONTENT (GAL./MCF)

Propane Calc. G.P.M.	.124
Butanes Calc. G.P.M.	.061
Pentanes Plus. G.P.M.	.067
Ethane Calc. G.P.M.	.722
RVP Gasoline G.P.M.	

B.T.U./Cu. Ft. @ 14.696 P.S.I.A.
Dry Basis 1017
Wet Basis 999

Sulfur Analysis by Titration
Gr./100 Cu. Ft.

Hydrogen Sulfide

Mercaptans

Sulfides

Residual Sulfur

Total Sulfur

Run by Deane Simpson

Checked by _____

RECEIVED

Approved by [Signature]

Additional Data and Remarks 7-1091

DATE 5-8-81 / 5-18-81

PERFORATIONS

8273-8281

DATE 5-8-81 / 5-18-81

[illegible]

OKLAHOMA CORPORATION COMMISSION - OIL & GAS CONSERVATION DIVISION
380 Jim Thorpe Building - Oklahoma City Oklahoma 73105
BACK - PRESSURE TEST FOR NATURAL GAS WELLS

Well Name: NEW MEXICO STATE COM OTC No.:
Well No.: 1 SEC: 7 TWP: 19S RGE: 24E County: EDDY
State: NEW MEXICO Type test: FOUR POINT-INITIAL Test date: 5-14-81
Company: EXXON USA Connection: AIR-NEW WELL
Field: WILDCAT Pool No.: Reservoir: MORROW
Location: UNIT F Compl date: 5-8-81 Tot depth: 8702 Plug back: 8499
Elev.: 3839 KB Type compl: SINGLE Packer set at: 0
Prod. thru: TUBING BHT: 158.0 F Atm temp: 70 F Baro press.: 13.2 PSI
Size: METER RUN 4 in Taps: FLANGE L: 8277 H: 8277 Gg: .595
%CO2: .78 %N2: 2.2 %H2S: 0 API WELL NO.: 31
Casing Size(in) Wt(#/Ft) Set at ***** Perforation *****
Tubing 5.500 17.00 8702 from 8273 to 8281
2.875 6.50 8109 from 0 to 0

***** FLOW DATA *****					** TUBING **		** CASING **		* DURATION *
No.	Orifice Size	Press PSIG	Diff in/RTS	Temp F	Press PSIG	Temp F	Press PSIG	Temp F	Dur. of Flow(hrs)
SI					2626.0	70.0	3201.0	70.0	136.00
1	1.5000	420.0	2.00	90	2281.0	68.0	2799.0	.0	1.00
2	1.5000	415.0	3.70	88	2112.0	70.0	2628.0	.0	1.00
3	1.5000	420.0	7.50	95	1840.0	70.0	2308.0	.0	1.00
4	1.5000	420.0	13.10	94	1508.0	71.0	1902.0	.0	1.00

***** RATE OF FLOW CALCULATION *****							
No.	Coeff. (24hrs)	SQRT (Hw*Pw)	Press Pm	Flow (Ft)	Gravity (Fg)	Compress (Fpv)	Rate of Flow(Q)
1	11.1200	29.43	433.2	.9723	1.2964	1.0271	424.
2	11.1200	39.80	428.2	.9741	1.2964	1.0276	574.
3	11.1200	57.00	433.2	.9680	1.2964	1.0265	816.
4	11.1200	75.33	433.2	.9688	1.2964	1.0265	1080.

***** **GAS LIQUID HYDROCARBON CALCULATION**					MCF/BBL	
No.	Pr	Temp. R	Tr	Z	Ratio .000	DEG.
1	.64	550.	1.59	.948	API Gravity .0	
2	.64	548.	1.58	.947	Specific Gravity:	
3	.64	555.	1.60	.949	Separator Gas .5950	
4	.64	554.	1.60	.949	Flowing Fluid .5950	
					Critical Press 672 PSIA	671 PSIA
					Critical Temp 347 R	346 R

Pc	3214.2	(Pc)2	10331.1
No.	Pw	(Pw)2	(Pc)2-(Pw)2
1	2812.2	7908.5	2423.0
2	2641.2	6975.9	3355.0
3	2321.2	5388.0	4943.0
4	1915.2	3668.0	6663.0

$$(Pc)^2 / ((Pc)^2 - (Pn)^2) = \frac{1.5505}{1.5505}$$

$$((Pc)^2 / ((Pc)^2 - (Pw)^2))^n = \frac{1.4985}{1.4518}$$

$$WHAOF = Q * ((Pc)^2 / ((Pc)^2 - (Pw)^2))^n$$

$$= 1618.3 \setminus \frac{1567.9}{1567.9}$$

Calculated Well Head Open Flow: 1618.3 MCFPD Slope: .9222 Angle: 47.3 Deg
~~1567.9 MCFPD~~ ~~.8500~~ ~~49.6 Deg~~

REMARKS

APPROVED BY COMMISSION

CONDUCTED BY

Don Bernhardt

CALCULATED BY

Wohlford & Jenkins
Gas Consultants

CHECKED BY

Artesia, New Mexico 882

FOUR POINT BACK PRES

SUBSURFACE PRESSURE MEASUREMENTS

COMPANY EXXON U.S.A.

WELL NAME NEW MEXICO STATE "DB" COM.

DATE OF TEST 5-14-81

FORMATION MORROW

PAGE 1 OF 1

CHART READINGS AND CALCULATIONS FOR BUILDUP OR DRAWDOWN TEST

*ELEMENT NUMBER RPG3#41552 RANGE 0-6000

CLOCK NUMBER 83443 RANGE 12 HOUR

CLOCK NUMBER _____
TIME WELL SHUT IN 1949 5-8-81

TIME CLOCK STARTED 0915

DEAD WEIGHT ELEMENT ON SURFACE 2637 LBS.

TIME ELEMENT REACHED BOTTOM 1047

DEAD WEIGHT ELEMENT ON BOTTOM 2637 LBS.

ELEMENT SET AT 8040 FEET.

TEMPERATURE 8040 FT. 158 °F.
HOURS MINUTES

DEAD WEIGHT AT THE END OF _____ HOURS _____ MINUTES.

DEAD WEIGHT AT THE END OF _____ HOURS _____
 * TANDEM BOMBS USED - #2 WAS RPG3#21121N, 0-5000 LB RANGE

[illegible]

BENNETT - CATHEY
 Artesia, New Mexico 88210
SUBSURFACE PRESSURE MEASUREMENTS

COMPANY EXXON U.S.A. WELL NAME NEW MEXICO STATE "DB" COM. #1
 DATE OF TEST 5-8-81 TO 5-14-81 FORMATION MORROW PAGE 1 OF 3

CHART READINGS AND CALCULATIONS FOR BUILDUP OR DRAWDOWN TEST

*ELEMENT NUMBER RPG3#41552 RANGE 0-6,000 LBS.
 CLOCK NUMBER H9499 RANGE 180 HOURS
 TIME WELL SHUT IN 1949 5-8-81
 TIME CLOCK STARTED 0831
 DEAD WEIGHT ELEMENT ON SURFACE _____ LBS.
 TIME ELEMENT REACHED BOTTOM _____
 DEAD WEIGHT ELEMENT ON BOTTOM FLOWING 615 LBS.
 ELEMENT SET AT 8040 FEET.
 TEMPERATURE 8040 FT. 158 °F.
 DEAD WEIGHT AT THE END OF _____ HOURS _____ MINUTES.

*TANDEM BOMBS RUN #2, RPG3#21121-N, 0-5,000 LBS RANGE WITH 36 HR. CLOCK

DATE	HOUR	TIME	DEFLECTION in/inches	CALCULATED PRESSURE psig	CORRECTION P ± PC psig	CORRECTED PRESSURE psia	PRESSURE AT MID-POINT OF PERFORATIONS psia
5-8-81		0947		3180	29		3209
OPENED WELL	0	0950		3180	29		3209
	10 MIN.	1000		2796	29		2825
	20 MIN.	1010		2162	29		2191
	30 MIN.	1020		1876	29		1905
	40 MIN.	1030		1666	29		1695
	50 MIN.	1040		1065	29		1095
	1 HOUR	1050		837	29		866
	1 HR. 10M	1100		749	29		778
	1 HR. 20M	1110		676	29		705
	1 HR. 30M	1120		672	29		701
	1 HR. 40M	1130		675	29		704
	1 HR. 50M	1140		685	29		714
	2 HOURS	1150		695	29		724
	2 HR. 10M	1200		703	29		732
	2 HR. 20M	1210		718	29		747
	2 HR. 30M	1220		731	29		760
	2 HR. 40M	1230		739	29		768
	2 HR. 50M	1240		829	29		858
	3 HOURS	1250		1075	29		1104
	3 HR. 10M	1300		915	29		944
	3 HR. 20M	1310		834	29		863
	3 HR. 30M	1320		793	29		822
	3 HR. 40M	1330		775	29		804
	3 HR. 50M	1340		767	29		796
	4 HOURS	1350		767	29		796
	4 HR. 10M	1400		770	29		799
	4 HR. 20M	1410		775	29		804
	4 HR. 30M	1420		776	29		805
	4 HR. 40M	1430		778	29		807
	4 HR. 50M	1440		780	29		809
	5 HOURS	1450		788	29		817
	5 HR. 10M	1500		788	29		817
	5 HR. 20M	1510		785	29		814
	5 HR. 30M	1520		787	29		816
	5 HR. 40M	1530		787	29		816
	5 HR. 50M	1540		800	29		829
	6 HOURS	1550		821	29		850

SUB. REFACE PRESSURE MEASUREMENTS

COMPANY EXXON U.S.A. WELL NAME NEW MEXICO STATE "DB" COM. #1
 DATE OF TEST 5-8-81 TO 5-14-81 LOCATION FORMATION - MORROW PAGE 2 OF 3

CHART READINGS AND CALCULATIONS FOR BUILDUP OR DRAWDOWN TEST

DATE	HOUR	TIME	DEFLECTION in/inches	CALCULATED PRESSURE psig	CORRECTION P ± PC psig	CORRECTED PRESSURE psig	PRESSURE AT MID-POINT OF PERFORATIONS psig
5-8-81	6HR. 10M	1600		839	29		868
	6HR. 20M	1610		857	29		886
	6HR. 30M	1620		865	29		894
	6HR. 40M	1630		872	29		901
	6HR. 50M	1640		876	29		905
	7 HOURS	1650		878	29		907
	7HR. 10M	1700		878	29		907
	7HR. 20M	1710		883	29		912
	7HR. 30M	1720		860	29		889
	7HR. 40M	1730		842	29		871
	7HR. 50M	1740		852	29		881
	8 HOURS	1750		865	29		894
	8HR. 10M	1800		845	29		874
	8HR. 20M	1810		832	29		861
	8HR. 30M	1820		827	29		856
	8HR. 40M	1830		828	29		857
	8HR. 50M	1840		827	29		856
	9 HOURS	1850		828	29		857
	9HR. 10M	1900		829	29		858
	9HR. 20M	1910		829	29		858
	9HR. 30M	1920		829	29		858
	9HR. 40M	1930		829	29		858
	9HR. 50M	1940		829	29		858
SHUT WELL	10 HOURS	1950		829	29		858
IN	10HR. 10M	2000		1,053	29		1,082
	10HR. 20M	2010		1,858	29		1,887
	10HR. 30M	2020		2,202	29		2,231
	10HR. 40M	2030		2,408	29		2,437
	10HR. 50M	2040		2,699	29		2,728
	11 HOURS	2050		2,861	29		2,890
	11HR. 10M	2100		2,941	29		2,970
	11HR. 20M	2110		3,022	29		3,051
	11HR. 30M	2120		3,054	29		3,083
	11HR. 40M	2130		3,071	29		3,100
	11HR. 50M	2140		3,085	29		3,114
	12 HOURS	2150		3,095	29		3,124
	12HR. 10M	2200		3,099	29		3,128
	12HR. 20M	2210		3,103	29		3,132
	12HR. 30M	2220		3,104	29		3,133
	12HR. 40M	2230		3,105	29		3,134
	12HR. 50M	2240		3,108	29		3,137
	13 HOURS	2250		3,109	29		3,138
	13HR. 30M	2320		3,109	29		3,138
	14 HOURS	2350		3,112	29		3,141
5-9-81	14HR. 30M	2420		3,120	29		3,149
	15 HOURS	2450		3,125	29		3,154
	16 HOURS	0150		3,133	29		3,162
	17 HOURS	0250		3,138	29		3,167
	18 HOURS	0350		3,142	29		3,171
	19 HOURS	0450		3,143	29		3,172

CHART READINGS AND CALCULATIONS FOR BUILDUP OR DRAWDOWN TEST

OFF BOTTOM AT 0820	TO CHANGE CHARTS AND CLOCKS	FOR STATIC GRADIENTS			
AND FOUR POINT BACK	PRESSURE TEST.				

Bennett Wire Line Service

P. O. Box 787 • Phone 746-3281

Artesia, New Mexico - 88210

TIME	MCF/D	TUBING PSIG
9:50 AM	OPENED WELL TO PIT	
10:45 AM	SWITCHED FLOW TO SEPARATOR & METER RUN	
10:46 AM	1,350.0	700 LBS.
11:45 AM	921.0	500 LBS.
12:45 PM	NO READING	
1:45 PM	1,112.0	560 LBS.
2:45 PM	1,070.0	548 LBS.
3:45 PM	1,070.0	573 LBS.
4:45 PM	1,150.0	641 LBS.
5:45 PM	1,100.0	610 LBS.
6:45 PM	1,200.0	599 LBS.
7:45 PM	1,200.0	602 LBS.
7:50 PM	SHUT WELL IN	