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TEFTELLER, INC.

reservoir engineering data

4

EXHIBIT NMOCC CASE NO. 9078
MIDLAND, TEXAS / FARMINGTON, NEW MEXICO
GRAND JUNCTION, COLORADO

P. O. Box 5247
Midland, Texas 79704
(915) 682-5574

January 19, 1987

BTA Oil Producers
104 South Pecos
Midland, Texas 79701

Attention: Mr. O. V. Sivage

Subject: Recombination Ratio
Determination
Byers, 8605 JV-P
Lea Wolfcamp Field
Lea County, New Mexico
Our File No. 3-18542-ST

Gentlemen:

Attached hereto are the results of a recombination ratio determination which was conducted on the above captioned well January 13 through 15, 1987.

The data presented are in tabular and graphical form. The Oil Conservation Commission Form C-122 is attached. Please be sure that all information is complete before filing with the commission.

It has been our pleasure to have conducted this service for you. If we may be of further assistance, please call us at any time.

Respectfully submitted,

TEFTELLER, INC.


Farrest Tefteller

FT/lw

BEFORE EXAMINER STOCKS OIL FIELD RECORD	
BTA	4
CASE NO.	9078

Serving the Permian Basin & Rocky Mountain Area

TEFTELLER, INC.
RESERVOIR ENGINEERING DATA
MIDLAND, TEXAS

COMPANY : BYERS, 8605 JV-P

FIELD : LEA WOLFCAMP

PAGE 1 OF 8

FILE 3-18542-ST

CHRONOLOGICAL PRESSURE AND PRODUCTION DATA

1987 DATE	STATUS OF WELL	TIME	ELAPSED TIME HRS.MIN.	DAILY RATE		G O R SCF/BBL	CUMULATIVE G O R SCF/BBL	WELLHEAD PRESSURES TBG. CSG.		BHP @ 11234' PSIG		BHP @ 11434' PSIG	
				OIL BBL/DAY	GAS MSCF/DAY								
1-13	Arrived on location. Well is shut in Tandem instruments in lubricator Gradient Traverse Tandem instruments at 11234'	09:00											
		11:00						2700	Pkr				
		12:50								4489	4526		
		13:30						2700		4489	4526		
	Opened well to fire heater	13:30											
		14:15											
		14:15	0 00					2632		4479	4516		
	Opened well - 1st Rate	14:30	0 15		710.587			2584		4432	4465		
		14:45	0 30		837.435			2534		4423	4457		
		15:00	0 45		887.146			2505		4422	4456		
		15:15	1 00		850.831			2474		4420	4455		
		15:15	0 00										
	Opened well - 2nd Rate	15:30	0 15		1173.332			2428		4399	4434		
		15:45	0 30		990.970			2483		4386	4420		
		16:00	0 45		1212.581			2512		4363	4396		
		16:15	1 00		1245.809			2542		4363	4395		

gas

COMPANY : BYERS, 8605 JV-P

FIELD : LEA WOLFCAMP

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FILE 3-18542-ST

CHRONOLOGICAL PRESSURE AND PRODUCTION DATA

1987 DATE	STATUS OF WELL	TIME	ELAPSED TIME HRS. MIN.	OIL		DAILY RATE		CUMULATIVE G O R SCF/BBL	WELLHEAD PRESSURES TBG., CSG.	BHP @	
				BBL/DAY	MSCF/DAY	GAS	G O R SCF/BBL			11234'	
										PSIG	PSIG
1-13	Opened well - 3rd Rate	16:15	0 00								BHP @ 11434'
		16:30	0 15						2513	4321	4353
		16:45	0 30		1834.288				2492	4302	4334
		17:00	0 45		1971.792				2502	4303	4335
		17:15	1 00		2061.570				2506	4305	4337
	Opened well - 4th Rate	17:15	0 00		2091.270						
		17:30	0 15		2912.834				2413	4206	4238
	Collected gas sample	17:45	0 30		3117.093				2402	4198	4230
		18:00	0 45		3083.675				2401	4198	4230
		18:15	1 00		3080.332				2405	4202	4234
	Shut well in to install 9/64" positive choke	18:15									
	Opened well on 9/64" positive choke	18:35									
		19:00									
	Started GOR test	19:00	0 00								
		20:00	1 00		767.122				2600	4441	4477
		21:00	2 00		743.714				2600	4441	4477
		22:00	3 00		724.615				2598	4444	4480
		23:00	4 00		729.679				2596	4443	4479

TEFTELLER, INC.
RESERVOIR ENGINEERING DATA
MIDLAND, TEXAS

COMPANY : BYERS, 8605 JV-P

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FIELD : LEA WOLFCAMP

FILE 3-18542-ST

CHRONOLOGICAL PRESSURE AND PRODUCTION DATA

1987 DATE	STATUS OF WELL	TIME	ELAPSED TIME HRS. MIN.	DAILY RATE		G O R SCF/BBL	CUMULATIVE G O R SCF/BBL	WELLHEAD PRESSURES TBG. CSG.	BHP @	
				OIL BBL/DAY	GAS MSCF/DAY				11234'	11434'
									PSIG	PSIG
1-14		01:00	6 00		727.285			2593	4443	4479
		03:00	8 00	92.10	708.535	7795	7795	2596	4443	4479
		05:00	10 00		750.767			2586	4442	4478
		07:00	12 00	96.12	745.203	7782	7788	2592	4440	4476
	Tandem instruments off bottom	08:00	13 00						4440	4476
1-15	Tandem instrument in lubricator	09:12	14 12					2596		
	Gradient Traverse									
	Tandem instrument at 11234'	11:00	16 00	106.13	745.203	7022	7512	2594	4439	4475
		15:00	20 00	110.13	763.284	6931	7353	2590	4438	4474
		19:00	24 00	108.13	759.393	7023	7283	2588	4437	4473
		23:00	28 00	106.08	777.242	7327	7291	2586	4436	4472
		03:00	32 00	110.13	762.746	6926	7235	2585	4436	4472
		07:00	36 00	108.13	762.746	7054	7212	2583	4436	4472
	Collected separator samples	11:00	40 00	102.13	749.649	7340	7226	2581	4436	4472
	Tandem instrument off bottom	15:00	44 00	110.13	754.981	6855	7186	2579	4436	4472
	Shut well in Rigged down, off location	16:00								

TEFTELLER, INC.
RESERVOIR ENGINEERING DATA
MIDLAND, TEXAS

COMPANY : BYERS, 8605 JV-P

PAGE 4 OF 8

FIELD : LEA WOLFCAMP

FILE 3-18542-ST

CHRONOLOGICAL PRESSURE AND PRODUCTION DATA

1987 DATE	STATUS OF WELL	TIME	ELAPSED TIME	OIL BBL/DAY	DAILY RATE		G O R SCF/BBL	CUMULATIVE G O R SCF/BBL	WELLHEAD PRESSURES TBG. CSG.	BHP @ 11234'	BHP @ 11434'
					GAS MSCF/DAY	SCF/DAY					
			HRS.MIN.							PSIG	PSIG

PLEASE NOTE THE FOLLOWING:

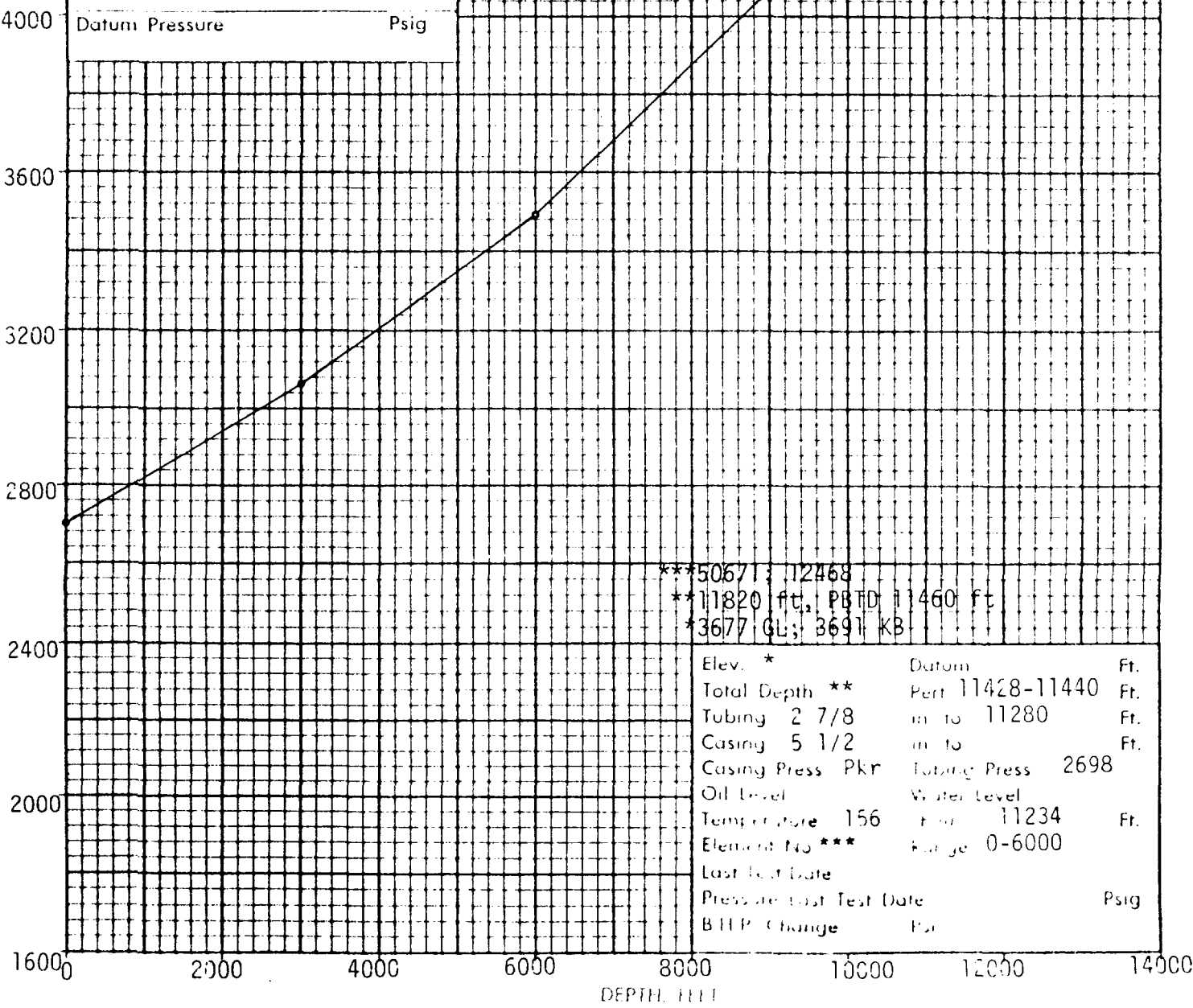
- Gas producing rates are calculated in accordance with the Oil Conservation Commission (New Mexico) manual for back-pressure testing of natural gas wells.
Base Pressure : 15.025 psia
Base Temperature : 60°F
Base Specific Gravity : 1.0
- Gas producing rates are corrected for temperature, gas gravity 0.700 and compressibility.
- Assumed barometric pressure : 13.2 psia
- Average gas flow temperature : 70.8°F
- Average stock tank temperature : 46.2°F
- The gas-oil ratio recommended for recombination work is 7083 scf/bbl. This ratio represents cumulative gas-oil ratio for the most stable and representative period of the test (last 24 hours).



Company BTA OIL PRODUCERS Lease BYERS, 8605 JV-P Well No. _____
Field LEA WOLFCAMP County LEA State NEW MEXICO
Formation WOLFCAMP Test Date JANUARY 13, 1987

Status of Well Shut-in		
DEPTH	PRESSURE	GRADIENT
Feet	Psig	Psi/Ft.
14	2698	
3000	3062	0.122
6000	3491	0.143
9000	4066	0.192
10934	4433	0.190
11234	4489	0.187
11434*	4526	0.187
*Mid-Perf		

Datum Pressure _____ Psig



Elev. *	Datum	Ft.
Total Depth **	Perf 11428-11440	Ft.
Tubing 2 7/8	in to 11280	Ft.
Casing 5 1/2	in to	Ft.
Casing Press Pkr	Tubing Press 2698	
Oil Level	Water Level	
Temperature 156	in to 11234	Ft.
Element No ***	Range 0-6000	
Last Test Date		
Pressure last Test Date		Psig
BHP Change		Psi



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File 3-18452-ST

Company BTA OIL PRODUCERS Lease BYERS, 8605 JV-P Well No.
Field LEA WOLFCAMP County LEA State NEW MEXICO
Formation WOLFCAMP Test Date JANUARY 14, 1987

Status of Well Flowing 9/64" pos. choke

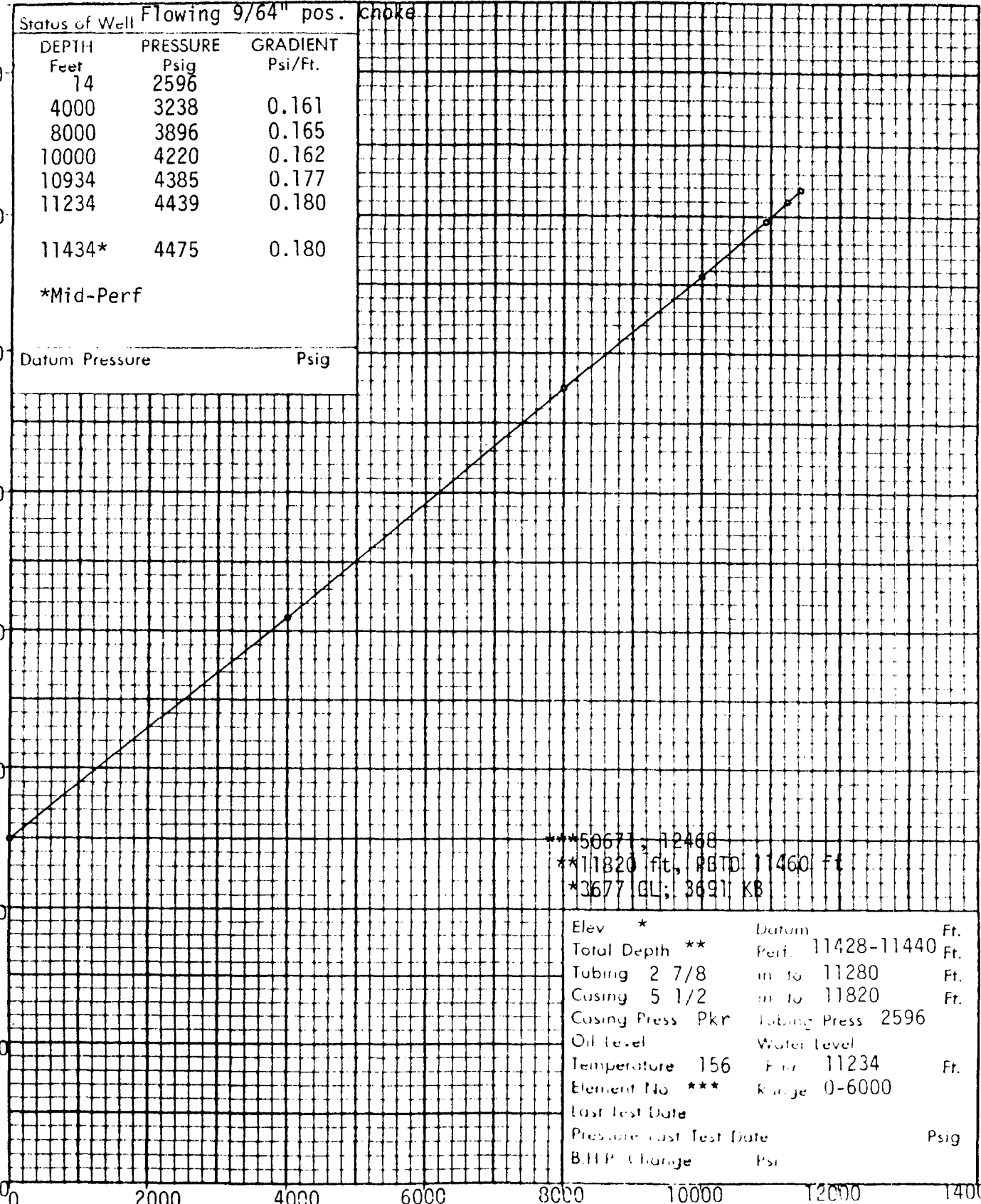
DEPTH Feet	PRESSURE Psig	GRADIENT Psi/Ft.
14	2596	
4000	3238	0.161
8000	3896	0.165
10000	4220	0.162
10934	4385	0.177
11234	4439	0.180
11434*	4475	0.180

*Mid-Perf

Datum Pressure Psig

PRESSURE POUNDS PER SQUARE INCH GAUGE

4800
4400
4000
3600
3200
2800
2400
2000
1600



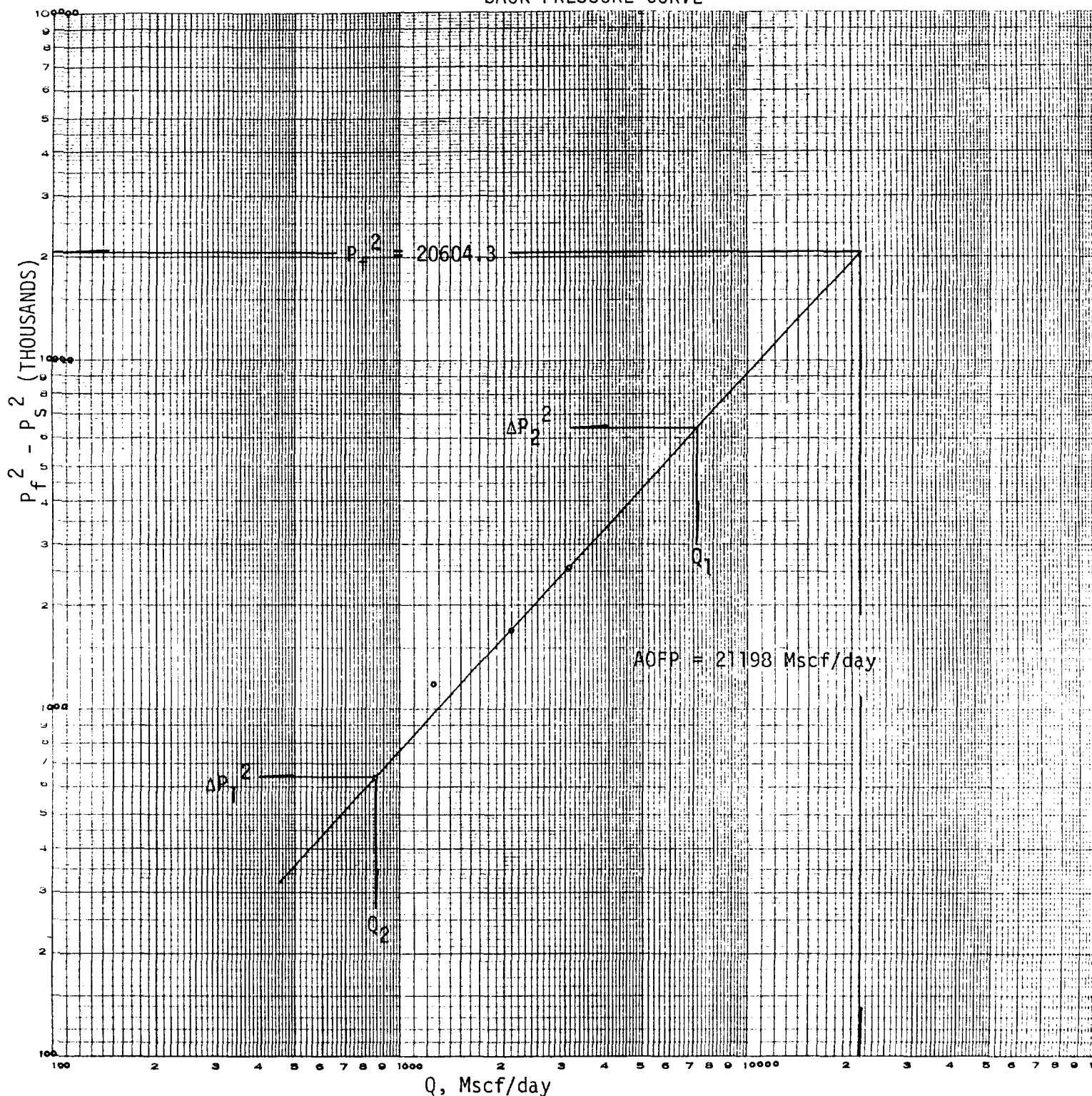
***50671; 112468
**11820 ft, PBTD 11460 ft
*3677 GL; 3691 KB

Elev *	Datum	Fr.
Total Depth **	Perf. 11428-11440	Fr.
Tubing 2 7/8	in to 11280	Fr.
Casing 5 1/2	in to 11820	Fr.
Casing Press Pkr	Tubing Press 2596	
Oil Level	Water Level	
Temperature 156	Fr. 11234	Fr.
Element No ***	Range 0-6000	
Last Test Date		
Pressure Last Test Date		Psig
B.H.P. Change	Psi	

DEPTH FEET

Company : BTA Oil Producers
 Well : Byers, 8605 JV-P
 Location : Unit H, Sec. 23-20S-35E
 County : Lea
 Date : January 13, 1987

BACK PRESSURE CURVE



$$Q_1 = 7175 \text{ Mscf/day}$$

$$Q_2 = 851 \text{ Mscf/day}$$

$$\log Q_1 = 3.8558219$$

$$\log Q_2 = 2.9299296$$

$$n = 0.9258923 = 0.9259$$

$$\text{Absolute Open Flow} = 21198 \text{ Mscf/day}$$

$$n = 0.9259$$

$$\theta = 47^{\circ}12'$$

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Type Test ☒ Initial ☐ Annual ☐ Special		Test Date 1/13/87									
Company BTA Oil Producers		Connection									
Pool		Formation Wolfcamp									
Completion Date 12-29-86		Total Depth 11820'									
Plug Back TD 11460'		Elevation 3691' KB									
Farm or Lease Name Byers, 8605 JV-P											
Coq. Size 5 1/2	Wt. 17	d 4.892	Set At 11820'	Perforations: From 11428' To 11440'	Well No. 1						
Thq. Size 2 7/8	Wt. 6.5	d 2.441	Set At 11280'	Perforations: From To	Unit H 23 20S 35E						
Type Well - Single - Bradenhead - G.G. or G.O. Multiple Single				Packer Set At 11086	County Lea						
Producing Thru Tubing		Reservoir Temp. °F 157 @ 11434	Mean Annual Temp. °F 60	Baro. Press. - P _a 13.2	State New Mexico						
L 11280	H 11280	G _g 0.700	% CO ₂ 0.22	% N ₂ 1.20	% H ₂ S 0						
Prover		Meter Run 4.026"	Taps Flange								
FLOW DATA											
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. p.s.i.g.	Temp. °F	Duration of Flow
SI								65	Pkr	65	SI hours
1.	4.026"x1.000"			720	26	65	2474		Pkr		60 min.
2.	4.026"x1.000"			720	57	72	2542		Pkr		60 min.
3.	4.026"x1.500"			690	33	78	2506		Pkr		60 min.
4.	4.026"x1.500"			710	70	81	2405		Pkr		60 min.
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	4.753	138.07	733.2	0.9952	1.195	1.090	851				
2	4.753	204.43	733.2	0.9887	1.195	1.085	1246				
3	10.84	152.33	703.2	0.9831	1.195	1.078	2091				
4	10.84	225.00	723.2	0.9804	1.195	1.078	3080				
5											
NO.	P _f	Temp. °R	T _f	Z	Gas Liquid Hydrocarbon Ratio <u>7083</u> Mcf/bbl.						
1	1.10	525	1.35	0.842	A.P.I. Gravity of Liquid Hydrocarbons <u>51.9° API @ 60°F</u> Deg.						
2	1.10	532	1.37	0.850	Specific Gravity Separator Gas <u>0.700</u> X X X X X X X X						
3	1.05	538	1.38	0.861	Specific Gravity Flowing Fluid <u>X X X X X</u>						
4	1.08	541	1.39	0.861	Critical Pressure <u>667</u> P.S.I.A. P.S.I.A.						
5					Critical Temperature <u>389</u> R R						
P _f 4539.2 P _s 20604.3					(1) $\frac{P_f^2}{P_f^2 - P_s^2} = 32.21939$ (2) $\left[\frac{P_s^2}{P_f^2 - P_s^2} \right]^n = 24.90955$						
NO.	P _f ²	P _s ²	P _s ²	P _f ² - P _s ²	AOF = Q $\left[\frac{P_f^2}{P_f^2 - P_s^2} \right]^n = 21198$						
1	6186.2	4468.2	19964.8	639.5							
2	6529.0	4408.2	19432.2	1172.1							
3	6346.4	4350.2	18924.2	1680.1							
4	5847.7	4247.2	18038.7	2565.6							
5											
Absolute Open Flow <u>21198</u> Mcfd @ 15.025					Angle of Slope <u>47°12'</u>		Slope, n <u>0.9259</u>				
Remarks: Bottomhole pressures were measured with Amerada RPG-3 guage, Serial No. 50671, 0-6000 psi											
Approved By Division		Conducted By: Teffteller, Inc.		Calculated By: V. A. Asinvosky		Checked By:					

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EXHIBIT - NMOCC CASE NO. 9078

A RESERVOIR FLUID STUDY

For

BTA OIL PRODUCERS
BYERS 8605 JV-P #1
WOLFCAMP FORMATION
LEA COUNTY, NEW MEXICO

BEFORE EXAMINER SIGNATURE CITIZENSHIP AND RESIDENCE STATE	
BTA	EXHIBIT NO. 5
CASE NO.	9078

Litton

Core Lab

February 4, 1987

BTA OIL PRODUCERS
104 South Pecos
Midland, Texas 79701
Attn: Mr. O. V. Savage

Subject: Reservoir Fluid Analysis
Byers 8605 JV-P #1
Wolfcamp Formation
Lea County, New Mexico
File: RFLM 87007

Gentlemen:

Duplicate separator liquid and vapor samples from the subject well were submitted to our Midland laboratory on January 16, 1987 for use in a reservoir fluid study. Presented in the following report are the results of this study.

The producing gas-liquid ratio was measured in the field to be 7083 cubic feet of primary separator gas at 15.025 psia and 60°F per barrel of stock tank liquid at 46.2°F. Using the factors presented on page one and correcting the stock tank liquid rate to 60°F, the ratio was corrected to 5067 standard cubic feet of primary separator gas per barrel of primary separator liquid. The separator products were then recombined to this ratio, and the resulting mixture was used for the remainder of this study.

The compositions of the separator products as well as the calculated wellstream composition are presented on page two.

The recombined reservoir fluid was examined in a visual cell at the reservoir temperature of 160°F and found to exhibit a retrograde dew point at 4539 psig. Comparison of this value to the reported reservoir pressure indicates this system to exist in two phase. The pressure-volume relations of the reservoir fluid are shown on page three of the report.

The volume of retrograde liquid condensed during pressure depletion is presented on page four.

It has been a pleasure to perform this study for BTA Oil Producers. Should you have any questions, or if we may be of any further assistance, please feel free to call upon us.

Very truly yours,

CORE LABORATORIES, INC.



Doug Turner
Supervisor Reservoir Fluid Laboratory

BTA OIL PRODUCERS
BYERS 8605 JV-P #1
LEA WOLFCAMP FIELD

DATE SAMPLED: NOVEMBER 15, 1986
LEA COUNTY, NEW MEXICO

FORMATION CHARACTERISTICS

Formation Name	Wolfcamp
Date First Well Completed	N/A
Original Reservoir Pressure	N/A psig @ N/A ft.
Original Produced Gas/Oil Ratio	N/A SCF/Bbl
Production Rate	N/A Bbls/Day
Separator Pressure and Temperature	N/A psig N/A F
Liquid Gravity at 60°F	N/A API
Datum	N/A ft. Subsea

WELL CHARACTERISTICS

Elevation	3691 ft. KB
Total Depth	11820 ft.
Producing Interval	11428-11440 ft.
Tubing Size and Depth	2 7/8 In. to 11280 ft.
Open Flow Potential	21.198 MMSCF/Day
Last Reservoir Pressure	4526 psig @ 11434 ft.
Date	January 13, 1987
Reservoir Temperature	160 psig @ 11434 ft.
Status of Well	_____
Pressure Gauge	_____

SAMPLING CONDITIONS

Flowing Tubing Pressure	2581 psig
Flowing Bottom Hole Pressure	4472 psig
Primary Separator Pressure	750 psig
Primary Separator Temperature	93°F
Secondary Separator Pressure	750 psig
Secondary Separator Temperature	78 F
Field Stock Tank Liquid Gravity	51.9°API @ 60°F
Primary Separator Gas Production Rate	764.940 MMSCF/Day
Pressure Base	15.025 psia
Temperature Base	60° F
Compressability Factor (Fpv)	1.0721
Gas Gravity (Laboratory)	0.696
Gas Gravity Factor (Fg)	1.1987
Stock Tank Liquid Production Rate @ 60°F.	110 Bbls/Day
Primary Separator Gas/Stock Tank Liquid Ratio	6954 SCF/Bbl

Core Laboratories, Inc., Engineer
Remarks:

HYDROCARBON ANALYSES OF SEPARATOR PRODUCTS AND CALCULATED WELL STREAM

Component	Separator Liquid, Mol Percent	Separator Gas Mol %	Well Stream, Mol Percent
Hydrogen Sulfide	0.00	0.00	0.00
Carbon Dioxide	0.07	0.29	0.25
Nitrogen	0.09	1.13	0.96
Methane	16.85	81.10	70.57
Ethane	8.33	10.71	10.32
Propane	8.22	4.27	4.92
iso-Butane	2.45	0.59	0.89
n-Butane	6.70	1.16	2.07
iso-Pentane	4.05	0.24	0.86
n-Pentane	4.18	0.25	0.89
Hexanes	6.86	0.17	1.27
Heptanes	8.72	0.07	1.49
Octanes	9.31	0.01	1.53
Nonanes	5.73	0.01	0.95
Decanes	4.09	0.00	0.67
Undecanes plus	14.35	0.00	2.36
	100.00	100.00	100.00

Properties of Heptanes plus

API gravity @ 60°F.	47.2		
Density, gm/cc @ 60°F.	0.7911		0.791
Molecular weight	154	103*	153
Sample Molecular Weight:	91		

Calculated separator gas gravity (air = 1.000) = 0.696

Calculated gross heating value for separator gas = 1232 Btu
per cubic foot of dry gas @ 15.025 psia and 60°F.

Primary separator gas collected @ 750 psig and 90°F.

Primary separator liquid collected @ 750 psig and 90°F.

Primary separator gas/separator liquid ratio = 5067 SCF/Bbl @ 90°F.

Primary separator liquid/stock tank liquid ratio = 1.3724 Bbls @ 90°F.
/Bbl @ 60°F.

Primary separator gas/well stream ratio = 836.15 MSCF/MSCF

*Assumed

PRESSURE-VOLUME RELATIONS OF RESERVOIR FLUID AT 160°F

<u>Pressure</u> <u>psig</u>	<u>Relative</u> <u>Volume</u>
8000	0.8954
7500	0.9046
7000	0.9147
6500	0.9266
6000	0.9404
5500	0.9565
5000	0.9761
4539 Dew Point	1.0000
4400	1.0085
4297	1.0146
4250	1.0181
4208	1.0215
4169	1.0249
4128	1.0283
4089	1.0318
4000	1.0391
3909	1.0476
3739	1.0650
3487	1.1000
3106	1.1707
2710	1.2785
2359	1.4217
1983	1.6385
1602	2.0041
1169	2.7395
839	3.8325

RETROGRADE CONDENSATION DURING PRESSURE DEPLETION AT 160°F

<u>Pressure PSIG</u>	<u>Retrograde Liquid Volume, Percent of Hydrocarbon Pore Space</u>
4539 Dew Point	0.0
3700	17.9
3100	21.7
2500	22.2
1900	21.9
1300	20.0
700	18.1
0	15.4

Properties of Residue Liquid:**Molecular Weight: 150****Density @ 60°F: 0.7843**

RETROGRADE CONDENSATION DURING PRESSURE DEPLETION

