

NEW MEXICO OIL CONSERVATION COMMISSION MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

Type Test ☒ Initial ☐ Annual ☐ Special						Test Date 10/23/87	
Company BTA OIL PRODUCERS				Connection El Paso Natural Gas Company			
Pool Pitchfork Ranch				Formation Morrow		Unit	
Completion Date 7-6-87		Total Depth 15,325'		Plug Back TD 15,300'		Elevation 3,348' GR	
Farm or Lease Name Pitchfork, 8703 JV-P							
Csg. Size 5	Wt. 23.2	d 4.044	Set At 15,325	Perforations: From 14,826' To 15,201'		Well No. 1	
Tbg. Size 2-7/8	Wt. 6.5	d 2.441	Set At 14,688	Perforations: From To		Unit Sec. Twp. Rge. B 9 25-S 34-E	
Type Well - Single - Bradenhead - G.G. or G.O. Multiple Single				Packer Set At 14,600		County	
Producing Thru Tubing		Reservoir Temp. °F 195° @ 15325		Mean Annual Temp. °F 60°		Baro. Press. - P _a 13.2	
						State New Mexico	
L 14,688	H 14,688	Gg 0.578	% CO ₂ 0.45	% N ₂ 0.35	% H ₂ S 0.0	Prover	Meter Run 4.026"
						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. p.s.i.g.		Temp. °F
SI	4.026" X 1.5000"							80°	Pkr	80°	SI Days
1.	4.026" X 1.5000"			295	16.5	95	4702	75°	Pkr		60 mins
2.	4.026" X 1.5000"			535	30	89	4554	76°	Pkr		60 mins
3.	4.026" X 1.5000"			760	63	71	4300	78°	Pkr		60 mins
4.	4.026" X 1.5000"			770	89	61	4202	80°	Pkr		60 mins
5.											

RATE OF FLOW CALCULATIONS							
NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P _m	Flow Temp. Factor Ft.	Gravity Factor F _g	Super Compress. Factor, F _{pv}	Rate of Flow Q, Mcfd
1	10.84	71.31	308.2	0.9680	1.315	1.019	1002.7
2.	10.84	128.24	548.2	0.9732	1.315	1.034	1839.5
3.	10.84	220.71	773.2	0.9896	1.315	1.056	3287.8
4.	10.84	264.02	783.2	0.9990	1.315	1.061	3989.1
5.							

NO.	P _r	Temp. °R	T _r	Z	Gas Liquid Hydrocarbon Ratio	1542	Mcf/bbl.
1.	0.46	555	1.60	0.963	A.P.I. Gravity of Liquid Hydrocarbons	36.5 @ 60° F	Deg.
2.	0.82	549	1.59	0.935	Specific Gravity Separator Gas	0.578	XXXXXXX
3.	1.15	531	1.53	0.896	Specific Gravity Flowing Fluid	XXXXX	
4.	1.17	521	1.51	0.889	Critical Pressure	672	P.S.I.A.
5.					Critical Temperature	346	R

P _c 4878.2 P _c ² 23797				
NO.	P _r ²	P _w	P _w ²	P _c ² - P _w ²
1	22233	4731	22382	1415
2	20861	4576	20940	2857
3	18604	4334	18784	5013
4	17768	4253	18088	5709
5				

$$(1) \frac{P_c^2}{P_c^2 - P_w^2} = 15.6$$

$$(2) \left[\frac{P_c^2}{P_c^2 - P_w^2} \right]^n = 15.6$$

$$AOF = Q \left[\frac{P_c^2}{P_c^2 - P_w^2} \right]^n = 15642$$

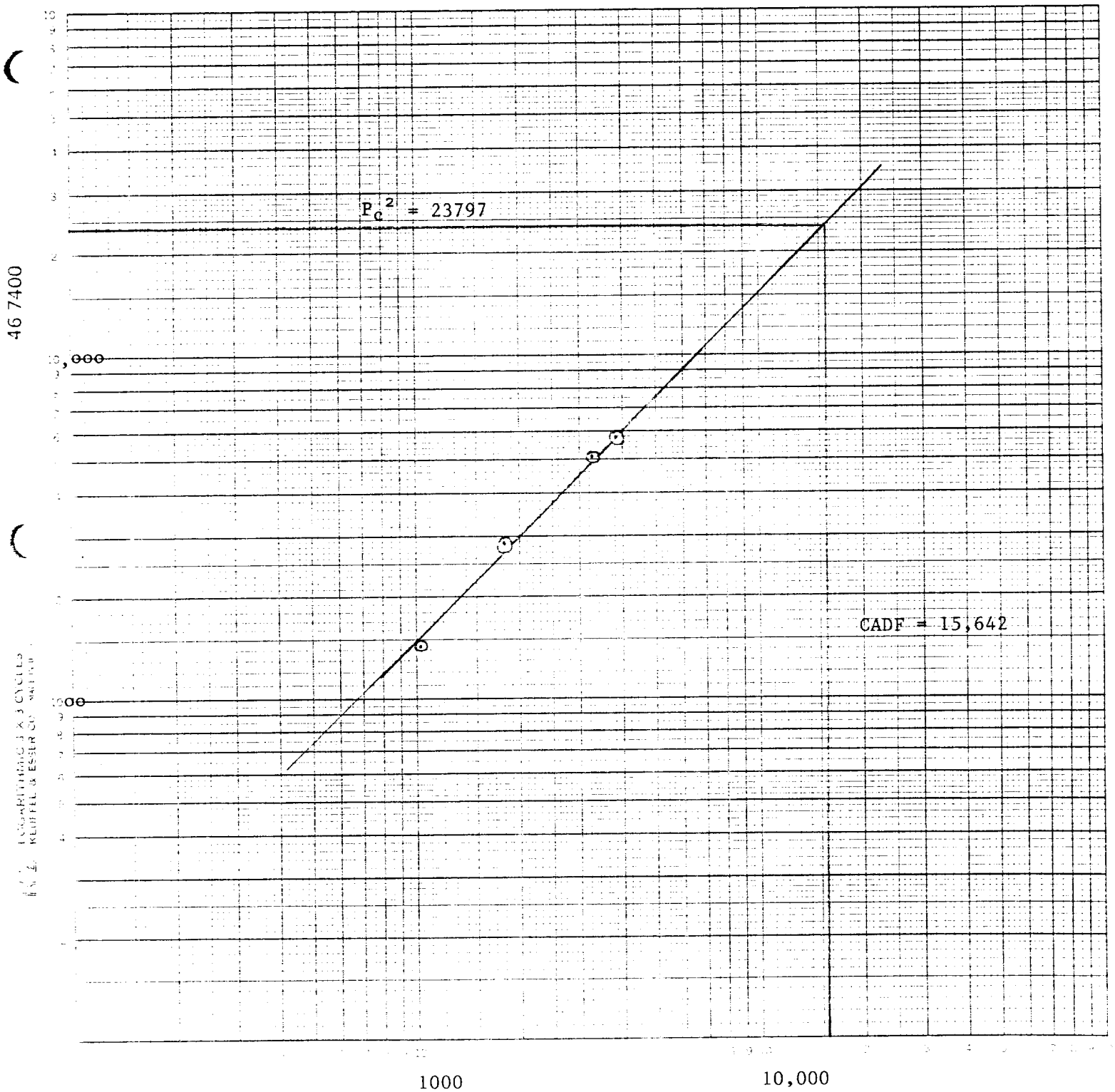
Absolute Open Flow	15642	Mcfd @ 15.025	Angle of Slope °	45	Slope, n	1.0
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Remarks:

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	BTA OIL PRODUCERS	T.J. WILLIAMS	

NOV 17 1987

BTA OIL PRODUCERS
Pitchfork, 8703 JV-P #1
10/23/87



1000

10,000

Absolute Open Flow = 15,642 MCF

n = 1.000

$\theta = 45^\circ$

WORK SHEET FOR STEPWISE CALCULATION (300 SURFACE PRESSURE (1000-1000) (SURFACE) (P_g-P_g))

Adapted to 1-85

COMPANY BTA Oil Producers

LEASE Pitchfork, 8703 JD-P

WELL NO. 1

DATE 10/23/87

LOCATION: Unit B

Section 9

Township 25-S

Range 34-E

L 14688

H 14688

L/H 1

G 0.5805

% CO₂ 0.45

% N₂ 0.35

% H₂S 0

d 2.441

F₁ 0.01263

Q_m 1.00227

M₂ cid

(L/H) (F₁Q_m)² 0.0001165

P_{cr} 672

TABLE IX B X

T_{cr} 346

TABLE IX B X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	7344		14688						
2	GH		0.00	4263.19		8526.38						
3	37.5GH		0	159870		319739						
4	P _c or P _n		4715.2	5470.2	5450.3	60184.1	60150.0					
5	P _r		7.02	8.14	8.11	9.2	9.15					
6	T		535	595	595	655	655					
7	T _r		1.55	1.72	1.72	1.99	1.89					
8	Z		0.934	1.0272	1.026	1.1012	1.0974					
9	P/Z		5048.2	5325.4	5322.2	5615.8	5604.2					
10	P/TZ		94359	8.9502	8.9281	8.5738	8.5560					
11	(P/TZ) ² /1000	(10) ² /1000	0.029035	0.080107	0.079711	0.073509	0.073205					
12	L/H(F ₁ Q _m) ²		0.0001165	0.0001165	0.0001165	0.0001165	0.0001165					
13		I ₁ + I ₂	0.089152	0.080223	0.079828	0.073626	0.073322					
14	I _n	I ₀ ÷ I ₃	105.84	111.567	111.842	116.450	116.691					
15	M = P _n - P _{n-1}			735	735	734	700					
16	N = I _n + I _{n-1}			217.407	217.683	228.294	228.535					
17	M x N	15 x 16		159997	159997	159997	159997					
18	Σ (M x N)	Σ I ₇		159997	159997	159997	159997					

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WORK SHEET FOR STEPWISE CALCULATION (SURFACE) PRESSURE (P_c & P_w)

COMPANY BTA Oil Producers LEASE Pitchfork, 8703 JO-P WELL NO. 1 DATE 10/23/87

LOCATION: Unit B Section 9 Township 25-S Range 34-E

L 14688 H 14688 L/H 1 G 0.5805 % CO₂ 0.45 % N₂ 0.35 % H₂S 0

d 2.441 F_r 0.0573 Q_m 0 M²cid (L/H) (F_r Q_m)² 0 P_{cr} 678 T_{cr} 346

TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		14688	7344		0						
2	GH		8526.38	4263.19		0.00						
3	37.5GH		319739	159870		0						
4	P _c or P _n		4150.0	5466.1	5450.9	4752.9	4733.5					
5	P _r		9.15	8.13	8.11	7.07	7.04					
6	T		655	595	595	555	555					
7	T _r		1.89	1.72	1.72	1.60	1.60					
8	Z		1.0974	1.027	1.026	0.948	0.946					
9	P/Z	4 ÷ 8	5604.2	5322.4	5312.8	5013.6	5003.7					
10	P/TZ	9 ÷ 6	8.5560	8.9452	8.9290	9.0335	9.0157					
11	(P/TZ) ² /1000	(10) ² /1000										
12	L/H(F _r Q _m) ²											
13		11 + 12										
14	I _n	10 ÷ 13	116.877	111.792	111.995	110.699	110.918					
15	M = P _n - P _{n-1}			684	699	699	717					
16	N = I _n + I _{n-1}			228.669	228.872	222.694	222.912					
17	M x N	15 x 16			159982							
18	Σ (M x N)	Σ 17			159758							

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) PRESSURE (PSIA) (SURFACE) (PSIA)

Adoption 6-1-65

COMPANY BTA Oil Producers LEASE Pitchfork 870350-P WELL NO. 1 DATE 10/23/87

LOCATION: Unit B Section 9 Township 25-S Range 34-E

L 14688 H 14688 L/H 1 G 0.5805 % CO₂ 0.15 % N₂ 0.35 % H₂S 0
d 2.441 F_r 0.010763 Q_m 1.8395 M²cid (L/H) (F_rQ_m)² 0.0003920 P_{cr} 672 T_{cr} 346
TABLE IX B.3 TABLE IX B.3

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	7344		14688						
2	GH		0	4263.19		8526.38						
3	37.5GH		0	159870		319739						
4	P _c or P _n		4567.4	5310.0	5290.7	6013.0	5981.1	5979.9				
5	P _r		6.8	7.9	7.87	8.95	8.90	8.70				
6	T		536	596	596	655	655	655				
7	T _r		1.55	1.72	1.72	1.89	1.89	1.89				
8	Z		0.9215	1.0154	1.0134	1.0881	1.0861	1.0861				
9	P/Z		4956.5	5229.4	5220.7	5526.1	5506.9	5505.8				
10	P/TZ		9.2472	8.7742	8.7596	8.4369	8.4075	8.4058				
	(P/TZ) ² /1000	(10) ² /1000	0.085510	0.076987	0.076730	0.071121	0.070686	0.070658				
12	L/H(F _r Q _m) ²		0.0003920	0.0003920	0.0003920	0.0003920	0.0003920	0.0003920				
13		I ₁ + I ₂	0.085902	0.077379	0.077122	0.071573	0.071078	0.071050				
14	I _n	I ₀ ÷ I ₃	107.648	113.393	113.581	117.878	118.285	118.309				
15	M = P _n - P _{n-1}			743	723	722	690	689				
16	N = I _n + I _{n-1}			221.041	221.228	231.458	231.865	231.889				
17	M x N	I ₅ x I ₆			159948			159772				
18	Σ (M x N)	Σ I ₇			159948			319719				

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WORK SHEET FOR STEPWISE CALCULATION (SURFACE) PRESSURE (P_c & P_w)

Adoption 2/1/85

COMPANY BTA Oil Producers

LEASE Pitchfork, 8703 JD-P

WELL NO. 1

DATE 10/23/87

LOCATION: Unit B

Section 9

Township 25-S

Range 34-E

L 14688 H 14688

L/H 1

G 0.5805

% CO₂ 0.45

% N₂ 0.35

% H₂S 0

d=2.441 F_r 0.0763 Q_m

⊙

M²cid (L/H) (F_rQ_m)²

⊙

P_c 672

T_{cr}

346

TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		14688	7344			0					
2	GH		8526.38	4263.19			0.00					
3	37.5GH		319739	159870			0					
4	P _c or P _n		5979.2	5302.9	5293.7	5294.2	4608.9	4573.9	4575.4			
5	P _r		8.9	7.90	7.88	7.88	6.86	6.81	6.81			
6	T		655	596	596	596	536	536	536			
7	T _r		1.89	1.72	1.72	1.72	1.55	1.55	1.55			
8	Z		1.0861	1.0154	1.0144	1.0144	0.9255	0.9225	0.9225			
9	P/Z		5505.8	5222.4	5218.5	5219.1	4979.9	4958.2	4959.8			
10	P/TZ		8.4658	8.7709	8.7559	8.7568	9.2909	9.2503	9.2534			
11	(P/TZ) ² /1000	(10 ² /1000)										
12	L/H(F _r Q _m) ²											
13		I ₁ + I ₂										
14	I _n	I ₀ ÷ I ₃	118.965	114.04	114.209	114.196	107.632	108.105	108.068			
15	M=P _n -P _{n-1}			672	686	686	685	729	719			
16	N=I _n +I _{n-1}			232.979	233.174	233.162	221.829	222.301	222.245			
17	M x N	15 x 16				159949			159809			
18	Σ (M x N)	Σ 17				159790						

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WORK SHEET FOR STEPWISE CALCULATION

(SURFACE) PRESSURE (P_{sc})
(SURFACE) (P_{sc})

Adapted from

COMPANY BP Oil Producers

LEASE Pitchfork 8703 JD-P

WELL NO. 1

LOCATION: Unit B

Section 9

Township 25-S

Range 34-E

DATE 10/23/87

L 14688 H 14688 LN 1 G 0.5805

d 2.441 Fr 0.06763 Q_m 3.2878 M²cid (LN/H) (Fr Q_m)² 0.0012522 P_{cr} 672 T_{cr} 346

TABLE 10.2

TABLE 10.2

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	7344			14688					
2	GH		0.00	4263.19			8526.38					
3	37.5GH		0	159870			319739					
4	P _c or P _n		4313.2	5036.5	5019.0	5002.9	5721.7	5693.1	5692.1			
5	P _r		6.42	7.49	7.47	7.44	8.51	8.47	8.47			
6	T		538	597	597	597	655	655	655			
7	T _r		1.55	1.73	1.73	1.73	1.89	1.89	1.89			
8	Z		0.9	0.9957	0.9947	0.993	1.0669	1.0649	1.0649			
9	P/Z		4792.4	5058.2	5045.7	5082.4	5362.9	5346.2	5345.2			
10	P/TZ		8.9079	8.4728	8.4518	8.4392	8.1876	8.1621	8.1604			
11	(P/TZ) ² /1000	(10 ² /1000)	0.07935	0.071789	0.071433	0.071220	0.067037	0.066620	0.066595			
12	L/H(Fr Q _m) ²		0.0012522	0.0012522	0.0012522	0.0012522	0.0012522	0.0012522	0.0012522			
13			0.080603	0.073040	0.072685	0.072472	0.068289	0.067872	0.067848			
14	I _n		110.516	116.002	116.280	116.447	119.896	120.252	120.278			
15	M=P _n -P _{n-1}			723	706	690	719	690	689			
16	N=I _n +I _{n-1}			226.518	226.796	226.963	236.343	236.704	236.726			
17	M x N	15 x 16										
18	Σ (M x N)	Σ 17										

21

DATE 10/23/87

Range 34-E

0.35 %H₂S

346
TABLE IX

One copy to be filed in District Office (Not for 30-20 table)

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WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) PRESSURE (P₁ & P₂) (SURFACE) (P₂ & P_m)

Adapted to 1-85

COMPANY BTA Oil Producers LEASE Pitchfork 8703 JO-P WELL NO. 1 DATE 10/23/87
 LOCATION: Unit B Section 9 Township 25-S Range 34-E
 L 14688 H 14688 L/H 1 G 0.5805 % CO₂ 0.45 % N₂ 0.35 % H₂S 0
 d 2.441 F_r 0.05763 Q_m 3.9891 M²cid (L/H) (F_rQ_m)² 0.0018434 P_{ci} 672 T_{cr} 346
TABLE 12 B 2 TABLE 12 B 2

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	7344			14688					
2	GH		0.00	4263.19			8526.38					
3	37.5GH		0	159870			319739					
4	P _c or P _n		4215.2	4929.9	4914.4	4914.4	5613.1	5588.0				
5	P _r		6.27	7.34	7.31	7.31	8.35	8.32				
6	T		540	598	598	598	655	655				
7	T _r		1.56	1.73	1.73	1.73	1.89	1.89				
8	Z		0.8942	0.9883	0.9863	0.9863	1.0608	1.0598				
9	P/Z		4713.9	4988.2	4982.7	4982.7	5291.4	5272.7				
10	P/TZ		8.7295	8.3415	8.3323	8.3323	8.0795	8.0499				
	(P/TZ) ² /1000	(100 ² /1000)	0.076204	0.069581	0.069427	0.069427	0.065262	0.0641801				
12	L/H(F _r Q _m) ²		0.0018434	0.0018434	0.0018434	0.0018434	0.0018434	0.0018434				
13		I ₁ + I ₂	0.078048	0.071424	0.071270	0.071270	0.067105	0.066644				
14	I _n	I ₀ ÷ I ₃	111.848	116.788	116.911	116.911	120.385	120.789				
15	M = P _n - P _{n-1}			715	1699	1699	699	674				
16	N = I _n + I _{n-1}											
17	M × N	15 × 16		228.636	228.716	228.759	232.296	237.700				
18	Σ (M × N)	Σ I ₇				159903						

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WORK SHEET FOR STEPWISE CALCULATION
(SURFACE) PRESSURE (P_c & P_w)

Adapted from

COMPANY BTA Oil Producers

LEASE Pitchfork, 8703-212-0

WELL NO. 1

DATE 10/23/87

LOCATION: Unit B

Section 9

Township 25-S

Range 34-E

L 14688

H 14688

L/H 1

G 0.5805

% CO₂ 0.45

% N₂ 0.35

% H₂S 0

d₂₄₄₁

F_r 0.02763 Q_m

0

M₂cid

(L/H) (F_rQ_m)²

0

P_{cr}

672

T_{cr}

346

TABLE 12.6.2

TABLE 12.6.2

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		14688	7344			0					
2	GH		8526.38	4263.19			0.00					
3	37.5GH		319739	159890			0					
4	P _c or P _n		5528.0	4944.5	4932.3	4932.9	4277.7	4247.7	4249.2			
5	P _r		8.32	7.36	7.34	7.34	6.37	6.32	6.32			
6	T		655	598	598	598	540	540	540			
7	T _r		1.89	1.73	1.73	1.73	1.56	1.56	1.56			
8	Z		1.0598	0.989	0.9883	0.9883	0.8996	0.8972	0.8972			
9	P/Z		5272.7	4999.5	4990.7	4991.3	4735.1	4734.3	4736.1			
10	P/TZ		8.0499	8.3604	8.3457	8.3467	8.8057	8.7672	8.7705			
11	(P/TZ)/2/1000											
12	L/H(F _r Q _m) ²											
13												
14	I _n		10=13									
15	M=P _n -P _{n-1}		134.226	119.612	119.822	119.809	113.563	114.041	114.019			
16	N=I _n +I _{n-1}		643	656	655	655	695	684				
17	M x N		243.837	244.048	244.034	233.371	233.870	233.827				
18	Σ (M x N)		Σ 17			159897			159938			