

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

Form C-122
Revised 9-1-65

Type Test ☒ Re-Completion ☐ Annual ☐ Special		Test Date 12/8/69	
Company H. L. Brown, Jr.		Connection Transwestern Pipeline Co.	
Pool Bluitt Wolfcamp		Formation Wolfcamp	
Completion Date		Total Depth 8762	Plug Back TD 2010
		Elevation 4049.1 GR	Farm or Lease Name Federal
Dep. Size 5 1/2	Wt. 17.0	d 4.892	Set At 8140
		Perforations: From 7964 To 7997	
Dep. Size 2 3/8	Wt. 4.7	d 1.995	Set At 7971
		Perforations: From To	
Type Well - Single - Bradenhead - G.G. or G.O. Multiple Single		Packer Set At 7928	County Roosevelt
Producing Thru Tubing		Reservoir Temp. °F 140 @ 7980	Mean Annual Temp. °F 60°
		Baro. Press. - P _a 32.2	State New Mexico
L 7971	H 7971	Gg .7273	% CO ₂ .04
		% N ₂ 3.09	% H ₂ S 0
		Prover	Meter Run X
			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							1254			Choke	72
1.	4	X	1.250	350	54	58	872	60		20/64	3.50
2.	4	X	1.250	350	43	68	945	57		18/64	1.75
3.	4	X	1.250	355	38	73	1015	55		16/64	1.25
4.	4	X	1.250	350	17	67	1070	58		12/64	1.00
5.											

RATE OF FLOW CALCULATIONS							
NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P _m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super. Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	7.469	140.0	363.2	1.002	1.173	1.040	1278
2	7.469	124.9	363.2	.9924	1.173	1.038	1128
3	7.469	118.3	368.2	.9831	1.173	1.035	1055
4	7.469	78.57	363.2	.9933	1.173	1.038	710
5							

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	0.56	518	1.38	.924	54.59	68.7	.7273	X X X X X	654	376
2	0.56	528	1.40	.929						
3	0.56	538	1.43	.934						
4	0.55	527	1.40	.929						
5										

NO.	P _r	P _w	P _w ²	P _c ² - P _w ²
1		921.5	849.2	756.6
2		974.6	949.8	656.0
3		1043.0	1087.8	518.0
4		1088.8	1185.5	420.3
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = 2.122$

AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2} \right]^n = 2390$

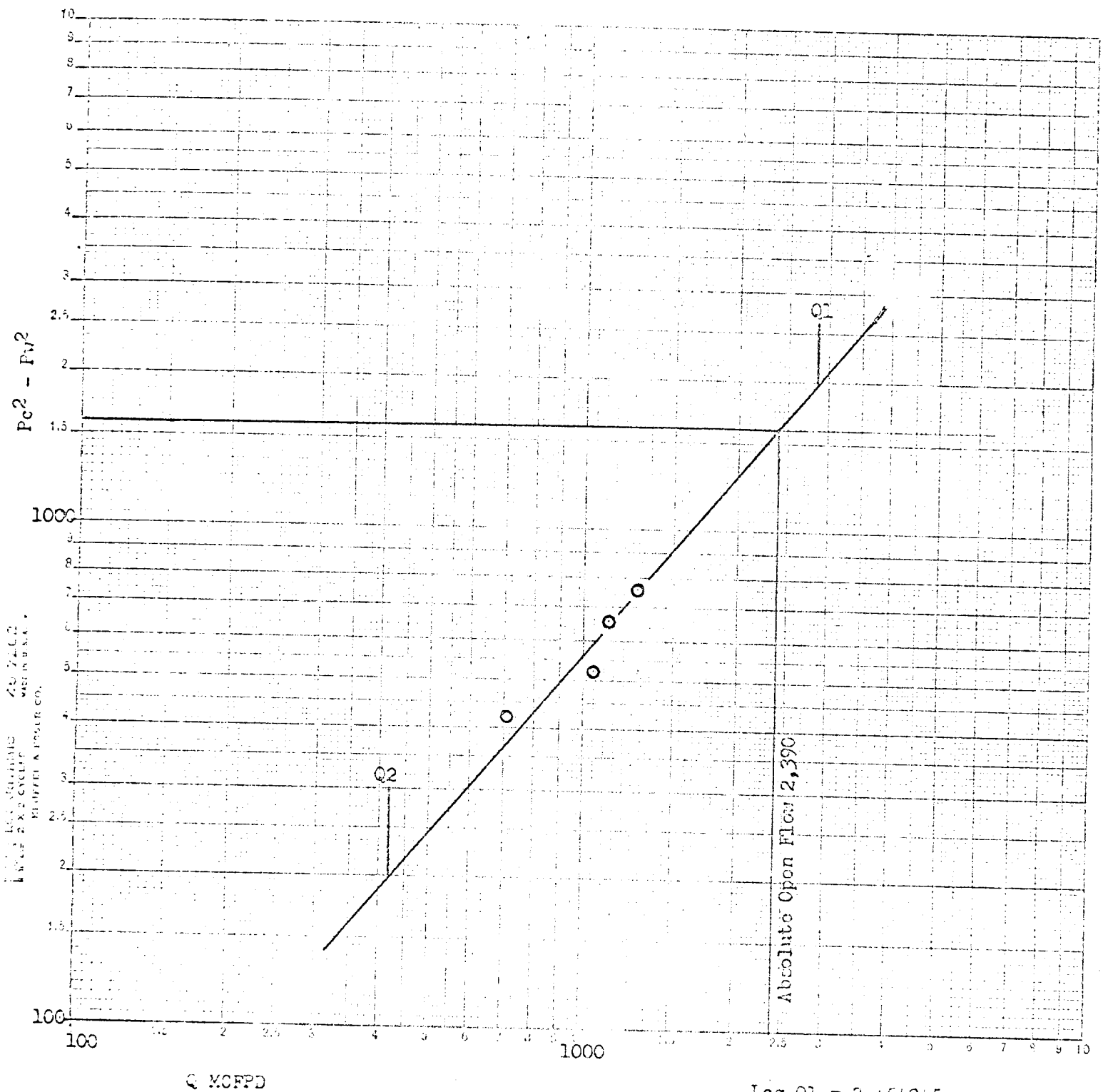
(2) $\left[\frac{P_c^2}{P_c^2 - P_w^2} \right]^n = 1.870$

Absolute Open Flow	2390	Mcf/d @ 15.025	Angle of Slope @	Slope, n	0.832
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Remarks:

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
<i>[Signature]</i>		<i>[Signature]</i>	

H. L. Brown, Jr.
 Federal No. 1
 Unit K, Sec. 33, T7S, R37E
 Roosevelt County, New Mexico
 December 8, 1969



Log Q1 = 3.454845
 Log Q2 = 2.623219
 n = 0.831596

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) PRESSURE (P_f & P_s)
 (SUSFACE) (SUSFACE)
 Form C-122-E
 Adopted 9-1-65

COMPANY H. L. Brown, Jr. LEASE Federal WELL NO. 1 DATE 12/8/69
 LOCATION: Unit K Section 33 Township 7 S Range 37 E
 L 7971 H 7971 L/H 1.000 G .765 % CO₂ .04 % N₂ 8.09 % H₂S -
 d 1.995 $F_f \cdot 0.18231 Q_m$ 1.278 $M^2 cfd$ (L/H) ($F_f Q_m$)² .000543 P_{CT} 653 T_{CT} 389
 TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	3985.5		7971						
2	SH		0	3048.9		6097.8						
3	37.5OH		0	114,334		228,668						
4	P_f or P_h		885.2	1029.1	1027.5	1169.5	1169.7					
5	P_f		1.36	1.58	1.57	1.79	1.79					
6	T		520	560	560	600	600					
7	T_f		1.34	1.44	1.44	1.54	1.54					
8	Z		.803	.829	.830	.852	.852					
9	P/Z F/Z	$\bar{4} \cdot 8$	1102.4	1241.4	1238.0	1372.7	1372.9					
10	P/TZ	$\bar{9} \cdot 6$	2.1200	2.2168	2.2107	2.2878	2.2882					
11	$(P/TZ)^2 / 1000$	$(10) 2 / 1000$	.004494	.004914	.004887	.005234	.005236					
12	$L / H(F_f Q_m)^2$		.000543	.000543	.000543	.000543	.000543					
13		$11 + 12$	.005037	.005457	.005430	.005777	.005779					
14	I_n	$10 + 13$	397.227	406.231	407.127	396.018	395.950					
15	$M^2 P_n - P_{n-1}$			143.9	142.3	142.0	142.2					
16	$M^2 I_n + I_{n-1}$			803.458	804.354	803.145	803.077					
17	$M^2 \times N$	15×16			114,460		114,198					
18	$\Sigma (M^2 \times N)$	$\Sigma 17$			114,460		228,658					

WORK SHEET FOR STEPWISE CALCULATION

(ATTACHED) PRESSURE (SURFACE) (P_c & P_w)

Form C-122-E
Adopted 9-1-65

COMPANY H. L. Brown, Jr. LEASE Federal WELL NO. 1 DATE 12/3/69

LOCATION: Unit K Section 33 Township 7 S Range 37 E

7971 H 7971 L/H 1.000 G .765 % CO₂ .04 % N₂ 8.09 % H₂S -

$d \frac{1.995}{F_r} \frac{.018231}{Q_m} 1.278 M^2 \text{ cfd } (L/H) (F_r Q_m)^2 .000543 P_{ci} \frac{653}{\text{TABLE IX \& X}} T_{ci} \frac{389}{\text{TABLE IX \& X}}$

$2 = \frac{686,004}{2673.655} = 248.2 \quad P_w = 1169.7 - 248.2 = 921.5$

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		7971	3985.5		0						
2	GH		6097.8	3048.9		0						
3	37.5GH		228,668	114,334		0						
4	P _o or P _n		1169.7	1038.9	1040.3	910.7	913.3					
5	P _r		1.79	1.59	1.59	1.39	1.40					
6	T		600	560	560	520	520					
7	T _r		1.54	1.44	1.44	1.34	1.34					
8	Z		.852	.828	.828	.798	.797					
9	P/Z or P/Z	4-8	1372.9	1254.7	1256.4	1141.2	1145.9					
10	P/TZ	9-6	2.2882	2.2405	2.2436	2.1946	2.2037					
11	(P/TZ) ² /1000	(10) ² /1000										
12	L/H(F _r Q _m) ²											
13		11 + 12										
14	I _n	10-13	437.025	446.328	445.712	455.663	453.782					
15	M P _n ² n ⁻¹			130.8	129.4	129.6	127.0					
16	(1-I _n +I _{n-1})			883.353	882.737	901.375	899.494					
17	M x N	15 x 16			114,226		114,424					
18	Σ (M x N)	Σ 17	228,668		114,442							

3	1.995	F_1	0.1823	b_m	1.128	M_{cd}^2	(L/H)	$(F_1^2 Q_m)^2$	0.000423	P_{CT}	652	T_{CT}	399
										TABLE IX & X			TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	3985.5		7971						
2	GH		0	3148.5		6297.1						
3	37.5GH		0	118,069		236,141						
4	$P_{0 \text{ or } P_n}$		958.2	1112.1	1114.1	1270.3	1273.8					
5	P_1		1.47	1.71	1.71	1.95	1.95					
6	T		517	558.5	558.5	600	600					
7	T_r		1.30	1.40	1.40	1.50	1.50					
8	Z		.762	.794	.794	.827	.827					
9	$P/T \text{ } P/Z$	$\bar{P}/\bar{Z}$	1257.5	1400.6	1403.1	1536.0	1540.3					
10	P/TZ	$\bar{P}/\bar{Z}$	2.4323	2.5078	2.5123	2.5600	2.5672					
11	$(P/TZ)/1000$	$(10)/1000$	.005916	.006289	.006312	.006554	.006591					
12	$L/100(1/Q_m)^2$		.000423	.000423	.000423	.000423	.000423					
13		$11 + 12$	.006339	.006712	.006735	.006977	.007014					
14	I_n	$10 + 13$	383.704	373.629	373.022	366.920	366.010					
15	$M^{-1}P_n - P_{n-1}$			153.9	155.9	156.2	159.7					
16	$M^{-1}I_n + I_{n-1}$			757.333	756.726	739.942	739.032					
17	$M \times N$	15×16			117,974		118,023					
18	$\Sigma(M \times N)$	ΣIV			117,974		235,997					

WORK SHEET FOR STEPWISE CALCULATION

(SURFACE) PRESSURE (P_f & P_s)

COMPANY H. L. Brown, Jr. LEASE Federal WELL NO. 1 DATE 12/8/69

LOCATION: Unit K Section 33 Township 7 S Range 37 E

L 7971 H 7971 L/H 1.000 G .790 % CO₂ .04 % N₂ 8.09 % H₂S -

708,423 = 299.2 P_f = 1273.8 - 299.2 = 974.6

2368.035 F_f 1.995 F_f 0.18231 Q_m 1.123 M²ctd (L/H) (F_fQ_m)² .000423 P_{ct} 652 T_{ct} 399

TABLE 1A & X TABLE 1A & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		7971	3985.5		0						
2	GH		6297.1	3148.5		0						
3	ST.5GH		236,141	118,069		0						
4	F _f or P _n		1273.8	1122.2	1123.2	972.5	975.2					
5	F _f		1.95	1.72	1.72	1.49	1.50					
6	T		600	558.5	558.5	517	517					
7	T _f		1.50	1.40	1.40	1.30	1.30					
8	Z		.827	.793	.793	.759	.757					
9	P _f or F _f /Z		1540.3	1415.1	1416.4	1281.3	1288.2					
10	P _f /T _f Z		2.5672	2.5338	2.5361	2.4783	2.4917					
11	(P _f /T _f Z) ² / (1000)											
12	L _f / (1000)											
13												
14	I _n		389.529	394.664	394.306	403.502	401.332					
15	M _n P _n - P _{n-1}			151.6	150.6	150.7	148.0					
16	M _n I _n + I _{n-1}			784.193	783.835	797.808	795.638					
17	M _n I _n				118,046		117,754					
18	Σ (M _n I _n)		236,141		118,095							

WORK SHEET FOR STEPWISE CALCULATION

(SURFACE) PRESSURE (P_c & P_w)

COMPANY H. L. Brown, Jr. LEASE Federal WELL NO. 1 DATE 12/8/69

LOCATION: Unit K Section 33 Township 7 S Range 37 E

L 7971 H 7971 L/H 1.000 G .759 % CO₂ .04 % N₂ 8.09 % H₂S -

$$P = \frac{680,625}{2259.150} = 301.3 \quad P_w = 1344.3 - 301.3 = 1043.0$$

$$d = \frac{1.995}{F_1 Q_m} \frac{Q_m}{1.055} \frac{M^2 c d}{(L/H) (F_1 Q_m)^2} \frac{.000370}{P_{ct}} \frac{653}{T_{ct}} \frac{386}{T_{ct}}$$

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		7971	3985.5		0						
2	SH		6050.0	3025.0		0						
3	SH		226,875	113,438		0						
4	P _g or P _n		1394.3	1192.8	1193.4	1042.4	1043.0					
5	P _g		2.06	1.83	1.83	1.60	1.60					
6	T		600	557.5	557.5	515	515					
7	T _r		1.55	1.44	1.44	1.33	1.33					
8	Z		.839	.807	.807	.764	.763					
9	P _g /P _w	4-8	1602.3	1478.1	1478.8	1364.4	1367.0					
10	P _g /P _w	9-6	2,6705	2,6513	2,6526	2,6493	2,6544					
11	(P _g /P _w) ² /1000	(10) 2/1000										
12	L/H (T _r Q _m) ²											
13		11 + 12										
14	L _n	10-13	374,461	377,173	376,589	377,458	376,733					
15	L _n P _n ¹⁻ⁿ⁻¹			151.5	150.9	151.0	150.4					
16	L _n P _n ¹⁻ⁿ⁻¹			751,634	751,450	754,447	753,722					
17	L _n P _n ¹⁻ⁿ⁻¹	15 x 16			113,394		113,360					
18	Σ (14 x 15)	Σ 17	226,875		113,481							

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) PRESSURE (P_f & P_s)
NEOGENIC MIOCENE

Form C-122-E
Adopted 9-1-65

COMPANY H. L. Brown, Jr.

LEASE Federal

WELL NO. 1

DATE 12/8/69

LOCATION: Unit K

Section 33

Township 7 S

Range 37 E

L 7971 H 7971

L/H 1.000

G .785

% CO₂ .04

% N₂ 8.09

% H₂S -

d 1.995 F₁ 0.018231 Q_m 0.710 M²cfd (L/H) (F₁Q_m)² .000168

P_{cr} 652 T_{cr} 396

TABLE IX & X

TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	3985.5		7971						
2	GH		0	3128.6		6257.2						
3	37.03E		0	117,323		234,645						
4	P ₀ = 1.0											
5	P ₁		1083.2	1252.0	1253.6	1424.3	1426.5					
6	T		1.66	1.92	1.92	2.18	2.19					
7	T ₁		513	559	559	600	600					
8	Z		1.31	1.41	1.41	1.52	1.52					
9	P ₁ /T ₁		.742	.779	.779	.820	.820					
10	P ₁ /T ₁		1459.8	1607.2	1609.2	1737.0	1739.6					
11	(P ₁ /T ₁) ² / (P ₀ /T ₀) ²		2.8181	2.8751	2.8787	2.8950	2.8993					
12	L/H (F ₁ Q _m) ²		.007942	.008266	.008287	.008381	.008406					
13			.000168	.000168	.000168	.000168	.000168					
14	H		.008110	.008434	.008455	.008549	.008574					
15	H _n		347.484	340.894	340.473	338.636	338.150					
16	H _n + P _n		168.8	170.4	170.4	170.7	172.9					
17	H _n + P _n + 1		608.378	687.957	679.109	678.623						
18	Σ (H _n + P _n)		117,228	117,228		117,334						
	Σ (H _n + P _n)		117,228			234,562						

WORK SHEET FOR STEPWISE CALCULATION

RECORDED & INDEXED
(SURFACE) PRESSURE (P_c & P_w)

Form C-122-E
Adopted 9-1-65

COMPANY H. L. Brown, Jr. LEASE Federal WELL NO. 1 DATE 12/8/69

LOCATION: Unit K Section 33 Township 7 S Range 37 E

L. 7971 H. 7971 L/H 1.000 G .705 % CO₂ .04 % N₂ 8.09 % H₂S -

$$\frac{703,935}{2081.141} = 338.2 \quad \frac{1.995 \cdot F_1(0.18231)_{Q_m}}{P_1} = 1426.5 - 338.2 = 1088.3 \quad M^2_{ctd} (L/H) (F_1 Q_m)^2 = .000168 \quad P_{ct} = 652 \quad T_{ct} = 396$$

TABLE IX & X TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		7971	3285.5		0						
2	SH		6257.2	3128.6		0						
3	SH		234,645	117,323		0						
4	$P_1 - P_n$		1426.5	1256.4	1256.8	1086.9	1088.8					
5	H		2.19	1.93	1.93	1.67	1.67					
6	H		600	559	559	518	518					
7	H		1.52	1.41	1.41	1.31	1.31					
8	Z		.820	.778	.778	.740	.740					
9	$P_1 - P_n$		1739.6	1614.9	1615.4	1468.8	1471.4					
10	$P_1 - P_n$		2.6993	2.8889	2.8898	2.8355	2.8405					
11	$(P_1 - P_n)^2 / 1000$											
12	$(P_1 - P_n)^2 / 1000$											
13	H		11 + 12									
14	H		346,910	346,152	346,045	352,671	352,051					
15	$M - P_n - P_{n-1}$			170.1	169.7	169.9	168.0					
16	$M - P_n - P_{n-1}$			691.062	690.995	698.716	698.096					
17	M x N		15 x 16		117,255							
18	$\Sigma (M \times N)$		234,645		117,320							

TELEPHONE 3-3541
3-5770

SERIAL NO.	111	STATION	SPAWN, AR.
LEASE	FEDERAL		
WELL NO.	1		
FIELD			
DATE	12-8-00	TIME	10:00 A.M.
STATUS	SHUT-IN	WELL DEPTH	7,901'
TIME SIN.	72 HRS.	LAST TEST DATE	
CAS. PRES.		DAY LAST TEST	
TUB. PRES.	12600	DAY CHANGE	
ELEV.		FLUID TOP	
DATUM		WATER TOP	
TEMP	140°F.	WELL BY	A. ALLMAN
CLOCK NO.	24906	GAUGE NO.	19089
ELEMENT NO.	18948-N		

DEPTH	PRESSURE	GRADIENT
300	1260	
2000	1343	.042
4000	1430	.044
6000	1519	.045
7000	1565	.046
7901	1609	.049
7981*	1613*	.049

*PRESSURE CORRECTED TO CENTER
OF PERFORATIONS

