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

Form C-122
Revised [illegible]

Field	Entry
Type Test	[X] Initial [ ] Annual [ ] Special
Test Date	9-7-77
Company	Cleary Petroleum Corporation
Connection	
Pool	Undesignated
Formation	Morrow
Unit	
Completion Date	[illegible]-77
Total Depth	14100
Plug Back TD	14060
Elevation	3688 [illegible]
Farm or Lease Name	New Mexico Federal "D"
Csg. Size	5.5"
Wt.	[illegible]
d	[illegible].670"
Set At	14100
Perforations: From	[illegible]
To	[illegible]
Well No.	1
Tbg. Size	2.[illegible]
Wt.	[illegible].50
d	2.[illegible]"
Set At	13[illegible]
Perforations: From	
To	
Unit	N
Sec.	4
Twp.	21S
Rge.	32E
Type Well – Single – Bradenhead – G.G. or G.O. Multiple	Single Completion
Packer Set At	13[illegible]
County	Lea
Producing Thru	[illegible]
Reservoir Temp. °F	27[illegible]
P	137[illegible]
Mean Annual Temp. °F	60
Baro. Press. – P_a	13.2
State	New Mexico
L	137[illegible]
H	1375[illegible]
Gg	0.64[illegible]
% CO_2	[illegible]
% N_2	[illegible]
% H_2S	0.00
Prover	
Meter Run	[illegible]
Taps	

FLOW DATA / TUBING DATA / CASING DATA

NO.	Prover Line Size	X	Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	Tubing Press. p.s.i.g.	Tubing Temp. °F	Casing Press. p.s.i.g.	Casing Temp. °F	Duration of Flow
SI							[illegible]	80			
1.	[illegible]		1.5[illegible]	700	[illegible]"	[illegible]	[illegible]	7[illegible]			1.0[illegible] Hr.
2.	[illegible]		1.5[illegible]	700	[illegible]"	7[illegible]	3[illegible]	7[illegible]			1.[illegible] Hr.
3.	[illegible]		1.[illegible]	700	42.[illegible]"	[illegible]	3[illegible]	80			1.[illegible] Hr.
4.	[illegible]		1.5[illegible]	700	30.[illegible]"	[illegible]	3[illegible]	82			1.00 Hr.
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	1[illegible]	[illegible]	71[illegible].2	[illegible]	1.2[illegible]	1.0[illegible]	[illegible]
2	1[illegible]	[illegible]	71[illegible].2	[illegible]	1.2[illegible]1	1.0[illegible]	[illegible]
3	1[illegible]	[illegible]	71[illegible].2	[illegible]	1.2[illegible]	1.0[illegible]	[illegible]
4	1[illegible]	[illegible]	71[illegible]	[illegible]	1.2[illegible]	1.0[illegible]	[illegible]
5							

NO.	P_r	Temp. °R	T_r	Z
1	[illegible]	5[illegible]	1.4[illegible]	0.[illegible]
2	[illegible]	5[illegible]	1.4[illegible]	0.[illegible]
3	[illegible]	5[illegible]	1.4[illegible]	0.[illegible]
4	[illegible]	5[illegible]	1.4[illegible]	0.[illegible]
5				

Gas Liquid Hydrocarbon Ratio [illegible] Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons 51.7 Deg.
Specific Gravity Separator Gas 0.6[illegible] | X X X X X X X X X
Specific Gravity Flowing Fluid X X X X X | 0.718
Critical Pressure 673 P.S.I.A. | 668 P.S.I.A.
Critical Temperature 370 R | 398 R

P_c 4752.2 P_c^2 22583

NO.	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1		3065.7	9399	13184
2		3362.8	11308	11275
3		3701.3	13700	8883
4		3903.6	15238	7345
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = 1.71291$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.64178$

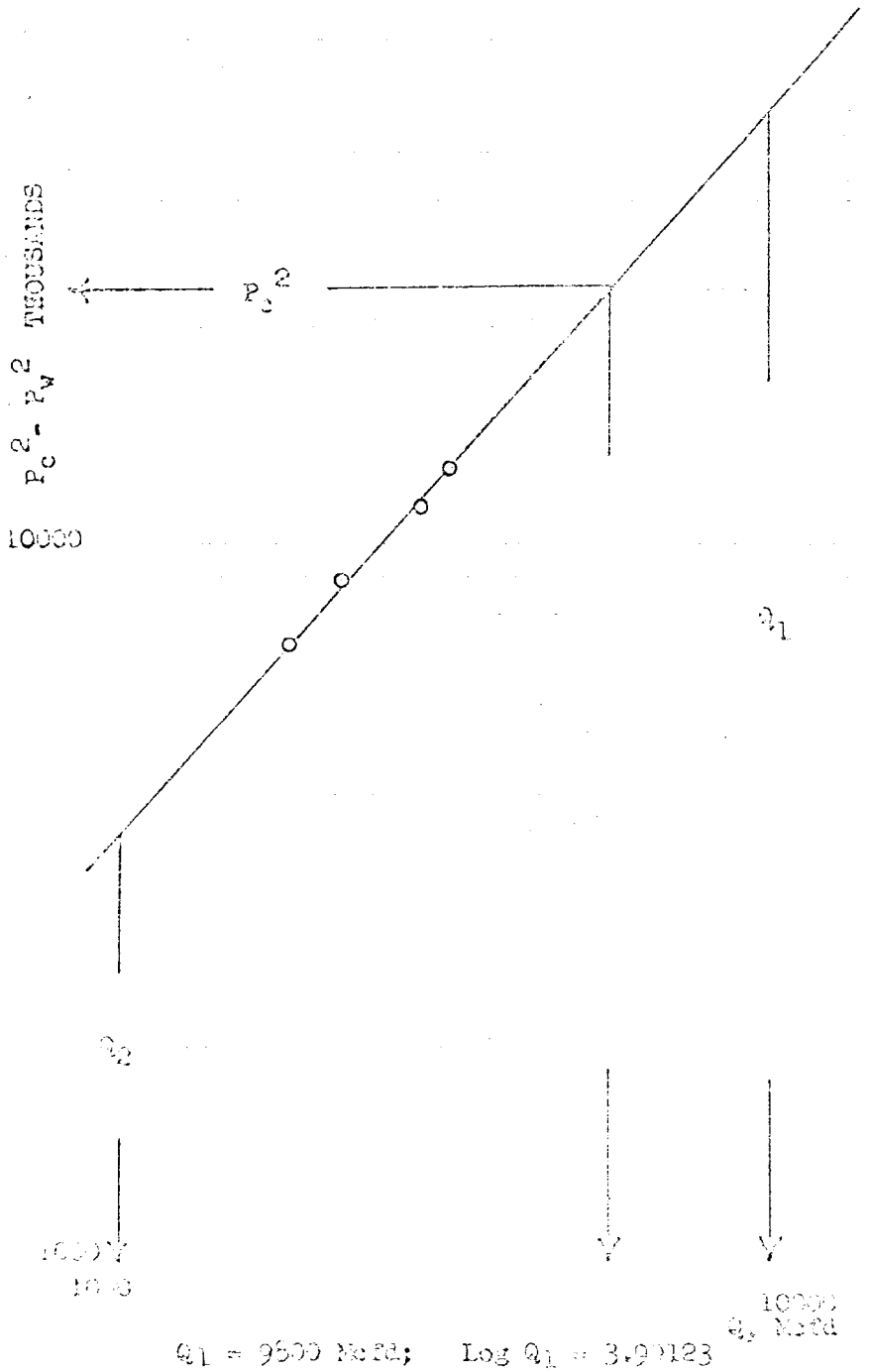
$AOF = Q\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 5740$

Absolute Open Flow 5740 Mcfd @ 15.025 Angle of Slope θ 47.34 Slope, n .92119

Remarks: Bottom Hole Pressure measured with Amerada, Type RPG-3, Instrument No. 7445-6900# Range
Wellhead Pressures measured with Dead Weight Gauge

Approved By Commission: | Conducted By: | Calculated By: | Checked By:

Operator:	Cleary Petroleum Corporation
Lease:	New Mexico Federal "D"
Well No.:	1
Location:	N, 4 21S 34E
County:	Lea
Date:	9-7-71



Q_1 = 9500 Mcfd; Log Q_1 = 3.97823

Q_2 = 1175 Mcfd; Log Q_2 = 3.07004

n = .92114 = .921

Form C-122-E

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

RATE NO. 1

MPANY Cleary Petroleum Corporation LEASE New Mexico Federal "D" WELL NO. 1 DATE 9-7-77

CATION: UNIT N SECTION 4 TOWNSHIP 21S RANGE 32E

13750 H 13750 L/H 1.00 G 0.718 % CO_2 0.93 %N_2 0.22 %H_2S [illegible]

d 2.441 F_r 0.010763 Q_m 3.503 M^2cfd (L/H) $(F_rQ_m)^2$ 0.001422 P_{cr} 668 T_{cr} [illegible]

NE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	6875			13750					
2			0	4936			[illegible]					
3	37.5GH		0	185109			370219					
4	P_c or P_n		3108.2	3868.2	3813.2	3810.2	4511.2	[illegible]	[illegible]			
5	P_r		4.65	5.79	5.71	5.70	[illegible]	6.5[illegible]	6.63			
6	T		5[illegible]	636	636	6[illegible]6	735	735	735			
7	T_r		1.35	1.60	1.60	1.60	1.85	1.85	1.[illegible]			
8	Z		0.[illegible]	0.881	0.877	0.877	0.9[illegible]	0.982	0.981			
9	P/Z P/Z	$\overline{4} \div \overline{8}$	4515.61	4390.40	4348.00	4344.47	4577.57	4515.76	4517.29			
10	P/TZ	$\overline{9} \div \overline{6}$	[illegible]	6.9[illegible]	[illegible]	[illegible]	[illegible]	6.1438	[illegible]			
11	$(P/TZ)^2/1000$	$(\overline{10})^2/1000$	0.064626	0.047660	0.046738	0.046664	0.038788	0.037764	0.037773			
12	$(F_rQ_m)^2$		0.001422	0.001422	0.001422	0.001422	0.001422	0.001422	0.001422			
13		$\overline{11} + \overline{12}$	0.066047	0.049081	0.048159	0.048086	0.040209	0.039186	0.0391[illegible]			
14	I_n	$\overline{10} \div \overline{13}$	121.716	140.657	141.956	142.062	154.869	156.824	156.807			
15	$M=P_n - P_{n-1}$			760	705	702	701	623	619	619		
16	$N=I_n + I_{n-1}$			262.373	263.673	263.778	296.951	298.886	298.869			
17	M x N	$\overline{15} \times \overline{16}$				185172			185000			
18	$\sum$ (M x N)	$\sum \overline{17}$				185172			370172			

Delta P = $\frac{3 \; [370219]}{140.657 + 4 [154.869] + 156.807} = \frac{1110656}{917.020}$ = 1211.2   P = 3108.2 + 1211.2 = 4319.4

WORK SHEET FOR STEPWISE CALCULATION (SURFACE) PRESSURE (P_c & P_w) RATE NO.1

Form C-122-E

OMPANY Cleary Petroleum Corporation LEASE New Mexico Federal "D" WELL NO. 1 DATE 9-7-77

OCATION: UNIT N SECTION 4 TOWNSHIP 21S RANGE 32E

[illegible] H [illegible] L/H 1.00 G 0.718 % CO_2 [illegible] % N_2 [illegible] % H_2S [illegible]

d ______ F_r ______ Q_m ______ M^2cfd (L/H) $(F_rQ_m)^2$ ______ P_{cr} [illegible] T_{cr} [illegible]

INE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		13750	6875		0						
2			9573	4[illegible]		0						
3	37.5GH		370219	185109		0						
4	P_c or P_n		4319.4	3761.2	3728.9	3140.0	30[illegible].8	3054.9				
5	P_r		6.47	[illegible]	5.58	[illegible]	4.[illegible]	4.57				
6	T		735	636	636	5[illegible]7	5[illegible]	5[illegible]				
7	T_r		1.6[illegible]	1.[illegible]	1.60	1.35	[illegible]	1.3[illegible]				
8	Z		0.[illegible]	0.[illegible]3	0.[illegible]	0.723	0.[illegible]	0.[illegible]				
9	P/Z P/Z	$\overline{4} \div \overline{8}$	[illegible]	430[illegible].42	[illegible]	[illegible]	[illegible]	4[illegible].62				
0	P/TZ	$\overline{9} \div \overline{6}$	6.0305	6.[illegible]	[illegible]	[illegible]	[illegible]	7.[illegible]				
1	$(P/TZ)^2/1000$	$(10^2)/1000$										
2	$(F_rQ_m)^2$											
3		$\overline{11} + \overline{12}$										
4	I_n	$\overline{10} \div \overline{13}$	165.823	147.618	145.[illegible]	123.[illegible]	126.11[illegible]	125.861				
5	$M=P_n-P_{n-1}$			58[illegible]	591	5[illegible]	[illegible]	574	67[illegible]			
6	$N=I_n+I_{n-1}$			315.441	31[illegible]	27[illegible]	27[illegible]	2[illegible]				
7	M x N	$\overline{15} \times \overline{16}$			185801			15[illegible]				
8	$\sum(M \times N)$	$\sum \overline{17}$			185801			3[illegible]				

$$\text{Delta } P = \frac{[illegible]\ 370219]}{165.823 + 4[148.560] + 125.861} = \frac{1110[illegible]}{885.92[illegible]} = 1253.7$$

P = 4319.4 - 1253.7 = 3065.7

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

XX(SURFACE) (P_c & P_w)

Form C-122-E

RATE NO. 2

COMPANY Cleary Petroleum Corporation LEASE New Mexico Federal "D" WELL NO. 1 DATE 9-7-77

LOCATION: UNIT N SECTION 4 TOWNSHIP 21S RANGE 32E

L 13750 H 13750 L/H 1.00 G 0.718 % CO_2 0.93 % N_2 0.32 % H_2S 0.00

d [illegible] F_r 0.010763 Q_m 3.074 M^2 cfd $(L/H)(F_rQ_m)^2$ 0.001095 P_{cr} 668 T_{cr} [illegible]

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	6875			13750					
2	[illegible]		0	4936			9873					
3	37.5GH		0	185109			370219					
4	P_c or P_n		3335.2	4122.2	4066.2	4061.2	4787.2	4704.2	4700.2			
5	P_r		[illegible]	6.17	6.09	6.08	7.17	7.04	7.04			
6	T		[illegible]	636	636	636	735	735	735			
7	T_r		[illegible]	1.60	1.60	1.60	1.85	1.85	1.85			
8	Z		0.741	[illegible]	[illegible]	0.896	1.003	0.998	0.998			
9	P/Z P/Z	$\overline{4} \div \overline{8}$	4500.94	4550.22	4537.05	4532.[illegible]	4772.88	4713.63	4709.62			
10	P/TZ	$\overline{9} \div \overline{6}$	[illegible]	7.2016	7.1337	7.1267	6.4937	6.4131	6.4076			
11	$(P/TZ)^2/1000$	$(10^2)/1000$	0.070252	0.051863	0.050890	0.050790	0.042168	0.041128	0.041058			
12	$a(F_rQ_m)^2$		0.001095	0.001095	0.001095	0.001095	0.001095	0.001095	0.001095			
13		$\overline{11} + \overline{12}$	0.071347	0.052958	0.051985	0.051885	0.043263	0.042222	0.042153			
14	I_n	$\overline{10} \div \overline{13}$	117.478	135.988	137.227	137.357	150.099	151.888	152.011			
15	$M = P_n - P_{n-1}$			787	730	726	726	643	639	639		
16	$N = I_n + I_{n-1}$			253.465	254.705	254.835	287.455	289.245	289.368			
17	M x N	$\overline{15} \times \overline{16}$				185010			184906			
18	$\sum(M \times N)$	$\sum \overline{17}$				185010			369916			

$$\text{Delta } P = \frac{3[370219]}{117.478 + 4[137.357] + 152.011} = \frac{1110656}{818.917} = 1356.3$$

P = 3335.2 + 1356.3 = 4691.5

WORK SHEET FOR STEPWISE CALCULATION (SURFACE) PRESSURE (P_c & P_w) RATE NO. 2

COMPANY Cleary Petroleum Corporation LEASE New Mexico Federal "D" WELL NO. 1 DATE 9-7-77

LOCATION: UNIT N SECTION 4 TOWNSHIP 21S RANGE 32E

13750 H 13750 L/H 1.00 G 0.718 % CO_2 0.93 % N_2 0.32 % H_2S [illegible]

d ____ F_r ____ Q_m ____ M^2cfd (L/H) $(F_rQ_m)^2$ ____ P_{cr} 668 T_{cr} [illegible]

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		13750	6875		0						
2			9873	4936		0						
3	37.5GH		370219	185109		0						
4	P_c or P_n		4691.5	4098.9	4065.5	3370.9	3346.7	3351.8				
5	P_r		7.02	6.14	6.09	5.15	5.01	5.02				
6	T		735	636	636	537	537	537				
7	T_r		1.85	1.60	1.60	1.35	1.35	1.35				
8	Z		0.997	0.899	0.895	0.752	0.743	0.743				
9	P/Z P/Z	4 ÷ 8	4705.62	4559.45	4542.46	4482.58	4504.58	4511.22				
10	P/TZ	9 ÷ 6	6.4022	7.1689	[illegible]	[illegible]	8.3877	8.4008				
11	$(P/TZ)^2/1000$	$(10^2/1000$										
12	$H(F_rQ_m)^2$											
13		11 + 12										
14	I_n	10 ÷ 13	156.196	139.490	140.170	117.361	119.230	119.037				
15	$M=P_n-P_{n-1}$			593	626	695	719	714	714			
16	$N=I_n+I_{n-1}$			295.687	280.[illegible]	257.531	236.590	2[illegible].[illegible]				
17	M x N	15 x 16			185525			185073				
18	$\sum (M \times N)$	$\sum$ 17			185525			370598				

Delta P = $\frac{3 \times 370219}{156.196 + 4 [140.170] + 119.037} = \frac{1110656}{835.913} = 1328.7$

P = 4691.5 - 1328.7 = 3362.8

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) X(SURFACE)X PRESSURE (P_f & P_s) (P_c & P_w) Form C-122-E

RATE NO. 3

COMPANY Cleary Petroleum Corporation LEASE New Mexico Federal "D" WELL NO. 1 DATE 9-7-77

LOCATION: UNIT N SECTION 4 TOWNSHIP 21S RANGE 32E

[illegible] H 13750 L/H 1.00 G 0.718 % CO_2 0.93 % N_2 0.32 % H_2S [illegible]

d 2.441 F_r 0.010763 Q_m 2.436 M^2cfd (L/H) $(F_rQ_m)^2$ 0.000687 P_{cr} 668 T_{cr} [illegible]

NO	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	L		0	6875		13750						
2	GH		0	4936		9873						
3	37.5GH		0	185100		370219						
4	P_c or P_n		3683.2	[illegible]	[illegible]	5101.2	5115.2	5112.2				
5	P_r		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
6	T		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
7	T_r		1.26	1.60	1.60	1.75	1.75	1.85				
8	Z		0.780	[illegible]	[illegible]	1.030	[illegible]	[illegible]				
9	P/Z P/Z	$\overline{4} \div \overline{8}$	4720.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
10	P/TZ	$\overline{9} \div \overline{6}$	8.7423	7.5[illegible]	7.5331	[illegible]	[illegible]	[illegible]				
11	$(P/TZ)^2/1000$	$(\overline{10})^2/1000$	0.076428	0.057590	0.056748	0.047165	0.046190	0.046136				
12	$L/H(F_rQ_m)^2$		0.000687	0.000687	0.000687	0.000687	0.000687	0.000687				
13		$\overline{11} + \overline{12}$	0.077115	0.058277	0.057[illegible]	[illegible]	[illegible]	[illegible]				
14	I_n	$\overline{10} \div \overline{13}$	113.367	130.219	131.150	143.517	141.900	140.063				
15	$M = P_n - P_{n-1}$			816	759	757	673	670	670			
16	$N = I_n + I_{n-1}$			243.586	2[illegible].[illegible]	[illegible]	[illegible]	[illegible]				
17	M x N	$\overline{15} \times \overline{16}$			18[illegible]			[illegible]				
18	$\sum (M \times N)$	$\sum \overline{17}$			18559[illegible]			370663				

Delta P = $\frac{2 \times 370219}{113.367 + 4[131.150] + 145.005} = \frac{1110656}{783.002}$ = 1418.5   P = 3683.2 + 1418.5 = 5101.7

WORK SHEET FOR STEPWISE CALCULATION

(SURFACE) PRESSURE (P_c & P_w)

RATE NO. 3

Form C-122-E

COMPANY Cleary Petroleum Corporation LEASE New Mexico Federal "D" WELL NO. 1 DATE 9-7-77

LOCATION: UNIT N SECTION 4 TOWNSHIP 21S RANGE 32E

L 13750 H 13750 L/H 1.00 G 0.718 % CO_2 0.93 %N_2 0.32 %H_2S [illegible]

d ____ F_r ____ Q_m ____ M^2 cfd (L/H) $(F_rQ_m)^2$ ____ P_{cr} 668 T_{cr} [illegible]

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		13750	6875		0						
2	GH		9873	4936		0						
3	37.5GH		370219	185109		0						
4	P_c or P_n		5101.7	4474.2	4440.0	[illegible]	3607.0	[illegible]				
5	P_r		7.64	6.70	6.65	[illegible]	[illegible]	[illegible]				
6	T		735	632	631	[illegible]	[illegible]	[illegible]				
7	T_r		1.85	1.60	1.60	[illegible]	[illegible]	1.36				
8	Z		1.024	0.928	[illegible]	[illegible]	0.[illegible]	0.781				
9	P/Z P/Z	$\overline{4} \div \overline{8}$	[illegible]2.13	4821.47	[illegible]	[illegible]	[illegible]	[illegible]				
10	P/ZT	$\overline{9} \div \overline{6}$	[illegible]	7.[illegible]	7.[illegible]	[illegible]	6.7213	6.74[illegible]				
11	$(P/TZ)^2/1000$	$(\overline{10}^2)/1000$										
12	L/H$(F_rQ_m)^2$											
13		$\overline{11} + \overline{12}$										
14	I_n	$\overline{10} \div \overline{13}$	147.527	132.221	132.812	113.0[illegible]	11[illegible]	114.297				
15	$M=P_n-P_{n-1}$			627	662	[illegible]	[illegible]	[illegible]	[illegible]			
16	$N=I_n + I_{n-1}$			279.748	[illegible]	[illegible]	[illegible]	[illegible]				
17	M x N	$\overline{15} \times \overline{16}$			18558[illegible]			1[illegible]				
18	$\sum$(M x N)	$\sum \overline{17}$			18[illegible]			370[illegible]				

Delta P = $\frac{[\quad 370219]}{[illegible] + 4[132.812] + 114.297}$ = $\frac{1110[illegible]}{793.0[illegible]}$ = 1400.4   P = 5101.7 - 1400.4 = 3701.3

WORK SHEET FOR STEPWISE CALCULATION [illegible] PRESSURE (P_f & P_s)

X(SURFACE)X (P_c & P_w)

Form C-122-E

RATE NO. 4

COMPANY Cleary Petroleum Corporation LEASE New Mexico Federal "D" WELL NO. 1 DATE 9-7-77

LOCATION: UNIT H SECTION 4 TOWNSHIP 21S RANGE 32E

L 13750 H 13750 L/H 1.00 G 0.718 % CO_2 0.93 %N_2 0.32 %H_2S [illegible]

d 2.441 F_r 0.010763 Q_m 2.042 M^2cfd (L/H) $(F_rQ_m)^2$ 0.000483 P_{cr} 668 T_{cr} [illegible]

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	6875			13750					
2	[illegible]		0	[illegible]			4873					
3	37.5GH		0	185199			370219					
4	P_c or P_n		3891.2	[illegible]	4667.2	[illegible]	[illegible]	[illegible]	5310.2			
5	P_r		5.83	7.0?	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
6	T		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
7	T_r		[illegible]	[illegible]	1.60	1.60	[illegible]	[illegible]	[illegible]			
8	Z		[illegible]	0.9?8	[illegible]	[illegible]	1.0??	1.0??	1.0??			
9	P/Z 2/Z	$\overline{4} \div \overline{8}$	[illegible]	4?51.22	[illegible]	4943.13	[illegible]	[illegible]	51?4.??			
10	P/TZ	$\overline{9} \div \overline{6}$	[illegible]	[illegible]	[illegible]	[illegible]	7.00??	6.9977	6.99??			
11	$(P/TZ)^2/1000$	$(\overline{10}^2)/1000$	0.07????	0.050063	0.0500??	0.050008	0.0?9969	0.0?8?69	0.048???			
12	$H(F_rQ_m)^2$		0.000?83	0.000483	0.000483	0.000483	0.000483	0.000483	0.000483			
13		$\overline{11} + \overline{12}$	0.0???59	0.051346	0.0507??	0.050???	0.050??2	0.049?51	0.049???			
14	I_n	$\overline{10} \div \overline{13}$	11?.26?	127.172	12?.??9	135.060	140.111	1??.50?	1??.???			
15	$M=P_n-P_{n-1}$			831	776	773	773	6??	60?	6??		
16	$N=I_n+I_{n-1}$			238.458	23?.?5?	239.348	268.171	269.?69	259.530			
17	M x N	$\overline{15} \times \overline{16}$				180014			[illegible]			
18	$\sum(M \times N)$	$\sum \overline{17}$				180014			3?????			

Delta P = $\frac{[illegible]\ 3?0819?}{1?1.26? + 4[135.060] + 141.478} = \frac{1113656}{765.004} = 1451.8$ P = 3891.2 + 1451.8 = 53?3.0