

WORK SHEET FOR STEPWISE CALCULATION

XXXXXXXXXXXX

(P_f & P_s)

PRESSURE

(SURFACE)

(P_c & P_w)

Form C-122-E

RATE NO. 1

WELL NO. 1

DATE 5-16-77

LEASE New Mexico Federal "C"

IPANY Cleary Petroleum Corporation

RANGE 32 E

TOWNSHIP 21 S

SECTION 4

UNIT Q

13796 H 13796 L/H 1 G 0.738 % CO₂ 0.71 % N₂ 0.32 % H₂S 0.00
 6 F Q M CO₂ (L/H) (F Q_m)² P_{cr} 665 T_{cr} 424

ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
H		13796	6898		0						
GR		10181	5091		0						
37.5GR		381804	190902		0						
P _{cr}		5173.2	4520.7	4479.4	3786.8	3674.7	3678.5				
P _f		7.78	6.80	6.74	5.69	5.53	5.53				
T		745	639	639	532	532	532				
T _r		1.26	1.51	1.51	1.25	1.25	1.25				
Z		1.016	0.912	0.908	0.768	0.753	0.753				
P/Z P/Z	4 ÷ 8	5092.73	4955.29	4935.94	4930.72	4880.11	4885.13				
P/TZ	9 ÷ 6	6.8359	7.7608	7.7305	9.2683	9.1731	9.1826				
(P/TZ ² /1000	(10 ² /1000										
L/H(F Q _m) ²											
I _n	11 + 12										
M=P _n -P _{n-1}	10 ÷ 13	146.287	128.852	129.357	107.895	109.014	108.902				
N=1 _n ÷ 1 _{n-1}		652	652	694	693	805	801	801			
M x N	15 x 16		275.139	275.644	237.252	238.371	238.259				
Σ (M x N)	Σ 17		191297	191297			190845				
				191297			382142				

Delta P = 146.287 + 4[129.357] + 108.902 = $\frac{1145413}{772.617}$ = 1482.5 P = 5173.2 - 1482.5 = 3690.7

IPANY Cleary Petroleum Corporation LEASE New Mexico Federal "C" WELL NO. 1 DATE 5-16-77

SECTION 4 TOWNSHIP 21 S RANGE 32 E

UNIT H 13796 L/H 1.00 G 0.738 % CO₂ 0.71 % N₂ 0.32 % H₂S 0.00

Q_m 381804 M² cfd (L/H) (P_r Q_m)² P_{cr} 665 T_{cr} 424

ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
H		13796	6898		0						
GH		10181	5091		0						
37.5GH		381804	190902		0						
P _c or P _n		5564.2	4882.3	4838.8	4114.6	4001.4	4008.3	4004.8			
P _r		8.27	7.34	7.28	6.19	6.02	6.03	6.02			
T		745	637	637	528	528	528	528			
T _r		1.76	1.50	1.50	1.25	1.25	1.25	1.25			
Z		1.045	0.945	0.940	0.813	0.805	0.799	0.799			
P/Z P/Z	$\bar{4} \div \bar{6}$	5322.56	5166.41	5147.66	5061.06	4970.71	5016.68	5012.26			
P/TZ	$\bar{9} \div \bar{6}$	7.1444	8.1169	8.0875	9.5853	9.4142	9.5013	9.4929			
(P/TZ) ² /1000	$(10^2/1000)$										
L/H(F _r Q _m) ²											
$\bar{11} + \bar{12}$											
I _n	$\bar{10} \div \bar{13}$	139.970	123.200	123.648	104.326	106.222	105.249	105.342			
M=P _n -P _{n-1}			682	725	724	837	830	834			
N=1 _n +1 _{n-1}			263.170	263.619	227.974	229.871	228.897	228.990			
M x N	$\bar{15} \times \bar{16}$			191124				190978			
$\Sigma (M \times N)$	$\Sigma \bar{17}$			191124				382101			

Delta P = $\frac{3[381804]}{139.970 + 4[123.648]} + 105.342 = \frac{1145413}{739.904} = 1548.1$ P = 5564.2 - 1548.1 = 4016.1

PANY Cleary Petroleum Corporation LEASE New Mexico Federal "C" WELL NO. 1 DATE 5-16-77

SECTION 4 TOWNSHIP 21 S RANGE 32 E

13796 H 13796 ±/H 1.00 G 0.738 ± CO₂ 0.71 ± N₂ 0.32 ± H₂S 0.00

± F 2 M cfd (L/H) (F Q_r)² P_{cr} 665 T_{cr} 424

ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
H		13796	6898		0						
GH		10181	5091		0						
37.5GR		381804	190902		0						
P _c or P _n		5688.2	4997.3	4953.7	4221.2	4109.1	4112.0				
P _r		8.55	7.51	7.45	6.35	6.18	6.18				
T		745	637	637	528	528	528				
T _r		1.76	1.50	1.50	1.25	1.25	1.25				
Z		1.055	0.956	0.953	0.828	0.812	0.812				
P/Z P/Z	4 ÷ 8	5392.68	5227.28	5198.03	5098.04	5060.46	5063.99				
P/TZ	9 ÷ 6	7.2385	8.2125	8.1666	9.6554	9.5842	9.5909				
(P/TZ) ² /1000	(10 ² /1000)										
L/H(F _r Q _m) ²											
I _n	11 + 12										
M=P _n ⁻¹	10 ÷ 13	138.150	121.765	122.450	103.569	104.338	104.266				
N=1 _n + 1 _{n-1}			691	734	733	845	842	842			
M x N	15 x 16		259.915	260.600	226.020	226.789	226.716				
Σ (M x N)	Σ 17		191280	191280			190895				
				191280			382175				

Delta P = $\frac{3[381804]}{138.150 + 4[122.450] + 104.266} = \frac{1145413}{732.216} = 1564.3$

P = 5688.2 - 1564.3 = 4123.9

PANY Cleary Petroleum Corporation LEASE New Mexico Federal "C" WELL NO. 1 DATE 5-16-77

SECTION 4 TOWNSHIP 21 S. RANGE 32 E

13796 H 13796 I/E 100 G 0.738 % CO₂ 0.71 % N₂ 0.32 % H₂S 0.00

d F_r 2 M cfa (L/H) (P_r Q_r)² P_{cr} 665 T_{cr} 424

RATE NO. 4

ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
H		13796	6898		0						
GH		10181	5091		0						
37.5GH		381804	190902		0						
P _c or P _n		5723.2	5030.0	4986.6	4251.6	4139.5	4142.3				
P _r		8.61	7.56	7.50	6.39	6.22	6.23				
T		745	637	637	528	528	528				
T _r		1.76	1.50	1.50	1.25	1.25	1.25				
Z		1.059	0.960	0.956	0.822	0.816	0.816				
P/Z P/Z	4 ÷ 8	5410.4	5230.58	5216.13	5110.09	5072.90	5076.38				
P/TZ	9 ÷ 6	7.2624	8.2319	8.1950	9.6782	9.6078	9.6144				
(P/TZ ² /1000	(10 ² /1000										
L/H(F _r Q _r) ²											
I _n	11 + 12										
M=P _n -P _{n-1}	10 ÷ 13	137.696	121.479	122.025	103.325	104.082	104.011				
N=1 _n +1 _{n-1}			692	737	735	847	844	845			
M x N	15 x 16		259.175	259.721	225.350	226.108	226.036				
Σ (M x N)	Σ 17			191414			190774				
				191414			382189				

$$\Delta P = \frac{3[381804]}{137.696 + 4[122.025]} + 104.011 = \frac{1145413}{729.807} = 1569.5$$

$$P = 5723.2 - 1569.5 = 4153.7$$