N MEXICO OIL CONSERVATION COMMISSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

Type Test: [x] Initial [ ] Annual [ ] Special				Test Date: 4/24/74	
Company: El Paso Natural Gas Co.			Connection: None		
Pool: Wildcat			Formation: Morrow		Unit: Y F
Completion Date: 4-24-74	Total Depth: 16,870		Plug Back TD: 12,470	Elevation: 3357.5 G	Farm or Lease Name: Cooper Federal
Csg. Size:	Wt.:	d:	Set At:	Perforations: From 11452 To 11460	Well No.: 1
Tbg. Size: 2 7/8	Wt.: 6.5	d: 2.441	Set At: 11275	Perforations: From To	Unit: K Sec.: 21 Twp.: 24 Rge.: 36
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Single			Packer Set At: 11275		County: Lea
Producing Thru: Tbg.	Reservoir Temp. °F: 154 @ 11456		Mean Annual Temp. °F:	Baro. Press. – P_a: 13.2	State: New Mexico

L	H	Gg	% CO_2	% N_2	% H_2S	Prover	Meter Run	Taps
11275	11275	.603	0	1.03	.01Grs.		3"	Flg.

	FLOW DATA				TUBING DATA		CASING 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					4689				123 hrs.
1.	3 x 1.500	630	15.00	32	4059	78			1 hr.
2.	3 x 1.500	630	36.00	54	3540	79			1 hr.
3.	3 x 1.500	660	52.00	63	3002	80			1 hr.
4.	3 x 1.500	690	79.00	71	2422	78			2 hrs.
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	11.13	98.22	643.2	1.028	1.288	1.077	1,559
2.	11.13	152.17	643.2	1.006	1.288	1.058	2,322
3.	11.13	187.10	673.2	.9971	1.288	1.060	2,834
4.	11.13	235.70	703.2	.9896	1.288	1.056	3.531
5.							

NO.	P_r	Temp. °R	T_r	Z
1.	.96	492	1.37	.862
2.	.96	514	1.44	.894
3.	1.00	523	1.46	.890
4.	1.05	531	1.48	.897
5.				

Gas Liquid Hydrocarbon Ratio 144.6 Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons 52.0 @ 60° Deg.
Specific Gravity Separator Gas .603 XXXXXXXXX
Specific Gravity Flowing Fluid XXXXX G Mix - 624
Critical Pressure 671 P.S.I.A. 671 P.S.I.A.
Critical Temperature 358 R 365 R

P_c 4702.2 P_c^2 22110.7

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1		4093.2	16754.3	5356.4
2		3567.5	12727.1	9383.6
3		3025.8	9155.5	12955.2
4		2441.0	5958.5	16,152.2
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = 1.369$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.258$

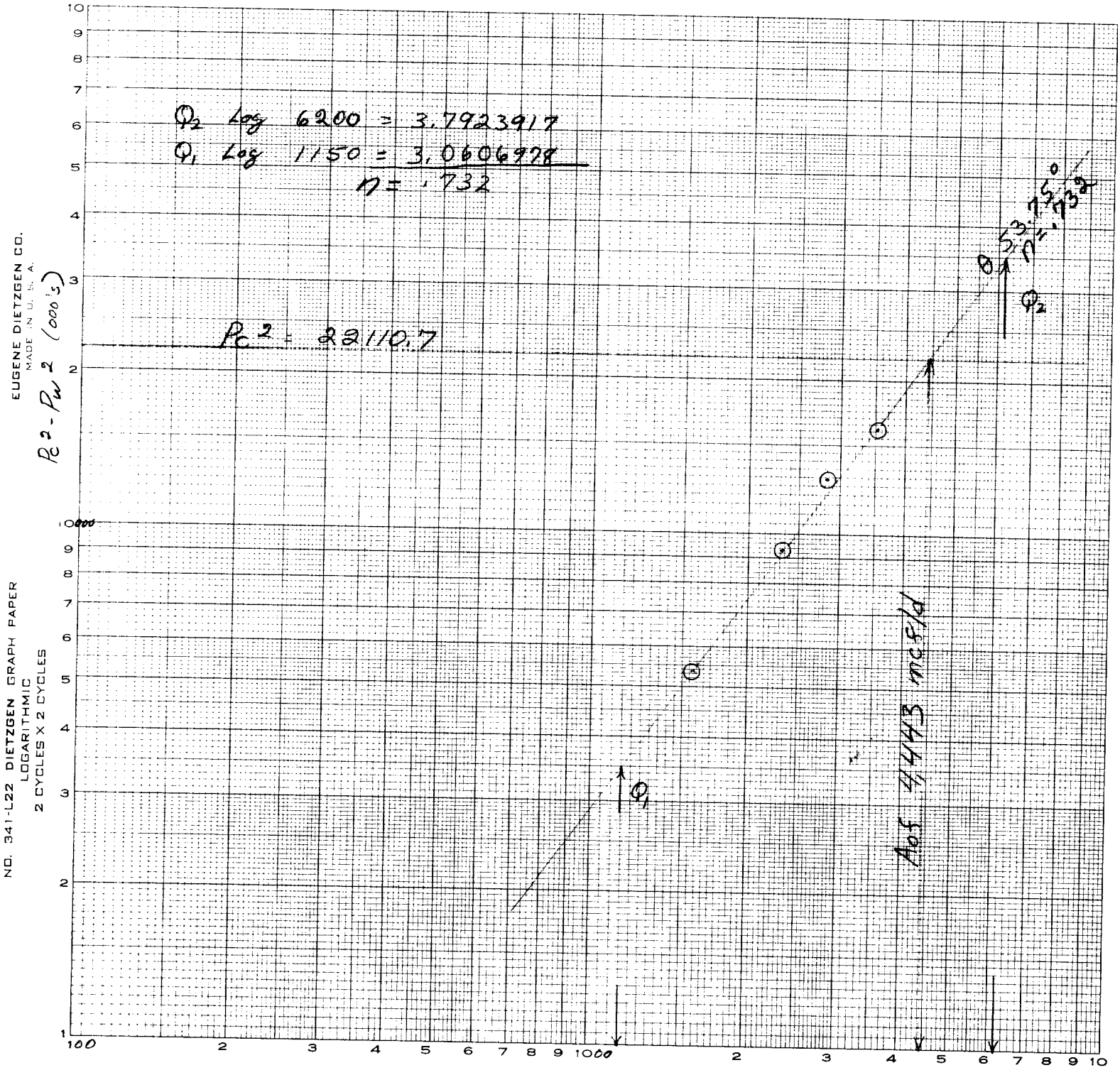
AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 4.443$

Absolute Open Flow 4,443 Mcfd @ 15.025 Angle of Slope θ 53.75 Slope, n .732

Remarks: 3.97 Bbls. of 52.0 @ 60° condensate made during test.

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	Reston, Pagan	Rick Pagan	Joe B. Murray

El Paso Natural Gas Co.
Wildcat Morrow
Cooper Federal #1
4/24/74 Lea County
θ 53.75° n = .732



Q mcf/d

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) (SURFACE) PRESSURE (P_t & P_s) (P_t & P_w)

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

COMPANY [illegible] LEASE [illegible] WELL NO. 1 DATE 4-28-70

LOCATION: Unit L Section 21 Township 29 Range 36

L 11285.00 H 11275 L/H 1.000 G .666 % CO_2 _____ % N_2 _____ % H_2S _____

d 2.441 F_r .010765 Q_m 3.531 M^2cfd (L/H) $(F_rQ_m)^2$ .001444 P_{cr} 671 (TABLE IX & X) T_{cr} 376 (TABLE IX & X)

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	[illegible]		11275						
2	GH		0	3517.8		7085.6						
3	37.5GH		0	131,918		265,854						
4	P_d or P_n		4022.2	4674.6	4663.8	52543	5238.9		5236.8 = P_s = P_T + ΔP			
5	P_t		6.07	6.97	6.95	7.83	7.81					
6	T		5.39	574	574	618	618					
7	T_r		1.46	1.57	1.57	1.68	1.68					
8	Z		.850	.942	.941	1.008	1.007					
9	P/Z P/Z	4÷8	4790.8	4962.4	4956.2	5212.6	5202.5					
10	P/TZ	9÷6	8.9716	8.6453	8.6346	8.4896	8.4731					
11	$(P/TZ)^2/1000$	$(10)^2/1001$	.080489	.074741	.074556	.072073	.071793					
12	$L/H(F_rQ_m)^2$		.001444	.001444	.001444	.001444	.001444					
13		11 + 12	.081933	.076185	.076000	.073517	.073237					
14	I_n	10÷13	109.499	113.478	113.614	115.478	115.694					
15	$M=P_n-P_{n-1}$			602	59.2	591	575					
16	$N=I_n+I_{n-1}$			222.977	223.113	229.092	229.368					
17	M x N	15 x 16			132083		131,852					
18	Σ(M x N)	Σ17			131,751							

One copy to be filed in District Office (Work copy acceptable)

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WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) (SURFACE) PRESSURE ~~(P_f & P_s)~~ (P_c & P_w)

Form C–122–E
Adopted 9–1–65

COMPANY EPNG LEASE Cooper Federal WELL NO. #1 DATE 4/24/74

LOCATION: Unit K Section 21 Township 24 Range 36

L 11225 H 11225 L/H 1.000 G_{mix} .624 % CO_2 ____ % N_2 ____ % H_2S ____

d 2.441 F_r .010763 Q_m 0 M^2cfd (L/H) $(F_rQ_m)^2$ 0 P_{cr} 671 (TABLE IX & X) T_{cr} 365 (TABLE IX & X)

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		11275	56375		0						
2	GH		7035.6	35178		0						
3	37.5GH		263,834	131,918		0						
4	P_c or P_n		5236.8	4677.6	4672.0	4107.9	4090.4	4091.2		4093.2 = P_w =		PT - ΔP
5	P_r		7.80	6.97	6.96	6.12	6.10	6.10				
6	T		614	574	574	534	534	534				
7	T_r		1.68	1.57	1.57	1.46	1.46	1.46				
8	Z		1.006	.942	.942	.853	.852	.852				
9	P/Z P/Z	4÷8	5205.6	4965.6	4959.6	4815.9	4800.9	4801.9				
10	P/TZ	9÷6	8.4781	8.6509	8.6404	9.0185	8.9904	8.9924				
11	$(P/TZ)^2/1000$	$(10)^2/1000$										
12	$L/H(F_rQ_m)^2$											
13		11 + 12										
14	I_n	10÷13	117.951	115.595	115.735	110.883	111.229	111.205				
15	$M=P_n-P_{n-1}$			559	565	564	582	581				
16	$N=I_n+I_{n-1}$			233.546	233.696	226.618	226.964	226.940				
17	M x N	15 x 16			132033			131852				
18	Σ(M x N)	Σ17			131801							

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2nd

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) PRESSURE (P_t & P_s) (SURFACE) (P_t & P_w)

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

COMPANY EPNG LEASE Cooper Federal WELL NO. 1 DATE 8-28-74

LOCATION A Unit JC Section 21 Township 24 Range 36

L 11,252 H 11,275 L/H 1,000 G Max. 629 % CO_2 ____ % N_2 ____ % H_2S ____

d .791 F_t .919763 Q_m 2.854 M^2cfd (L/H) $(F_tQ_m)^2$ .000930 P_{cr} 671 TABLE IX & X T_{cr} 341 TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	5687.5		11275						
2	GH		0	1387.8		2015.6						
3	37.5GH/GH		0	421.918		763.939						
4	P_t or P_n		3553.2	4107.2	4096.6	4639.6	4626.3		4622.9 = P_s	P_T + ΔP		
5	P_t'		5.30	6.12	6.11	6.91	6.89					
6	T		534	574	574	614	614					
7	T_t'		1.46	1.57	1.57	1.68	1.68					
8	Z		.803	.898	.897	.960	.959					
9	P/Z P/Z	4÷8	4424.9	4573.7	4567.0	4833.0	4824.1					
10	P/TZ	9÷6	8.2863	7.9681	7.9565	7.8713	7.8569					
11	$(P/TZ)^2/1000$	$(10)^2/1000$	.068663	.063490	.063306	.061957	.061731					
12	$L/H(F_tQ_m)^2$		.000930	.000930	.000930	.000930	.000930					
13		11 + 12	.069593	.064420	.064236	.062887	.062661					
14	I_n	10÷13	119.267	123.689	123864	125.166	125.388					
15	$M=P_n-P_{n-1}$			554	543	543	530					
16	$N=I_n+I_{n-1}$			242.956	248.931	249.030	249.252					
17	M x N	15 x 16			135,912		132,103					
18	Σ(M x N)	Σ17			131,922							

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2nd

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) (SURFACE) PRESSURE ~~(P_f & P_s)~~ (P_c & P_w)

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

COMPANY EPNG LEASE Cooper Federal WELL NO. 1 DATE 4-29-74

LOCATION: Unit I Section 21 Township 29 Range 36

L 11275 H 11275 L/H 1.000 G Mix. 624 % CO_2 _____ % N_2 _____ % H_2S _____

d 2.441 F_r .010763 Q_m 0 M^2cfd (L/H) $(F_rQ_m)^2$ 0 P_{cr} 671 (TABLE IX & X) T_{cr} 365 (TABLE IX & X)

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		11275	5637.5		0						
2	GH		7035.6	3517.8		0						
3	37.5GH		263,834	131,918		0						
4	P_c or P_n		4622.9	4105.1	4101.4	3580.2	3564.7	3565.5		3567.5 = P_w = P_T - ΔP		
5	P_r		6.89	6.12	6.11	5.34	5.31	5.31				
6	T		614	574	574	534	534	534				
7	T_r		1.68	1.57	1.57	1.46	1.46	1.46				
8	Z		.952	.898	.897	.805	.804	.804				
9	P/Z P/Z	$\bar{4}\div\bar{8}$	4820.5	4571.3	4572.3	4447.4	4433.7	4434.7				
10	P/TZ	$\bar{9}\div\bar{6}$	7.8510	7.9640	7.9657	8.3285	8.3027	8.3046				
11	$(P/TZ)^2/1000$	$(\bar{10})^2/1000$										
12	$L/H(F_rQ_m)^2$											
13		$\bar{11}+\bar{12}$										
14	I_n	$\bar{10}\div\bar{13}$	127.372	125.565	125.539	120.070	120.442	120.415				
15	$M=P_n-P_{n-1}$			518	522	521	537	536				
16	$N=I_n+I_{n-1}$			252.937	252.911	245.609	245.981	245.954				
17	M x N	$\bar{15}\times\bar{16}$			132 019			131,831				
18	Σ(M x N)	$\Sigma\bar{17}$			131815							

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

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

COMPANY EPNG LEASE Cooper Federal WELL NO. 1 DATE 9-29-79

LOCATION: Unit IC Section 21 Township 24 Range 36

L 11275' H 11275' L/H 1:000 G Mix. .624 % CO_2 _____ % N_2 _____ % H_2S _____

d 2.991 F_r .010763 Q_m 2.322 M^2cfd (L/H) $(F_rQ_m)^2$ .000625 P_{cr} 671 (TABLE IX & X) T_{cr} 361 (TABLE IX & X)

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	5657.5'		11275'						
2	GH		0	3517.8		7085.6						
3	37.5GH		0	131,918		263,835'						
4	P_c or P_n		3015.2	3508.9	3500.9	3985.1	3975.3		3973.0 = P_S P_T + ΔP			
5	P_r		4.49	5.23	5.22	5.94	5.92					
6	T		534	574	574	614	614					
7	T_r		1.46	1.57	1.57	1.68	1.68					
8	Z		.763	.854	.854	.915	.914					
9	P/Z P/Z	$\bar{4}\div\bar{8}$	3951.8	4108.8	4099.4	4355.3	4349.3					
10	P/TZ	$\bar{9}\div\bar{6}$	7.4003	7.1581	7.1418	7.0934	7.0836					
11	$(P/TZ)^2/1000$	$(\bar{10})^2/1000$	.054765	.051239	.051005	.050316	.050177					
12	$L/H(F_rQ_m)^2$		.000625	.000625	.000625	.000625	.000625					
13		$\bar{11}+\bar{12}$	.055390	.051864	.051630	.050941	.050802					
14	I_n	$\bar{10}\div\bar{13}$	133.604	138.017	138.327	139.247	139.435					
15	$M=P_n-P_{n-1}$			494	486	484	474					
16	$N=I_n+I_{n-1}$			271.621	271.931	277.574	277.762					
17	M x N	$\bar{15}\times\bar{16}$			132158		131,659					
18	Σ(M x N)	$\Sigma\bar{17}$			131677							

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3rd

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) (SURFACE) PRESSURE ~~(P_t & P_s)~~ (P_c & P_w)

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

COMPANY EPNG LEASE Cooke Federal WELL NO. 1 DATE 9-28-74

LOCATION: Unit K Section 21 Township 24 Range 36

L 11275' H 11275' L/H 1.000 G Corr. .624 % CO_2 _____ % N_2 _____ % H_2S _____

d 2.031 F_r .00763 Q_m 0 M^2cfd $(L/H)(F_rQ_m)^2$ 0 P_{cr} 661 (TABLE IX & X) T_{cr} 343 (TABLE IX & X)

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		11275'	5637.5'		0						
2	GH		7035.6	3517.8		0						
3	37.5GH		263.834	131.918		0						
4	P_c or P_n		3973.0	3506.0	3503.7	3034.3	3022.7	3023.3		3025.8 = P_w	- P_T - ΔP	
5	P_r		5.92	5.23	5.22	4.52	4.50	4.51				
6	T		614	574	574	534	534	534				
7	T_r		1.68	1.57	1.57	1.46	1.46	1.46				
8	Z		.914	.854	.854	.764	.763	.763				
9	P/Z P/Z	$\bar{4}\div\bar{8}$	4346.8	4105.4	4102.6	3971.6	3961.5	3962.3				
10	P/TZ	$\bar{9}\div\bar{6}$	7.0795	7.1523	7.1475	7.4374	7.4186	7.4201				
11	$(P/TZ)^2/1000$	$(\bar{10})^2/1000$										
12	$L/H(F_rQ_m)^2$											
13		$\bar{11}+\bar{12}$										
14	I_n	$\bar{10}\div\bar{13}$	141.252	139.815	139.910	134.456	134.796	134.769				
15	$M=P_n-P_{n-1}$			467	469	469	481	480				
16	$N=I_n+I_{n-1}$			281.067	281.162	274.366	274.706	274.679				
17	M x N	$\bar{15}\times\bar{16}$			131865			131,846				
18	Σ(M x N)	$\Sigma\bar{17}$			131969							

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WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) (SURFACE) PRESSURE (P_f & P_s) ~~(P_c & P_w)~~

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

COMPANY EPNG LEASE Cooper Federal WELL NO. 1 DATE 4-29-79

LOCATION: Unit K Section 21 Township 29 Range 36

L 11275' H 11275' L/H 1:000 G Mix. .621 % CO_2 _____ % N_2 _____ % H_2S _____

d 2.491 F_r .010763 Q_m 1.559 M^2cfd $(L/H)(F_rQ_m)^2$ .000282 P_{cr} 671 (TABLE IN B II) T_{cr} 365° (TABLE IN B II)

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	5637.5'		11275'						
2	GH		0	3517.8		7035.6						
3	37.5GH		0	131,918		263,835'						
4	P_c or P_n		2435.2	2844.7	2840.0	3244.0	3240.4		3238.4 =	P_s	P_t	+ ΔP
5	P_t		3.63	4.24	4.23	4.83	4.83					
6	T		534	574	574	614	614					
7	T_r		1.46	1.57	1.57	1.68	1.68					
8	Z		.740	.823	.823	.823	.823					
9	P/Z P/Z	4÷8	3290.8	3456.5	3450.8	3715.9	3711.8					
10	P/TZ	9÷6	6.1626	6.0218	6.0119	6.0520	6.0454					
11	$(P/TZ)^2/1000$	$(10)^2/100$	.037977	.036262	.036143	.036627	.036546					
12	$L/H(F_rQ_m)^2$		.000282	.000282	.000282	.000282	.000282					
13		11 + 12	.038259	.036544	.036425	.036909	.036828					
14	I_n	10÷13	161,075	164.783	165.049	163.973	164.151					
15	$M=P_n-P_{n-1}$			409	405	404	400					
16	$N=I_n+I_{n-1}$			325.858	326.124	329.022	329.200					
17	M x N	15 x 16			132080		131,680					
18	Σ(M x N)	Σ17			131755							

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4 E6

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) (SURFACE) PRESSURE ~~(P_f & P_s)~~ (P_c & P_w)

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

COMPANY EPNG LEASE COOPER FEDERAL WELL NO. 1 DATE 4-24-74

LOCATION: Unit K Section 21 Township 29 Range 36

L 11275' H 11275' L/H 1.000 G MIX. .624 % CO_2 _____ % N_2 _____ % H_2S _____

d 2.441 F_r .610763 Q_m 0 M^2cfd (L/H) $(F_rQ_m)^2$ 0 P_{cr} 671 (TABLE IV B 3) T_{cr} 365° (TABLE IV B 3)

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		11275'	5637.5'		0						
2	GH		7035.6	3517.8		0						
3	37.5GH		263,834	131,918		0						
4	P_c or P_n		3238.4	2839.9	2840.9	2443.8	2439.1	2439.5		2441.0 = Pw PT-ΔP		
5	P_t		4.83	4.23	4.23	3.64	3.64	3.64				
6	T		614	574	574	534	534	534				
7	T_r		1.68	1.57	1.57	1.46	1.46	1.46				
8	Z		.873	.823	.823	.740	.740	.740				
9	P/Z P/Z	$\overline{4}\div\overline{8}$	3709.5	3450.7	3451.9	3302.4	3296.1	3296.6				
10	P/TZ	$\overline{9}\div\overline{6}$	6.0415	6.0116	6.0137	6.1842	6.1725	6.1735				
11	$(P/TZ)^2/1000$	$(\overline{10})^2/1000$										
12	$L/H(F_rQ_m)^2$											
13		$\overline{11}+\overline{12}$										
14	I_n	$\overline{10}\div\overline{13}$	165.521	166.344	166.286	161.702	162.009	161.984				
15	$M=P_n-P_{n-1}$			398	398	397	402	401				
16	$N=I_n+I_{n-1}$			331.865	331.807	327.988	328.295	328.270				
17	M x N	$\overline{15}\times\overline{16}$			132059			131,636				
18	Σ(M x N)	$\Sigma\overline{17}$			131775							

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