

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

Form C-122
Revised 9-1-65

Type Test ☒ Initial ☐ Annual ☐ Special						Test Date 11-11/11/15-74	
Company El Paso Natural Gas Co.				Connection El Paso Natural Gas Company			
Pool Wildcat				Formation Morrow			
Completion Date 4/24/74		Total Depth 12790		Plug Back TD 12470		Elevation 3757.5 GL	
Farm or Lease Name Cooper Federal				Well No. 1			
Csg. Size 9-7 5/8	Wt. 39	d 6.625	Set At 12,790	Perforations: From 11452 To 11460		Unit 1	
Tbg. Size 2 7/8	Wt. 6.5	d 2.441	Set At 11275	Perforations: From To		Unit 21	Sec. 24
Type Well - Single - Bradenhead - G.G. or G.O. Multiple Single				Packer Set At 11275		County Lea	
Producing Thru Tbg.		Reservoir Temp. °F 152 @ 11456		Mean Annual Temp. °F 13.2		State New Mexico	
L 11331	H 11331	Gg .606	% CO ₂	% N ₂	% H ₂ S	Prover	Meter Run 4"
						Taps Flg.	

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											
1.	4	x	2.000	497	4.41	75	3515				72
2.	4	x	2.000	517	8.41	80	2995				24
3.	4	x	2.000	509	13.69	74	2685				24
4.	4	x	2.000	523	19.36	76	2223				24
5.							1795				24

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	19.81	47.43	510.2	.9859	1.285	1.041	1239
2	19.81	66.78	530.2	.9813	1.285	1.041	1736
3	19.81	84.55	522.2	.9868	1.285	1.043	2215
4	19.81	101.89	536.2	.9850	1.285	1.043	2665
5.							

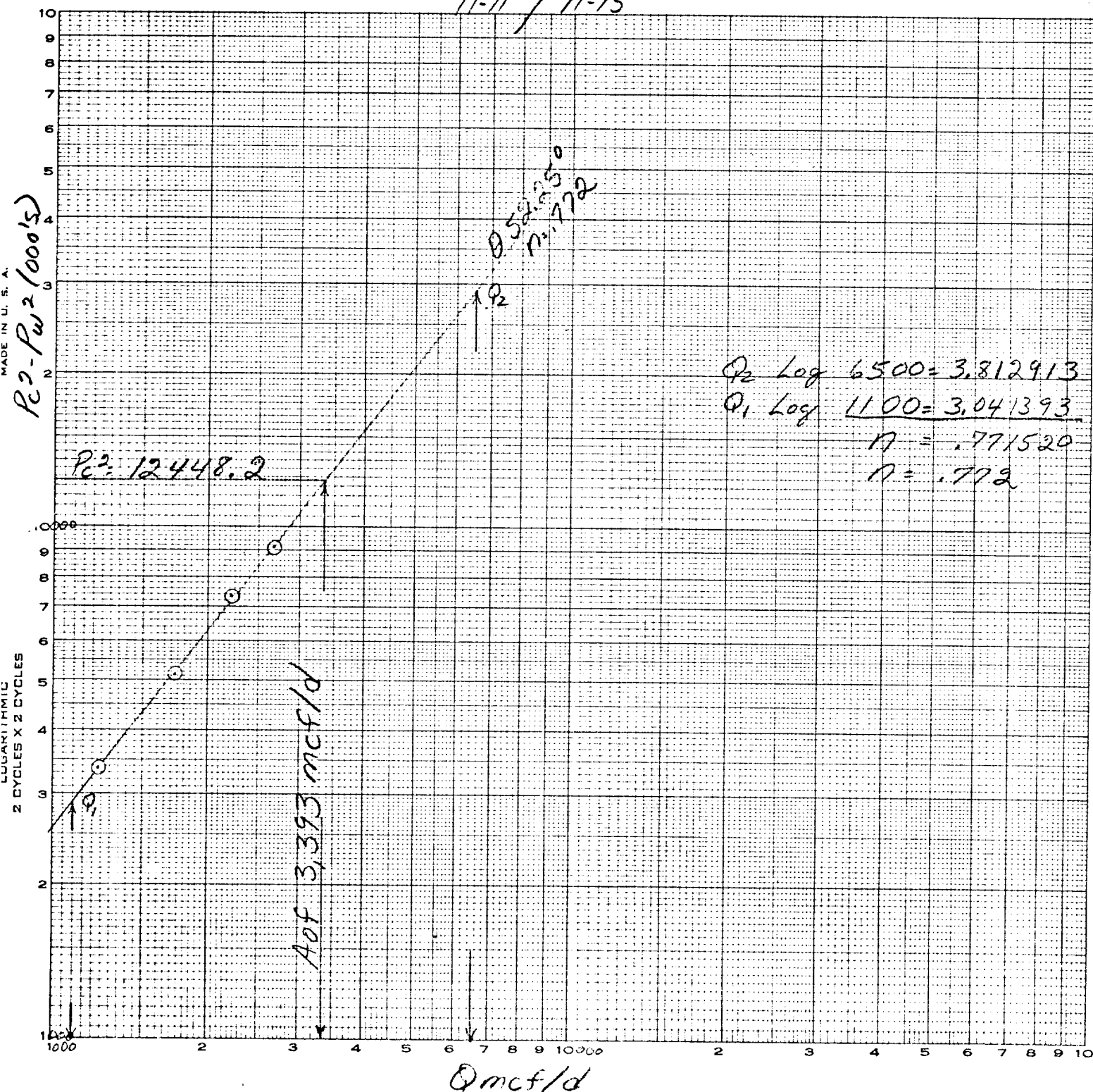
NO.	P _t	Temp. °R	T _t	Z	Gas Liquid Hydrocarbon Ratio 128.813 Mcf/bbl.
1	.76	535	1.49	.922	A.P.I. Gravity of Liquid Hydrocarbons 53.3 @ 60 Deg.
2.	.79	540	1.51	.923	Specific Gravity Separator Gas XXXXXXX
3.	.78	534	1.49	.920	Specific Gravity Flowing Fluid XXXXX .630
4.	.80	536	1.50	.920	Critical Pressure 671 P.S.I.A. 670 P.S.I.A.
5.					Critical Temperature 358 R 368 R

NO.	P _t	P _w	P _w ²	P _t ² - P _w ²	(1) $\frac{P_t^2}{P_t^2 - P_w^2} = 1.367$	(2) $\left[\frac{P_t^2}{P_t^2 - P_w^2} \right]^n = 1.273$
1		3011.6	9069.7	3378.5		
2		2704.9	7316.5	5131.7		
3		2248.6	5056.2	7392.0		
4		1828.9	3344.9	9103.3		
5						

Absolute Open Flow 3,393 Mcfd @ 15.025				Angle of Slope θ 52.25°		Slope, n .772	
Remarks: 60.98 Pbl distillate made during test. An equivalent flow length of 11331 Ft. was calculated by converting from 6.625 csg. to 2.441 Tbg.							
Approved By Commission: 		Conducted By: Rick Pagan		Calculated By: Rick Pagan		Checked By:	

El Paso Natural Gas Co
 Cooper Fed. #1 (Morro.)
 K 21-24-36 Lea Co.
 Aof 3,393 mcf/d $n = .772$

11-11 / 11-15



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

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

COMPANY EPNG LEASE Copper field WELL NO. 1 DATE 11-11 / 11-15

LOCATION: Unit K Section 21 Township 24 Range 36

L. 11331 H. 11331 L/H 1.000 G^m .630 %CO₂ %N₂ %H₂S

d 2.44 F_i 0.0263 Q_m 1.239 M_{cid} (L/H) (F_iQ_m)² .000178 P_{ci} 670 T_{cr} 368

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	5665.5		11331						
2	GH		0	3569.27		7138.53						
3	37.5GII		0	133847		267695						
4	P _c or P _n		3008.2	3503.9	3496.4	3983.2	3978.9					
5	P _i		4.47	5.23	5.22	5.35	5.93					
6	T		534	523	523	612	612					
7	T _i		1.45	1.56	1.56	1.66	1.66					
8	Z		.763	.854	.854	.915	.914					
9	P/2 P/2	$\bar{P} = 8$	3942.6	4103.0	4094.1	4353.8	4348.9					
10	P/TZ	$\bar{P} = 6$	23831	21605	21451	21140	21060					
11	(P/TZ) ² /1000	$(11)^2/1000$	.054511	.051272	.051052	.050609	.050495					
12	L/H(F _i Q _m) ²		.000178	.000178	.000178	.000178	.000178					
13		$\bar{I}1 + \bar{I}2$	.054689	.051450	.051230	.050788	.050623					
14	I _n	$\bar{I}0 = \bar{I}3$	135.002	139.173	139.471	140.075	140.232					
15	N=P _n -P _{n-1}		496	488	487	478						
16	N=I _n +I _{n-1}		274.175	274.423	279.546	279.703						
17	M x N	$\bar{I}5 \times \bar{I}6$		133943		133698						
18	Σ(M x N)	Σ $\bar{I}7$		133752		133997						

P_s = 3972.2

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

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

COMPANY EPNG LEASE Copper WELL NO. 1 DATE 11-11/11-15

LOCATION: Unit 4 Section 21 Township 24 Range 36

L 11331 H 11331 L/H 1.000 GPH 1330 % CO₂ 0 % N₂ 0 % H₂S 0
d 2.441 F_r .010763 Q_m C M₂ cfd (L/H) (F_r Q_m)² 0 P_{cr} 670 T_{cr} 568

TABLE IN B & TABLE IN B & TABLE IN B &

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		11331	5665.5		0						
2	GH		7138.53	3569.29		0						
3	37.5GH		267695	133847		0						
4	P _c or P _n		3922.2	349220	3495.5	3019.2	3009.0	3009.5				
5	P _f		5.93	5.22	5.22	4.51	4.49	4.49				
6	T		612	523	523	534	534	534				
7	T _r		1.66	1.56	1.56	1.45	1.45	1.45				
8	Z		.914	.854	.854	.763	.762	.762				
9	P/2 P/2		4346.0	4094.8	4093.0	39520	3948.8	3949.5				
10	P/TZ		71612	71463	71432	71101	713948	73960				
11	(P/TZ) ² /1000	(11) ² /1000										
12	L/H(F _r Q _m) ²											
13		I ₁ + I ₂										
14	I _n	I ₀ + I ₃	140.821	139933	139994	134951	135230	135208				
15	M = P _n - P _{n-1}		475	477	476	486	486	486				
16	N = I _n + I _{n-1}		280754	280815	274945	275224	275202					
17	M x N	15 x 16	133949	133949								
18	Σ (M x N)	Σ I ₇	133746									

P_w = 3011.6

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

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

COMPANY EPNG LEASE Copper WELL NO. 1 DATE 11-11/11-15

LOCATION: Unit K Section 21 Township 24 Range 36

L 11331 H 11331 L/H 1.000 G_m¹ 6.30 % CO₂ _____ % N₂ _____ % H₂S _____

d 2441 F_r 0.0763 Q_m 1.736 M₂cid (L/H) (F_rQ_m)² .000349 P_{cr} 670 T_{cr} 368

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	5665.5		11331						
2	GH		0	3569.27		7138.53						
3	37.5GHI		0	133847		267645						
4	P _c or P _n		2698.8	3154.3	3148.6	3598.5	3592.9		P _s = 3590.3			
5	P _f		4.03	4.71	4.70	5.37	5.36					
6	T		534	523	573	612	612					
7	T _f		145	1.56	1.56	1.66	1.66					
8	Z		747	.835	.835	.892	.891					
9	P/Z P/Z		3612.0	3777.6	3770.2	4034.2	4032.4					
10	P/TZ		1.7641	6.5928	6.5802	6.5919	6.5889					
11	(P/TZ) ² /1000		.045754	.043444	.043306	.043453	.043414					
12	L/H(F _r Q _m) ²		.000349	.000349	.000349	.000349	.000349					
13			.046103	.043813	.043655	.043802	.043763					
14	I _n		146.719	150.475	150.745	150.494	150.554					
15	N=P _n -P _{n-1}			456	450	450	444					
16	N=I _n +I _{n-1}			292.194	292.464	301.239	301.304					
17	M x N				133859		133779					
18	Σ(M x N)				133836		133916					

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

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

2nd

COMPANY EPNLG LEASE Copee 2nd WELL NO. 1 DATE 11-11/11-15
 LOCATION: Unit K Section 21 Township 24 Range 36
11331 H 11331 L/H 1.000 G^mx 1.630 % CO₂ 0 % N₂ 0 % H₂S 0
 d 2441 F_t 0.010763 Q_m 0 M₂cid (L/H) (F_tQ_m)² 0 P_{cr} 670 T_{cr} 368
TABLE 18 & 8

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		11331	5665.5		0						
2	GH		7138.53	3569.27		0						
3	37.5GH		267625	133842		0						
4	P _c or P _n		3590.3	3149.7	3149.7	2709.5	2702.6	2703.2				
5	P _t		5.36	4.70	4.70	4.04	4.03	4.03				
6	T		612	573	573	534	534	534				
7	T _r		1.66	1.56	1.56	1.45	1.45	1.45				
8	Z		1.891	.835	.835	.747	.747	.747				
9	P/Z P/Z		4029.5	3722.1	3722.1	3622.2	3618.0	3618.8				
10	P/TZ		6.5842	6.5830	6.5831	6.7925	6.7753	6.7767				
11	(P/TZ)/2/1000											
12	L/H(F _t Q _m) ²											
13												
14	I _n		151.879	151.907	151.905	147.222	147.595	147.565				
15	M=I _n -P _n ⁻¹		441	441	441	440	447	446				
16	N=I _n +I _n -1		303.786	303.784	303.784	299.127	299.500	299.470				
17	M x N		15 x 16	133969	133969			133564				
18	Σ(M x N)		ΣI _n	133726	133726							

WORK SHEET FOR STEPWISE CALCULATION

(SUBSURFACE) PRESSURE (P_f & P_s) 3rd
 (SURFACE) ——— (P_c & P_m) ———

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

COMPANY EPNG LEASE Cooper field WELL NO. 1 DATE 11-11/11-15

LOCATION: Unit 8 Section 21 Township 24 Range 36

L 11331 H 11331 L/H 1.000 G^m_L 630 %CO₂ _____ %N₂ _____ %H₂S _____

d 2441 F_f .010763 Q_m 2.215 M²ctd (L/H) (F_fQ_m)² .000568 P_{cr} 670 T_{cr} 368

TABLE 12 & 13

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	5665.5		11331						
2	GHI		0	3569.27		7138.53						
3	37.5GHI		0	133847		267695						
4	P _c or P _n		2236.2	2621.6	2619.7	3003.4	3055.8		P _s = <u>3003.2</u>			
5	P _f		3,34	3,91	3,91	4,48	4,49					
6	T		534	573	573	612	612					
7	T _r		1,45	1,56	1,56	1,66	1,66					
8	Z		.740	.812	.812	.856	.856					
9	P/2 P/2		3021.9	3208.9	3206.5	3508.7	3511.5					
10	P/TZ		5.6590	5.6001	5.5959	5.7331	5.7372					
11	(P/TZ) ² /1000	(10) ² /100	.032024	.031361	.031315	.032869	.032921					
12	L/H(F _f Q _m) ²		.000568	.000568	.000568	.000568	.000568					
13		II + I ₂	.032592	.031929	.031883	.033436	.033489					
14	I _n	I ₀ + I ₃	123.632	125.392	125.516	171.463	171.331					
15	N = P _n · P _n ⁻¹			385	383	384	386					
16	N = I _n + I _n ⁻¹			349.024	349.148	346.979	346.847					
17	M × N	I ₅ × I ₆		133724		133883						
18	Σ (M × N)	Σ I ₇		133971		133812						

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

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

COMPANY EPNG LEASE Cooper Std. WELL NO. 1 DATE 11-11/11-15

LOCATION: Unit K Section 21 Township 24 Range 36

L 11331 H 11331 L/H 1.000 G^m/L 1.630 %CO₂ _____ %N₂ _____ %H₂S _____

d 2.441 F_i .010763 Q_m _____ O _____ M²ctd (L/H) (F_iQ_m)² _____ O _____ P_{cr} 170 T_{cr} 368

TABLE IN B K

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		11331	5665.5		0						
2	GH		2138.53	3569.27		0						
3	37.5GHI		2676.95	133847		0						
4	P _c or P _n		3003.2	2620.4	2624.6	2245.7	2246.9	2246.8				
5	P _i		4.48	3.91	3.92	3.35	3.35	3.35				
6	T		612	573	573	534	534	534				
7	T _i		1.66	1.56	1.56	1.45	1.45	1.45				
8	Z		.858	.812	.812	.740	.740	.740				
9	P/Z P/Z		3.500.2	3.202.4	3.212.4	3.034.7	3.036.3	3.036.2				
10	P/TZ		5.719.3	5.592.5	5.606.3	5.683.0	5.686.0	5.685.2				
11	(P/TZ) ² /1000	(i) ² /1000										
12	L/H(F _i Q _m) ²											
13		i _i + i ₂										
14	I _n	i ₀ + i ₃	174.844	178.650	178.369	175.964	175.871	175.879				
15	M = P _n - P _{n-1}		383	379	379	378	378	378				
16	N = I _n + I _{n-1}		353496	353.215	354.333	354.240	354.248	354.248				
17	M x N	15 x i ₆										
18	Σ (M x N)	Σ i ₇										

P_u = 2248.6

WORK SHEET FOR STEPWISE CALCULATION

(SUBSURFACE) PRESSURE (P_f & P_s)
(SURFACE) (P_c & P_w)

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

COMPANY

EPNG

LEASE

Cooper

WELL NO.

1

DATE

11-11 / 11-15

LOCATION: Unit

K

Section

21

Township

24

Range

36

L. 11331

H. 11331

L/H

1.000

G^{m/h}

6.30

% CO₂

% N₂

% H₂S

d 2441 F_r .01076 Q_m 2.6665

M₂cid

(L/H) (F_rQ_m)²

.000823

P_{cr}

670

T_{cr}

358

TABLE IN B.4

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	5165.5		11331						
2	GH		0	3569.27		7138.53						
3	37.5GH		0	133847		267695						
4	P _c or P _n		1808.2	2120.3	2121.0	2433.6	2438.8					
5	P _f		2.70	3.16	3.17	3.63	3.64					
6	T		534	573	573	612	612					
7	T _r		1.45	1.56	1.56	1.66	1.66					
8	Z		.256	.822	.822	1.857	.857					
9	P/2 P/Z		2391.8	2579.4	2580.3	2839.7	2845.7					
10	P/TZ		4.4790	4.5015	4.5031	4.6401	4.6498					
11	(P/TZ) ² /1000		.020062	.020264	.020278	.021530	.021621					
12	L/H(F _r Q _m) ²		.000823	.000823	.000823	.000823	.000823					
13			.020885	.021087	.021101	.022353	.022444					
14	I _n		214464	213474	213405	202580	202174					
15	M=P _n -P _{n-1}			312	313	313	318					
16	N=I _n +I _{n-1}			427938	427869	420985	420579					
17	M x N			133923		133744						
18	Σ(M x N)			133772		133951						

P_s = 2437.9

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

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

4th.

COMPANY EPNG LEASE Cooper Field WELL NO. 1 DATE 11-11/11-15

LOCATION: Unit 6 Section 21 Township 24 Range 36

L 11331 H 11331 L/H 1.000 G^{m/h} 1.630 % CO₂ 0 % N₂ 0 % H₂S 0

d 2.441 F₁ 0.010763 Q_m 0 M²cid (L/H) (F₁Q_m)² 0 P_{cr} 620 T_{cr} 358

TABLE 18 & 19

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		11331	5665.5		0						
2	GH		7138.53	3569.29		0						
3	37.5GH		2676.85	1338.47		0						
4	P _c or P _n		2432.9	2126.8	2131.3	1824.2	1828.2	1822.9				
5	P _i		3.64	3.12	3.18	2.72	2.73	2.73				
6	T		6.12	5.23	5.23	5.34	5.34	5.34				
7	T _r		1.66	1.56	1.56	1.45	1.45	1.45				
8	Z		1.852	1.822	1.821	1.755	1.755	1.755				
9	P/2 P/2		2844.7	2582.4	2596.0	2416.1	2421.5	2421.1				
10	P/TZ		4.6482	4.5155	4.5306	4.5245	4.5342	4.5338				
11	(P/TZ) ² /1000	(10) ² /1001										
12	L/H(F ₁ Q _m) ²											
13		I ₁ + I ₂										
14	I _n	I ₀ ÷ I ₃	2151.38	221.459	220.723	221.017	220.523	220.565				
15	M = P _n · P _n ⁻¹		311	307	307	307	303	303				
16	N = I _n + I _n -1		436.597	435.961	441.740	441.246	441.288					
17	M × N	15 × 16			133809			133710				
18	Σ(M × N)	Σ17			133886							

P_w = 1828.9