

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

Form C-122
Revised 9-1-65

RECEIVED

Type Test ☒ Initial ☐ Annual ☐ Special		Test Date 1-22-81		JAN 30 1981	
Company GULF OIL EXPLORATION		Connection AIR		Unit G	
Well DIAMOND MOUND MOUND UNDESIGNATED		Formation DIAMOND MOUND UNDESIGNATED ATOKA		Field or Lease Name CALLAWAY FEDERAL	
Completion Date 1-19-81		Total Depth 9100		Elevation 3592 GL	
Casing Size 5 1/2	Wt. 15.5-17#	Set At 9100	Perforations: From 8914 To 9047		Well No. # 2
Tubing Size 2 7/8	Wt. 6.5	Set At 8846	Perforations: From To		Unit Sec. Twp. Rge. 6 16s 28e
Type Well - Single - Headhead - G.G. or G.O. Multiple SINGLE GAS WELL			Packer Set At 8846		County EDDY
Producing Thru TUBING		Reservoir Temp. °F 162° 8846	Mean Annual Temp. °F 60°	Boro. Press. - P _a 13.2	State NEW MEXICO
L 8846	R 8846	Cg .6387	% CO ₂ .363	% N ₂ .590	% H ₂ S Prover
Meter Run 4"		Flange 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	
5.							2500				72 hr
1.	4 X 2.250			600	2.5	74	2380				30 min
2.	4 X 2.250			610	9.0	74	2285				45 min
3.	4 X 2.250			620	45.0	58	2240				1hr/30min
4.	4 X 2.250			750	69.0	58	2120				1 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. Compens. Factor, Fpv	Rate of Flow Q, Mcfd
1	25 .64	39.15	613.2	.9868	1.251	1.057	1310
2	25 .64	74.89	623.2	.9868	1.251	1.058	2508
3	25 .64	168.80	633.2	1.002	1.251	1.076	5838
4	25 .64	229.47	763.2	1.002	1.251	1.083	7988
5.							

NO.	P _r	Temp. °R	T _r	Z	Gas Liquid Hydrocarbon Ratio	A.P.L. Gravity of Liquid Hydrocarbons	Specific Gravity Separator Gas	Specific Gravity Flowing Fluid	Critical Pressure	Critical Temperature
1	.92	534	1.44	.895	59.953	59 @ 60°	.6387	X X X X X X X X	670	372
2	.93	534	1.44	.894				X X X X X		
3	1.06	518	1.39	.864						
4	1.14	518	1.39	.853						
5.										

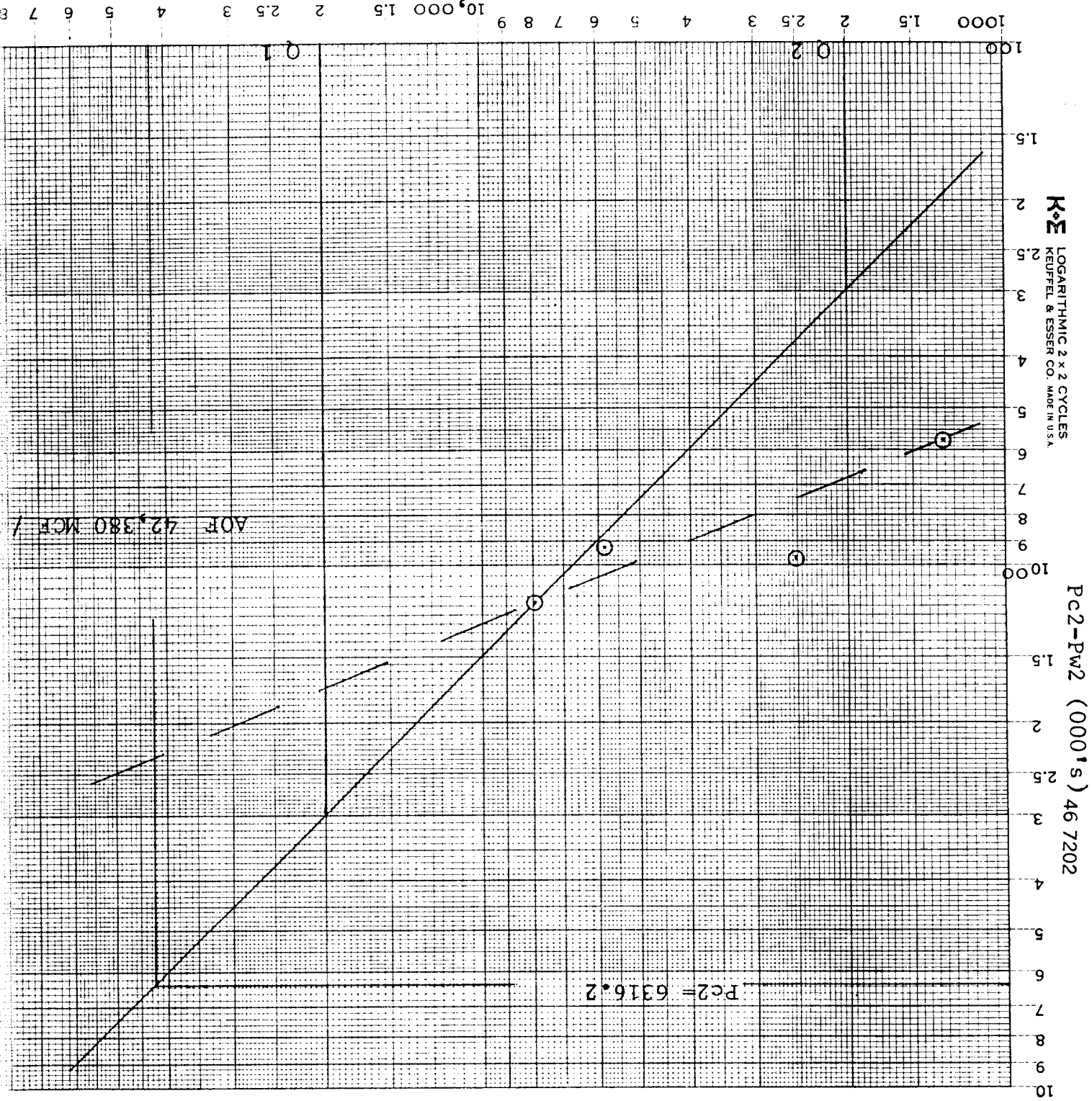
NO.	P _r ²	P _w ²	P _w ²	P _r ² - P _w ²	(1) $\frac{P_r^2}{P_r^2 - P_w^2} =$	(2) $\left[\frac{P_r^2}{P_r^2 - P_w^2} \right]^n =$
1	2513.2	6316.2			5.306	5.306
2						
3						
4						
5						

Absolute Open Flow		42,380		Mcfd @ 15.025		Angle of Slope @ 45°		Slope, n 1.000	
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Remarks: THE WELL PRODUCED 13.4 bbls. OF DISTILLATE DURING THE TEST.

Approved By Consultant:	Conducted By:	Calculated By:	Checked By:
	DAVIS SERVICES INC.	RICK PAGAN	

COMPANY : GULF OIL EXPLORATION & PRODUCTION
 LEASE : CALLAWAY FEDI L
 WELL NO. : # 2
 UNIT : G / sec.6/twp.16s/rge.28e
 COUNTY : EDDY
 STATE : NEW MEXICO
 DATE : JANUARY 22, 1981



Q = MCF / DAY
 Q 1 = 20,000; LOG OF Q 1 = 4.301030
 Q 2 = 2,000; LOG OF Q 2 = 3.301030
 N = 1.000
 θ = 45°

NEW-TEX LAB

P. O. BOX 1161
HOBBS, N.M. 88240

No. 4428
Run No. _____
Date of Run 1-23-81
Date Secured 1-22-81

CERTIFICATE OF ANALYSIS

A Sample of Gulf Exploration Calloway Federal #1
Secured from Davis Services
At Box 2033 Secured by _____
Hobbs, NM 88240 Time _____ Date _____
Sampling conditions _____ Press _____
Temp. _____

FRACTIONAL ANALYSIS

Percentage Composition

MOL % LIQ. % G.P.M.

Carbon Dioxide	.363	
Air		
Nitrogen	.590	
Oxygen		
Hydrogen sulfide		
Hydrogen		
Methane	88.917	
Ethane	6.319	1.685
Propane	2.387	.655
Butanes		
Iso-Butane	.245	.080
N-Butane	.602	.189
Pentanes		
Iso-Pentane	.165	.060
N-Pentane	.163	.059
Hexanes	.071	.029
Heptanes	.178	.082
Octanes		
TOTAL	100.000	2.839

Calc. Sp. Gr. — 0.6387

Calc. A.P.I. — _____

Calc. Vapor Press. — _____

Sp. Gr. _____

Mol. Wt. 18.51

LIQUID CONTENT (GAL./MCF)

Propane Calc. G.P.M. .655

Butanes Calc. G.P.M. .269

Pentanes Plus. G.P.M. .230

Ethane Calc. G.P.M. 1.685

_____ RVP Gasoline G.P.M. _____

B.T.U./Cu. Ft. @ 14.696 P.S.I.A.

Dry Basis 1124

Wet Basis 1104

Sulfur Analysis by Titration

Gr./100 Cu. Ft.

Hydrogen Sulfide _____

Mercaptans _____

Sulfides _____

Residual Sulfur _____

Total Sulfur _____

Run by Deane Simpson Checked by _____ Approved by Deane Simpson

Additional Data and Remarks

(SUBJECT AREA)
PRESSURE
(P-R-W)

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

LOCATION: Unit _____ G _____ Section _____ 6 _____ Township _____ 16s _____ Range _____ 28e _____

L	8846	H	8846	L/H	1.000	G mix	6864	% CO ₂	363	% N ₂	590	% H ₂ S
d	2.441	F _r	0.10763	M ² cfd	(L/H) (F _r Q _m) ²	0.000199	P _{cr}	669	T _{cr}	388	TABLE IX & X	

$$d \quad 2.441 \quad F_f \quad 0.01076_H \quad 1.310 \quad M^2_{\text{cfd}} \quad (L/H) \quad (F_f Q_m)^2 \quad P_{\text{cr}} \quad \frac{669}{\text{TABLE IX \& X}} \quad T_{\text{cr}} \quad 388 \quad \text{TABLE}$$

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	4423		8846						
2	GH		0	3035.9		6071.9						
3	37.5GH		0	113848		227696						
4	P _c or P _n		2393.2	2757.4	2750.4	3106.6	3096.3		Ps=	3094.5		
5	P _r		3.58	4.12	4.11	4.64	4.63					
6	T		534	578	578	622	622					
7	T _r		1.38	1.49	1.49	1.60	1.60					
8	Z		.704	.779	.779	.833	.833					
9	P/Z P/Z	4÷8	3399.4	3539.6	3530.6	3729.4	3717.0					
10	P/TZ	9÷6	6.3660	6.1239	6.1084	5.9959	5.9759					
11	(P/TZ) ² /1000	(10) ² /1000	.040526	.037502	.037312	.035951	.035712					
12	L/H(F _r Q _m) ²		.000199	.000199	.000199	.000199	.000199					
13		I ₁ + I ₂	.040725	.037701	.037511	.036150	.035911					
14	I _n	I ₀ ÷I ₃	156.316	162.433	162.842	165.861	166.409					
15	M=P _n -P _{n-1}			364	357	356	346					
16	N=I _n + I _{n-1}			318.750	319.159	328.704	329.252					
17	M x N	I ₅ x I ₆			113994		113891					
18	Σ (M x N)	Σ I ₇			113702							

(SUBSURFACE) PRESSURE (P_f & P_s) 2 nd
(Surface) (P_f & P_s)

WORK SHEET FOR STEPWISE CALCULATION

COMPANY GULF OIL EXPLORATION NEASE CALLAWAY FEDERAL WELL NO. # 2 DATE JANUARY 22, 1981

LOCATION: Unit G Section 6 Township 16s Range 28e

8846 H 8846 L/H 1.000 G mix .6864 % CO₂ .363 % N₂ .590 % H₂S

d 2.441 F_r .010763 2.508 M² cfd (L/H) (F_r Q_m)² .000729 P_{cr} .669 T_{cr} 388

TABLE 11 & 12

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	4423		8846						
2	GH		0	3035.9		6071.9						
3	37.5GH		0	113848		227696						
4	P _c or P _n		2298.2	2653.5	2647.8	2996.8	2988.4		P _s = 2986.9			
5	P _r		3.44	3.97	3.96	4.48	4.47					
6	T		534	578	578	622	622					
7	T _r		1.38	1.49	1.49	1.60	1.60					
8	Z		.703	.775	.775	.828	.828					
9	P/Z P/Z	4=8	3269.1	3423.8	3416.6	3619.3	3609.2					
10	P/TZ	9=5	6.1220	5.9236	5.9110	5.8188	5.8025					
11	(P/TZ) ² /1000	(10) 2/1000	.037479	.035089	.034940	.033858	.033669					
12	L/H(F _r Q _m) ²		.000729	.000729	.000729	.000729	.000729					
13		11+12	.038208	.035818	.035669	.034587	.034398					
14	I _n	10-13	160.227	165.380	165.719	168.236	168.688					
15	M=P _n -P _{n-1}			355	350	349	341					
16	N=I _n +I _{n-1}			325.608	325.947	333.955	334.407					
17	M x N	15x16			113967		113883					
18	Σ(M x N)	Σ17			113729							

3 rd

(P_f & P_s)
PRESSURE (P_f & P_s)

(SUBSURFACE)
(SURFACE)

WORK SHEET FOR STEPWISE CALCULATION

COMPANY GULF OIL EXPLORATION CALLAWAY FEDERAL WELL NO. # 2 DATE JANUARY 22, 1981

LOCATION: Unit G Section 6 Township 16s Range 28e

8846 H 8846 L/H 1.000 G mix 6864 % CO₂ 363 % N₂ 590 % H₂S

d 2.441 F_r 0.10703 5.838 M²cid (L/H) (F_rQ_m)² 0.003948 P_{cr} 669 T_{cr} 388

TABLE 18 & 19

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	4423		8846						
2	GH		0	3035.9		6071.9						
3	37.5GH		0	113848		227696						
4	P _z or P _n		2253.2	2632.7	2629.3	3005.1	3000.5		Ps=	2999.5		
5	P _r		3.37	3.94	3.94	4.49	4.49					
6	T		534	578	578	622	622					
7	T _r		1.38	1.49	1.49	1.60	1.60					
8	Z		.702	.775	.775	.829	.829					
9	P/Z P/Z	4-8	3209.7	3397.1	3392.7	3625.0	3619.4					
10	P/TZ	9-6	6.0106	5.8773	5.8697	5.8279	5.8190					
11	(P/TZ) ² /1000	(10) ² /1000	.036128	.034543	.034454	.033965	.033861					
12	L/H(F _r Q _m) ²		.003948	.003948	.003948	.003948	.003948					
13		11+12	.040076	.038491	.038402	.037913	.037809					
14	I _n	10-13	149.981	152.693	152.849	153.718	153.906					
15	M=P _n -P _{n-1}			380	376	376	371					
16	N=I _n +I _{n-1}			302.674	302.831	306.567	306.755					
17	M x N	15x16			113907		113859					
18	Σ (M x N)	Σ 17			113789							

(SUBSURFACE) PRESSURE (P₁ & P₂) 4th
(SURFACE) (P₁ & P₂)

WORK SHEET FOR STEPWISE CALCULATION

COMPANY GULF OIL EXPLORATION NEASE CALLAWAY FEDERAL WELL NO. # 2 DATE JANUARY 22, 1981

LOCATION: Unit G Section 6 Township 16S Range 28E

8846 H 8846 L/H 1.000 G mix 6864 % CO₂ 363 % N₂ 590 % H₂S

2.441 F_r 0.1076 7.988 M²ctd (L/H) (F_rQ_m)² P_{cr} 669 T_{cr} 388

TABLE 12 B 1

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	4423		8846						
2	GH		0	3035.9		6071.9						
3	37.5GH		0	113848		227696						
4	P _c or P _n		2133.2	2530.7	2530.3	2927.4	2927.7		Ps=	2927.4		
5	P _r		3.19	3.78	3.78	4.38	4.38					
6	T		534	578	578	622	622					
7	T _r		1.38	1.49	1.49	1.60	1.60					
8	Z		.703	.773	.773	.826	.826					
9	P/Z P/Z	4-8	3034.4	3273.9	3273.4	3544.1	3544.5					
10	P/TZ	9-6	5.6824	5.6642	5.6633	5.6978	5.6985					
11	(P/TZ) ² /1000 (10) ² /1000		.032290	.032083	.032073	.032465	.032473					
12	L/H(F _r Q _m) ²		.007392	.007392	.007392	.007392	.007392					
13		11 + 12	.039682	.039475	.039465	.039857	.039865					
14	I _n	10 + 13	143.199	143.487	143.501	142.957	142.945					
15	M=P _n ·P _n ⁻¹			398	397	.397	397					
16	N=I _n + I _n -1			286.687	286.701	286.458	286.446					
17	M x N	15 x 16			113853		113838					
18	Σ (M x N)	Σ 17			113843							

WORK SHEET FOR STEPWISE CALCULATION

(SURFACE) PRESSURE (P_c & P_w)

1 ST

COMPANY GULF OIL EXPLORATION NEASE CALLAWAY FEDERAL WELL NO. # 2 DATE JANUARY 22, 1981LOCATION: Unit G Section 6 Township 16S Range 28E8846 H 8846 L/H 1.000 G mix 6864 % CO₂ 363 % N₂ 590 % H₂Sd 2.441 F_r .010763 0 M²cfd (L/H) (F_rQ_m)² 0 P_{cr} 669 T_{cr} 388

TABLE 12.5.1

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		8846	4423		0						
2	GH		6071.9	3035.9		0						
3	37.5GH		227696	113848		0						
4	P_c or P_n		3094.5	2754.5	2750.4	2406.9	2395.3	2395.7		Pw=	2396.9	
5	P_r		4.63	4.12	4.11	3.60	3.58	3.58				
6	T		622	578	578	534	534	534				
7	T_r		1.60	1.49	1.49	1.38	1.38	1.38				
8	Z		.833	.779	.779	.706	.704	.704				
9	P/Z P/Z	4-8	3714.9	3536.0	3530.7	3409.2	3402.4	3402.9				
10	P/TZ	9-6	5.9225	6.1176	6.1085	6.3843	6.3716	6.3725				
11	$(P/TZ)^2/1000$	(10) 2/1000										
12	$L/H(F_rQ_m)^2$											
13	$I_1 + I_2$											
14	I_n	10-13	167.434	163.463	163.707	156.633	156.946	156.924				
15	$M = P_n - P_{n-1}$			340	344	344	355	355				
16	$N = I_n + I_{n-1}$			330.896	331.141	320.340	320.653	320.632				
17	$M \times N$	15x16			113932			113756				
18	$\Sigma(M \times N)$	$\Sigma 17$			113764							

COMPANY GULF OIL EXPLORATION EASE CALLAWAY FEDERAL WELL NO. # 2 DATE JANUARY 22, 1981

LOCATION: Unit G Section 6 Township 16S Range 28E

8846 H 8846 L/H 1.000 G mix 6864 % CO₂ 363 % N₂ 590 % H₂S

d 2.441 F_r 0.010703 0 M²cfd (L/H) (F_rQ_m)² 0 P_{cr} 669 T_{cr} 388

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		8846	4423		0						
2	GH		6071.9	3035.9		0						
3	37.5GH		227696	113848		0						
4	P _c or P _n		2986.9	2656.4	2652.9	2319.3	2308.9	2309.6		P _w =	2310.7	
5	P _r		4.46	3.97	3.97	3.47	3.45	3.45				
6	T		622	578	578	534	534	534				
7	T _r		1.60	1.49	1.49	1.38	1.38	1.38				
8	Z		.827	.775	.775	.703	.703	.703				
9	P/Z P/Z	$\frac{4}{8}$	3611.7	3427.6	3423.1	3299.2	3284.3	3285.4				
10	P/TZ	$\frac{9}{6}$	5.8066	5.9301	5.9223	6.1782	6.1504	6.1524				
11	(P/TZ) ² /1000	$(\frac{10}{10})^2/1000$										
12	L/H(F _r Q _m) ²											
13	$\frac{1}{1} + \frac{1}{2}$											
14	I _n	$\frac{10}{13}$	172.219	168.630	168.853	161.860	162.590	162.538				
15	M=P _n ·P _n ⁻¹			331	334	334	344	343				
16	N=I _n +I _n ⁻¹			340.849	341.072	330.712	331.443	331.391				
17	M x N	$\frac{15}{16}$			113922			113756				
18	Σ(M x N)	Σ $\frac{17}{17}$			113774							

WORK SHEET FOR STEPWISE CALCULATION

(SURFACE) PRESSURE (P_c & P_w) 3 rd

COMPANY GULF OIL EXPLORATION CALLAWAY FEDERAL WELL NO. # 2 DATE JANUARY 22, 1981

LOCATION: Unit G Section 6 Township 16S Range 28E

8846 H 8846 L/H 1.000 G mix 6864 % CO₂ 363 % N₂ 590 % H₂S

d 2.441 F_r 0.010763 0 M²cfd (L/H) (F_rQ_m)² 0 P_{cr} 669 T_{cr} 388

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		8846	4423		0						
2	GH		6071.9	3035.9		0						
3	37.5GH		227696	113848		0						
4	P _c or P _n		2995.5	2668.0	2664.5	2329.9	2319.4	2319.9		P _w = 2321.1		
5	P _r		4.48	3.99	3.98	3.48	3.47	3.47				
6	T		622	578	578	534	534	534				
7	T _r		1.60	1.49	1.49	1.38	1.38	1.38				
8	Z		.828	.776	.776	.704	.703	.703				
9	P/Z P/Z	4÷8	3622.6	3438.1	3433.6	3309.5	3299.3	3200.0				
10	P/TZ	9÷6	5.8241	5.9483	5.9405	6.1975	6.1784	6.1798				
11	(P/TZ) ² /1000 (10) ² /1000											
12	L/H(F _r Q _m) ²											
13	11 + 12											
14	I _n	10÷13	171.700	168.115	168.335	161.356	161.854	161.817				
15	M=P _n ·P _n ⁻¹			332	335	335	345	345				
16	N=I _n + I _n -1			339.815	340.036	329.692	330.189	330.152				
17	M x N	15 x 16			113922			113761				
18	Σ (M x N)	Σ 17			113774							

TABLE 15 & 16

COMPANY GULF OIL EXPLORATION CALLAWAY FEDERAL WELL NO. # 2 DATE JANUARY 22, 1981

LOCATION: Unit G Section 6 Township 16S Range 28E

8846 H 8846 L/H 1.000 G mix 6864 % CO₂ 363 % N₂ 590 % H₂S

d 2.441 F_r 0.010763 0 M²cf/d (L/H) (F_rQ_m)² 0 P_{cr} 669 T_{cr} 388

TABLE 18 B 3

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		8846	4423		0						
2	GH		6071.9	3035.9		0						
3	37.5GH		227696	113848		0						
4	P _c or P _n		2927.4	2603.1	2599.7	2272.3	2262.3	2263.1		P _w =	2264.0	
5	P _r		4.38	3.89	3.89	3.40	3.38	3.38				
6	T		622	578	578	534	534	534				
7	T _r		1.60	1.49	1.49	1.38	1.38	1.38				
8	Z		.826	.774	.774	.703	.703	.703				
9	P/Z P/Z	4÷8	3544.1	3363.1	3358.7	3232.3	3218.1	3219.2				
10	P/TZ	9÷6	5.6979	5.8185	5.8109	6.0531	6.0265	6.0284				
11	(P/TZ) ² /1000	(10) 2/1000										
12	L/H(F _r Q _m) ²											
13	I ₁ + I ₂											
14	I _n	10÷13	175.502	171.867	172.092	165.204	165.933	165.881				
15	M=P _n ·P _n ⁻¹			324	328	327	337	337				
16	N=I _n + I _{n-1}			347.369	347.594	337.296	338.024	337.973				
17	M x N	15 x 16			113922			113757				
18	Σ (M x N)	Σ 17			113774							