

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

Form C-122
 Revised 9-1-65

Type Test ☒ Initial ☐ Annual ☐ Special					Test Date 11-5-80	
Company WESTERN OIL PRODUCERS				Connection NATURAL GAS PIPELINE		
Pool MALJAMAR PENN				Formation MORROW		Unit M
Completion Date 10-24-80		Total Depth 13628		Plug Back To		Elevation
Date of Lease Term AMOCO STATE						
Csg. Size 5 1/2	Wt. d	Set At 13600	Perforations: From 13480 To 13490		Well No. 1	
Tub. Size 2 3/8	Wt. d	Set At 13460	Perforations: From To		Unit Sec. Twp. Rge. M 28 16s 33e	
Type Well - Single - Prodenhead - G.G. or G.O. Multiple SINGLE GAS				Packer Set At 13460		County LEA
Producing Thru TBG.		Reservoir Temp. °F 209 @ 13460	Mean Annual Temp. °F 60	Baro. Press. - P _a 13.2		State NEW MEXICO
L 13460	H 13460	G _g .7259	% CO ₂ .509	% N ₂ 1.192	% H ₂ S	Prover
					Meter Run 4"	Pipe FLG.

FLOW DATA							TUBING DATA		CASING DATA		Duration of Flow
NO.	Prover Line Size	X	Orifice Size	Press. p.s.i.g.	Diff. hw	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	
SI							4950				24 HR
1.	4	X	1.000	563	4.0	84	2900				1 "
2.	4	X	1.000	563	25.0	115	2725				1 "
3.	4	X	1.000	565	40.0	122	2400				1 "
4.	4	X	1.000	570	42.3	110	2025				1 "
5.											

RATE OF FLOW CALCULATIONS							
NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P _m	Flow Temp. Factor F _L	Gravity Factor F _g	Super Compress. Factor, F _{pv}	Rate of Flow Q, Mfd
1	4.753	48.01	576.2	.9777	1.174	1.067	279
2	4.753	120.02	576.2	.9510	1.174	1.055	672
3	4.753	152.08	578.2	.9452	1.174	1.052	844
4	4.753	157.06	583.2	.9551	1.174	1.056	884
5							

NO.	P _r	Temp. °R	T _r	Z	Gas Liquid Hydrocarbon Ratio	Mcf/bbl.
1.	.86	544	1.36	.878	28.622	
2.	.86	575	1.43	.899	52.1 @ 600	
3.	.87	582	1.45	.903	.7259	
4.	.87	570	1.42	.896		
5.						

NO.	P _r	P _w	P _w ²	P _r ² - P _w ²	(1) $\frac{P_r^2}{P_r^2 - P_w^2} = 1.205$	(2) $\left[\frac{P_r^2}{P_r^2 - P_w^2} \right]^n = 1.205$
1		2915.3	8499.0	16134.4		
2		2742.9	7523.5	17109.9		
3		2420.0	5856.4	18777.0		
4		2046.8	4189.4	20444.0		
5						

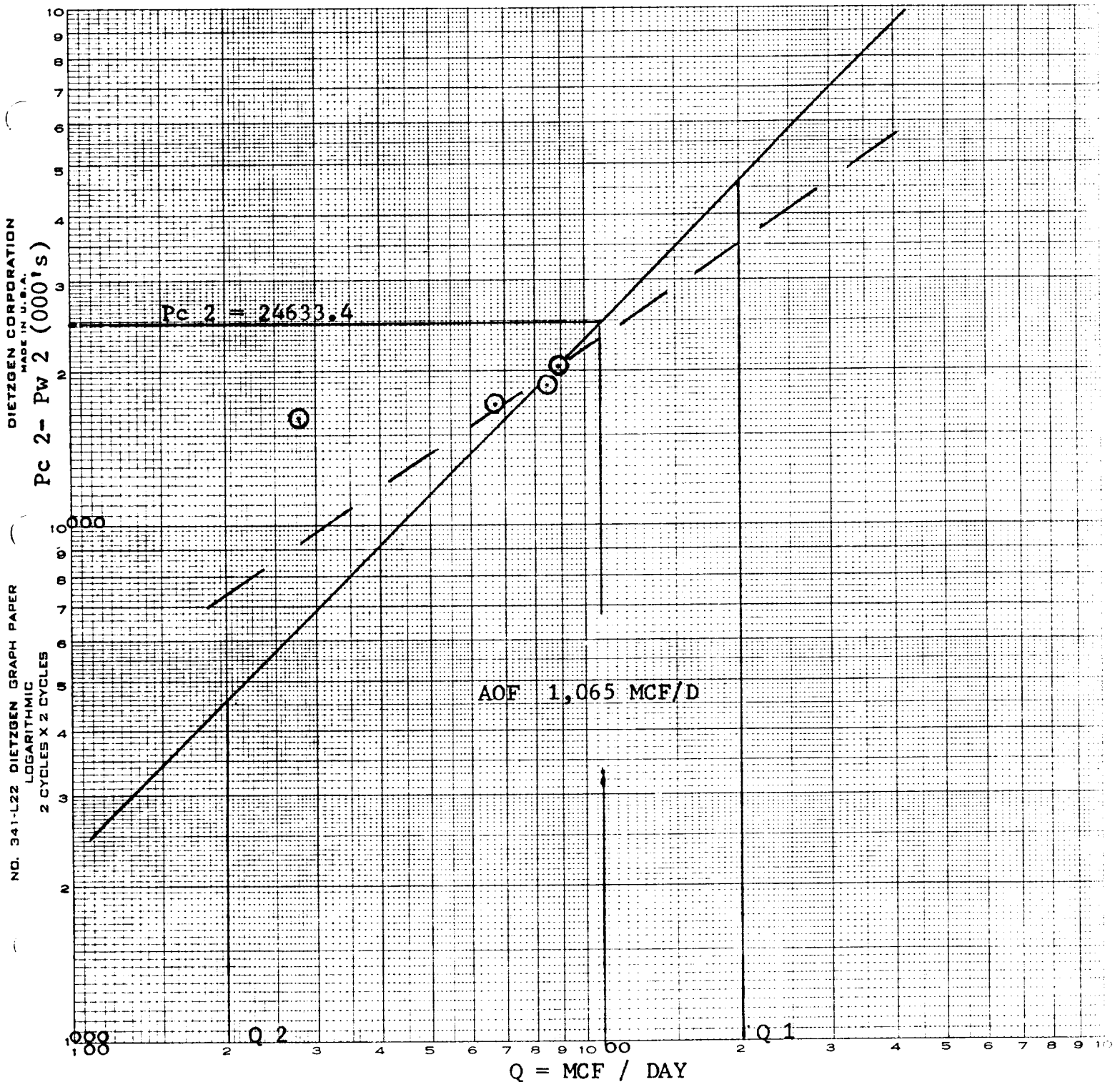
Absolute Open Flow		1,065	Mcf @ 15.025	Angle of Slope @	45°	Slope, n	1.000
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Remarks: **THERE WERE 3.9 BBLs OF OIL PRODUCED DURING THE TEST.**

Approved by Commission:	Conducted By:	Calculated By:	Checked By:
	DAVIS SERVICES, INC	RICK PAGAN	

NOV 12 1980

COMPANY : WESTERN OIL PL. JUCERS
 LEASE : AMOCO STATE
 WELL NO. : # 1
 UNIT : M /sec 28/twp 16s/rge. 33e
 COUNTY : LEA
 STATE : NEW MEXICO
 DATE : NOVEMBER 5, 1980



Q 1 = 2000; LOG OF Q 1 = 3.30103
 Q 2 = 200; LOG OF Q 2 = 2.30103
 N = 1.000
 θ = 45°

NOV 12 1980

U. S. DEPARTMENT OF AGRICULTURE

NEW-TEX LAB

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

CERTIFICATE OF ANALYSIS

No. 4159
Run No. _____
Date of Run 11-6-80
Date Secured 11-5-80

A Sample of Western Oil Producers Amoco State #1
Secured from Davis Services
At Box 2053 Secured by _____
Hobbs, N.M. 88240 Time _____ Date _____
Sampling conditions _____ Press _____
Temp. _____

FRACTIONAL ANALYSIS

Percentage Composition

MOL % LIQ. % G.P.M.

Carbon Dioxide	.509	
Air		
Nitrogen	1.192	
Oxygen		
Hydrogen sulfide		
Hydrogen	80.105	
Methane	9.917	2.645
Ethane	4.749	1.304
Propane		
Butanes	.488	.159
Iso-Butane	1.002	.315
N-Butane		
Pentanes	.391	.143
Iso-Pentane	.434	.157
N-Pentane	.370	.152
Hexanes	.843	.388
Heptanes		
Octanes		
TOTAL	100.000	5.263

Calc. Sp. Gr. 0.7259
Calc. A.P.I. _____
Calc. Vapor Press. _____ PSIA
Sp. Gr. _____
Mol. Wt. 21.08

LIQUID CONTENT (GAL./MCF)

Propane Calc. G.P.M.	1.304
Butanes Calc. G.P.M.	.474
Pentanes Plus. G.P.M.	.840
Ethane Calc. G.P.M.	2.645
RVP Gasoline G.P.M.	
B.T.U./Cu. Ft. @ 14.696 P.S.I.A.	
Dry Basis	1249
Wet Basis	1227
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

NOV 12 1980

NOV 12 1980

NOV 12 1980

WORK SHEET FOR STEPWISE CALCULATION (SUBSURFACE) PRESSURE (P_f & P_s)
(SURFACE) (P_o & P_w) 1ST

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

COMPANY WESTERN OIL PROD. LEASE AMOCO STATE WELL NO. 1 DATE 11-5-80

LOCATION: Unit M Section 28 Township 16s Range 33e

L 13460 H 13460 L/H 1.000 G MIX .828 % CO₂ .509 % N₂ 1.192 % H₂S

d 1.995 F_i .018231 .279 M₂ cfd (L/H) (F_i Q_m)² .000026 P_{cr} 665 T_{cr} 434
TABLE IX & X TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	6730		13460						
2	GH		0	5572.5		11144.9						
3	37.5GH		0	208967		417933						
4	P _c or P _n		2913.2	3777.2	3752.7	4589.8	4549.4		PS=	4545.1		
5	P _r		4.38	5.68	5.64	6.90	6.84					
6	T		534	601.5	601.5	669	669					
7	T _r		1.23	1.39	1.39	1.54	1.54					
8	Z		.660	.804	.801	.917	.912					
9	P/Z P/Z	$\frac{4}{9} \div \frac{8}{6}$	4413.9	4698.0	4685.0	5005.3	4988.4					
10	P/TZ	$\frac{9}{6} \div \frac{6}{8}$	8.2658	7.8104	7.7889	7.4817	7.4564					
11	(P/TZ) ² /1000	$(\frac{10}{9})^2 / 1000$	.068324	.061003	.060667	.055977	.055598					
12	L/H(F _i Q _m) ²		.000026	.000026	.000026	.000026	.000026					
13		$\frac{11}{1} + \frac{12}{2}$	.068350	.061029	.060693	.056003	.055624					
14	I _n	$\frac{10}{1} \div \frac{13}{3}$	120.933	127.979	128.333	133.595	134.051					
15	M=P _n -P _{n-1}			864	840	837	797					
16	N=I _n +I _{n-1}			248.913	249.267	261.929	262.384					
17	M x N	$\frac{15}{1} \times \frac{16}{6}$			209264		209031					
18	Σ(M x N)	Σ I ₇			208669							

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NOV 10 1960

COMPANY WESTERN OIL PROD. LEASE AMOCO STATE WELL NO. 1 DATE 11-5-80
 LOCATION: Unit M Section 28 Township 16S Range 33E
 L 13460 H 13460 L/H 1.000 G MIX .828 % CO₂ .509 % N₂ 1.192 % H₂S _____
 d 1.995 F_r .01823 m .672 M²cid (L/H) (F_rQ_m)² .000150 P_{cr} 665 T_{cr} 434
 TABLE IS IN " "

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	6730		13460						
2	GH		0	5572.5		11144.9						
3	37.5GH		0	208967		417933						
4	P _c or P _n		2738.2	3576.0	3554.2	4368.4	4331.6		PS=	4327.5		
5	P _r		4.12	5.38	5.34	6.57	6.51					
6	T		534	601.5	601.5	669	669					
7	T _r		1.23	1.39	1.39	1.54	1.54					
8	Z		.641	.783	.780	.896	.893					
9	P/Z P/Z	4.8	4271.8	4567.0	4556.7	4875.4	4850.6					
10	P/TZ	9.6	7.9996	7.5927	7.5756	7.2876	7.2506					
11	(P/TZ) ² /1000 (10) ² /1000		.063993	.057650	.057389	.053109	.052571					
12	L/H(F _r Q _m) ²		.000150	.000150	.000150	.000150	.000150					
13		I ₁ + I ₂	.064143	.057800	.057539	.053259	.052721					
14	I _n	I ₀ - I ₃	124.714	131.362	131.660	136.833	137.527					
15	M = P _n - P _{n-1}		838	816	814	777						
16	N = I _n + I _{n-1}		256.077	256.374	268.493	269.187						
17	M x N	I ₅ x I ₆	209210			209263						
18	Σ (M x N)	Σ I ₇	208723									

NOV 18 1960

COMPANY WESTERN OIL PROD. LEASE AMOCO STATE WELL NO. 1 DATE 11-5-80
 LOCATION: Unit M Section 28 Township 16S Range 33E
 L 13460 H 13460 L/H 1.000 G MIX .828 % CO₂ .509 % N₂ 1.192 % H₂S
 $d1.995$ $F_r \cdot 0.1823$ $.844$ M^2cid (L/H) (F_rQ_m)² $.000237$ P_{cr} 665 T_{cr} 434
TABLE IX & X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	6730		13460						
2	GH		0	5572.5		11144.9						
3	37.5GH		0	208967		417933						
4	P _c or P _n		2413.2	3190.6	3173.2	3931.1	3902.3		PS=	3898.8		
5	P _r		3.63	4.80	4.77	5.91	5.87					
6	T		534	601.5	601.5	669	669					
7	T _r		1.23	1.39	1.39	1.54	1.54					
8	Z		.610	.749	.747	.858	.855					
9	P/Z P/Z	$\bar{4} \pm \bar{8}$	3956.1	4259.8	4248.0	4581.7	4564.1					
10	P/TZ	$\bar{9} \pm \bar{6}$	7.4084	7.0820	7.0623	6.8486	6.8223					
11	(P/TZ) ² /1000	(10) $\bar{2}/1000$	.054884	.050154	.049876	.046904	.046544					
12	L/H(F _r Q _m) ²		.000237	.000237	.000237	.000237	.000237					
13		$\bar{11} \pm \bar{12}$	.055121	.050391	.050113	.047141	.046781					
14	I _n	$\bar{10} \pm \bar{13}$	134.402	140.540	140.928	145.280	145.835					
15	M=P _n -P _{n-1}		777	760	758	729						
16	N=I _n +I _{n-1}		274.942	275.329	286.208	286.763						
17	M x N	$\bar{15} \times \bar{16}$	209261	209076								
18	$\Sigma (M \times N)$	$\Sigma \bar{17}$	208672									

NOV 18 1969

NOV 18 1969

COMPANY WESTERN OIL PROD. LEASE AMOCO STATE WELL NO. 1 DATE 11-5-80

LOCATION: Unit M Section 28 Township 16S Range 33E

L 13460 H 13460 L/H 1.000 G MIX .828 %CO₂ .509 %N₂ 1.192 %H₂S
d 1.995 F_r .01823 .884 M₂cid (L/H) (F_rQ_m)² .000260 P_{ci} 665 T_{ci} 434
TABLE 12 B 2 TABLE 12 B 2

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		0	6730		13460						
2	GH		0	5572.5		11144.9						
3	37.5GH		0	208967		417933						
4	P _c or P _n		2038.2	2727.6	2714.3	3388.0	3370.8		PS=	3366.2		
5	P _i		3.06	4.10	4.08	5.09	5.07					
6	T		534	601.5	601.5	669	669					
7	T _r		1.23	1.39	1.39	1.54	1.54					
8	Z		.582	.719	.718	.814	.813					
9	P/Z P/Z		3502.1	3793.6	3780.3	4162.1	4146.1					
10	P/TZ		9.6	6.5582	6.2848	6.2214	6.1975					
11	(P/TZ) ² /1000	(10) ² /1000	.043010	.039776	.039499	.038706	.038409					
12	L/H(F _r Q _m) ²		.000260	.000260	.000260	.000260	.000260					
13		I ₁ + I ₂	.043270	.040036	.039759	.038966	.038669					
14	I _n	I ₀ ÷ I ₃	151.564	157.529	158.073	159.662	160.270					
15	M = P _n - P _{n-1}		689	676	674	657						
16	N = I _n + I _{n-1}		309.093	309.637	317.734	318.342						
17	M x N	I ₅ x I ₆	209335			208998						
18	Σ (M x N)	Σ I ₇	208598									

RECEIVED

NOV 10 1969

U.S. DEPARTMENT OF AGRICULTURE

COMPANY WESTERN OIL PROD. LEASE AMOCO STATE WELL NO. 1 DATE 11-5-80
LOCATION: Unit M Section 28 Township 16S Range 33E
L 13460 H 13460 L/H 1.000 G MIX .828 % CO₂ .509 % N₂ 1.192 % H₂S _____
d 1.995 F_i .018234 0 M₂cid (L/H) (F_iQ_m)² 0 P_{cr} 665 T_{cr} 434
TABLE IX B X TABLE IX B X

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		13460	6730		0						
2	GH		11144.9	5572.5		0						
3	37.5GH		417933	208967		0						
4	P _c or P _n		4545.1	3766.8	3748.9	2954.5	2909.7	2912.8			PW= 2915.3	
5	P _i		6.83	5.66	5.64	4.44	4.38	4.38				
6	T		669	601.5	601.5	534	534	534				
7	T _i		1.54	1.39	1.39	1.23	1.23	1.2304				
8	Z		.912	.803	.801	.665	.660	.660				
9	P/Z P/Z	4.8	4983.7	4690.9	4680.3	4442.9	4408.6	4413.3				
10	P/TZ	9.6	7.4494	7.7986	7.7811	8.3200	8.2557	8.2647				
11	(P/TZ) ² /1000	(10) 2/1000										
12	L/H(F _i Q _m) ²											
13		I ₁ + I ₂										
14	I _n	I ₀ + I ₃	134.239	128.228	128.516	120.193	121.129	120.996				
15	M = P _n - P _{n-1}		778	796	794	839	836					
16	N = I _n + I _{n-1}		262.468	262.756	248.709	249.645	249.512					
17	M x N	I ₅ x I ₆	209196					208626				
18	Σ (M x N)	Σ I ₇	208737									

NOV 1 1960

COMPANY WESTERN OIL PROD. LEASE AMOCO STATE WELL NO. 1 DATE 11-5-80

LOCATION: Unit M Section 28 Township 16S Range 33E

L 13460 H 13460 L/H 1.000 G MIX .828 % CO₂ .509 % N₂ 1.192 % H₂S

d 1.995 F_r .01823 m 0 M²cid (L/H) (F_rQ_m)² 0 P_{cr} 665 T_{cr} 434

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		13460	6730		0						
2	GH		11144.9	5572.5		0						
3	37.5GH		417933	208967		0						
4	P _c or P _n		4327.5	3570.7	3553.4	2780.1	2737.9	2741.5			PW= 2742.9	
5	P _r		6.51	5.37	5.34	4.18	4.12	4.12				
6	T		669	601.5	601.5	534	534	534				
7	T _r		1.54	1.39	1.39	1.23	1.23	1.23				
8	Z		.893	.783	.780	.646	.642	.642				
9	P/Z P/Z		4846.0	4560.2	4555.7	4303.5	4264.7	4270.2				
10	P/TZ		9.6	7.5814	7.5738	8.0591	7.9863	7.9967				
11	(P/TZ) ² /1000	(10) ² /1000										
12	L/H(F _r Q _m) ²											
13		I ₁ + I ₂										
14	I _n	I ₀ ÷ I ₃	138.051	131.902	132.035	124.083	125.214	125.052				
15	M = P _n - P _{n-1}			757	774	773	815	812				
16	N = I _n + I _{n-1}			269.953	270.085	256.118	257.248	257.087				
17	M x N	I ₅ x I ₆			209070			208732				
18	Σ (M x N)	Σ I ₇			208863							

NOV 12 1960

NOV 12 1960

COMPANY WESTERN OIL PROD. LEASE AMOCO STATE WELL NO. 1 DATE 11-5-80
 LOCATION: Unit M Section 28 Township 16S Range 33E
 L 13460 H 13460 L/H 1.000 G MIX .828 % CO₂ .509 % N₂ 1.192 % H₂S _____
 d 1.995 F_r .01823 m 0 M²cid (L/H) (F_rQ_m)² 0 P_{cr} 665 T_{cr} 434
TABLE 12.8.1

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		13460	6730		0						
2	GH		11144.9	5572.5		0						
3	37.5GH		417933	208967		0						
4	P _c or P _n		3898.8	3186.6	3173.0	2449.3	2414.9	2418.3		PW=	2420.0	
5	P _r		5.86	4.79	4.77	3.68	3.63	3.64				
6	T		669	601.5	601.5	534	534	534				
7	T _r		1.54	1.39	1.39	1.23	1.23	1.23				
8	Z		.855	.748	.747	.613	.610	.610				
9	P/Z P/Z		4560.0	4260.2	4247.6	3995.5	3958.9	3964.4				
10	P/TZ	9-6	6.8161	7.0826	7.0617	7.4823	7.4136	7.4241				
11	(P/TZ) ² /1000	(10) ² /1000										
12	L/H(F _r Q _m) ²											
13		I ₁ + I ₂										
14	I _n	I ₀ ÷ I ₃	146.712	141.192	141.610	133.648	134.888	134.696				
15	M = P _n - P _{n-1}		712	726	724	758	755					
16	N = I _n + I _{n-1}		287.904	288.322	275.258	276.497	276.305					
17	M x N	I ₅ x I ₆	209270				208518					
18	Σ (M x N)	Σ I ₇	208663									

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NOV 1 2 1960

WORK SHEET FOR STEPWISE CALCULATION

(SURFACE)

PRESSURE

(P_c & P_w)

4TH

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

COMPANY WESTERN OIL PROD. LEASE AMOCO STATE WELL NO. 1 DATE 11-5-80

LOCATION: Unit M Section 28 Township 16S Range 33E

L 13460 H 13460 L/H 1.000 G MIX .828 % CO₂ .509 % N₂ 1.192 % H₂S

d 1.995 F_1 .018231 m 0 M^2 cfd (L/H) ($F_1 Q_m$)² 0 P_{cr} 665 T_{cr} 434

TABLE 12 & 13

LINE	ITEM	SOURCE	1	2	3	4	5	6	7	8	9	10
1	H		13460	6730		0						
2	GH		11144.9	5572.5		0						
3	37.5GH		417933	208967		0						
4	P_c or P_n		3366.2	2718.7	2713.6	2062.3	2041.0	2043.8				
5	P_r		5.06	4.09	4.08	3.10	3.07	3.07				
6	T		669	601.5	601.5	534	534	534				
7	T_r		1.54	1.39	1.39	1.23	1.23	1.23				
8	Z		.812	.718	.718	.584	.583	.583				
9	P/Z P/Z		4145.6	3786.6	3779.4	3531.3	3500.8	3505.7				
10	P/TZ		9.6	6.2952	6.2834	6.6130	6.5558	6.5650				
11	$(P/TZ)^2/1000$	$(10)^2/1000$										
12	$L/H(F_1 Q_m)^2$											
13		$I_1 + I_2$										
14	I_n	$I_0 - I_3$	161.375	158.851	159.149	151.217	152.537	152.323				
15	$M = P_n - P_{n-1}$		647	653	651	673	670					
16	$N = I_n + I_{n-1}$		320.226	320.524	310.365	311.686	311.471					
17	$M \times N$	$I_5 \times I_6$	209161	208628								
18	$\Sigma(M \times N)$	ΣI_7	208772									

NOV 12 1999
NOV 12 1999
NOV 12 1999