CASE 6984: HARVEY E. YATES COMPANY FOR DESIGNATION OF A TIGHT FORMATION, LEA COUNTY, NEW MEXICO

Case No.

6984

Application

Transcripts

Small Exhibits

ETC

NEW MEXICO OIL CONSERVATION DIVISION

EXAMINER HEARING JULY 23, 1980

DOCKET NO.

PREPARED FOR:

HARVEY E. YATES COMPANY
SUITE 300
SECURITY NATIONAL BANK BUILDING
ROSWELL, NEW MEXICO 88201

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

AUSTIN MISSISSIPPI (GAS) POOL

In the matter of the determination of the Mississippi formation underlying certain lands in Lea County, New Mexico, as a "Tight Formation" pursuant to regulations of the Federal Energy Commission, Section 107(b) of the Natural Gas Policy Act of 1978 (15 USC 3317) and regulations thereunder, the certain exhibits will be evidence presented which demonstrates that the Mississippi gas reservoir beneath lands located in Townships 13, 14 and 15 South and Ranges 35 and 36 East, N.M.P.M., Lea County, New Mexico, qualifies as a "Tight Formation".

The producing Mississippi zone is a dense limestone, dolomite, with some possible conglomerates, and quartzites. The matrix is characterized as being very fine-grained with low porosity (less than 5%), and the formation is highly cemented. The producing zone is encountered at an average depth of 13,300 feet.

Operators in the Austin Mississippi (Gas) Pool have conducted reservoir buildup pressure surveys on their wells, the results of which show the average in-situ gas permeability throughout the Mississippi pay section averages 0.0202 millidarcies and is not expected to exceed 0.1 millidarcy. The results of the buildup surveys together with all pertinent data are summarized on Exhibit No. 1. The individual Horner calculations, data and buildup curves are included as sub-parts to Exhibit No. 1.

The stabilized production rates, against atmospheric pressure of wells completed for production in the Mississippi zone at an average depth of 13,300 feet with or without stimulation, are not expected to exceed a maximum of 1300 MCF of gas per day.

Exhibit No. 2 is a summary of gas production by operator and wells of the Austin Mississippi (Gas) Pool. Individual graphic presentation of the production history by wells are included as sub-parts to Exhibit No. 2. The declining daily delivery rates are typical of wells producing gas from a "Tight", low permeability reservoir. Specific reference is made to Adobe Oil and Gas Corporation's Hannah No. 1-Well which demonstrated a high production rate at the time of the buildup pressure survey; however, the subsequent production performance indicates that matrix flow rates are controlling, and it is doubtful that this well would now produce more than 800 MCFD against atmospheric pressure. The Phillips Petroleum Company Austin Comm well produced 4,300,000 MCF of gas through December 31, 1979. The well is no longer producing because of a down hole casing collapse condition. It is of interest to note, while the Phillips well was acidized, that at no time during its producing life did production rates exceed 1250 to 1300 MCFD. It should also be noted that the Mississippi zone in the Adobe Oil and Gas Corporation wells was stimulated with acid; however, the low permeability matrix is now the controlling factor of gas flow to the well bores.

The liquid hydrocarbons produced usually do not exist as a liquid in the Mississippi gas reservoir. None of the wells in the Austin Mississippi (Gas) Pool are expected to produce more than five to six barrels of condensate per day once stabilized reservoir flow rates are reached.

A recombination of the separator fluids, condensate and gas, utilizing a computer simulation Pressure-Volume-Temperature (PVT) technique (Gerrett Computing System) indicates that above a reservoir pressure of 3792 psig all fluids exist in a single gas phase. See Exhibit 3. As gas is produced and recovered at each well and the reservoir drainage area pressures decline, a severe reduction in gas production rates could occur as the retrograde condensation phenomena occurs when the reservoir pressure passes through the Dew-Point pressure.

Exhibit 4 is a Well Data Table and includes all pertinent well information. The casing design of the wells drilled and completed indicates that the fresh water aquifers in the area as required by rules and regulations of the New Mexico Conservation Commission have been fully protected.

EXHIBIT 1
AUSTIN - MISSISSIPPI GAS RESERVOIR
LEA COUNTY, NEW MEXICO
SUMMARY OF RESERVOIR BUILDUP SURVEYS
PRODUCTION TEST DATA, FORMATION RESERVOIR FLUID
CHARACTERISTICS, PERMEABILITIES, RADIUS OF INVESTIGATION,
DAMAGE RATIOS AND CALCULATED FLOW RATES TO ATMOSPHERE
USING SURVEY TEST DATA AND RESULTS
Ralph H. Viney & Associates, Inc.
Engineering Consultants

Owner-Operator / Lease Name / Well Number	Harvey E. Yates Company Austin Monteith Well No. 1	Yates Petroleum Corporation Barbee LL Well No. 1	Adobe Oil & Gas Corporation State 16 Well No. 1	Adobe Oil & Gas Corporation State 16 Well No. 2	Adobe Oil & Gas Corporation Hannah Well No. 1	An Average of All Wells at Time of Their Respective Pressure Buildup Surveys
Location: Section, Township and Range	Sec. 8, T-14-S, R-36-E	Sec. 19, T-14-S, R-36-E	Sec. 16, T-14-S, R-36-E	Sec. 16, T-14-S, R-36-E	Sec. 17, T-14-S, R-36-E	
Productive Mississippi Formation Interval Measured Depth - Feet	13,356' to 13,611'	13,350' to 13,655'	13,192' to 13,496'	13,266' to 13,552'	13,220' to 13,490'	
Test Data						
Date of Flow Tests and Reservoir Buildup Survey	4-[illegible]-1980	11-30-1979	5-11-1979	9-20-1979	9-26-1979	
Flowing Tubing Pressure - psig	1400	829	1100	1100	2290	1317
Flowing Bottom Hole Pressure (P_{wf}) -psig	2000	1358	854	1889	2613	1638
Choke Size - Inches	15/64"	13/64"	18/64"	13/64"	14/64"	
Gas Gathering Line Operating Pressure - psig	640	NR	250	672	320	596
Production Data						
Gas Production on Test - MCFD	1164	930	1132	725	2000	1207
Condensate Production - Barrels	40	-	29	33	59	40
Water Production - Barrels	-	-	-	-	-	-
Cumulative Gas Production at Test Date - MCF	51,561	2,790	13,505	5,800	8,150	16,361
Formation, Reservoir and Physical Characteristics Data						
Net Mississippi Zone Thickness - Feet	255	305	384	282	279	281
Porosity (ϕ) % of Bulk Volume	3.15	1.31	3.02	3.800	2.66	3.69
Interstitial Water (S_w) % of Pore Space	40	40	40	40	40	40
Reservoir Temperature °F/°R	188°F/648°R	192°F/652°R	230°F/690°R	225°F/685°R	206°F/666°R	207°F/667°R
Specific Gravity of Gas (SG) Air = 1.00	0.897	0.67	0.723	0.643	0.689	0.72
Gas Viscosity (μ_g) at Average Reservoir Pressure During Test - Centipoises	0.0270	0.0235	0.016	0.025	0.0245	0.0240
Critical Pressure (Pc) - psia	678	676	688	676	674	676
Critical Temperature (To) - °R	414	375	374	372	378	388
Gas Compressibility (Cg) - psi^{-1}	2.80×10^{-4}	3.458×10^{-4}	3.14×10^{-4}	2.69×10^{-4}	2.758×10^{-4}	3.14×10^{-4}
Water Compressibility (Cw) - psi^{-1}	3.1×10^{-6}	3.500×10^{-6}	3.30×10^{-6}	3.30×10^{-6}	3.30×10^{-6}	3.30×10^{-6}
Rock Compressibility (Cf) - psi^{-1}	8.56×10^{-6}	10.590×10^{-6}	8.60×10^{-6}	8.59×10^{-6}	8.58×10^{-6}	8.55×10^{-6}
Total Compressibility (Ct) - psi^{-1}	1.77×10^{-4}	1.95×10^{-4}	1.9832×10^{-4}	1.712×10^{-4}	1.753×10^{-4}	2.048×10^{-4}
Gas Deviation Factor (Z) @						
Flowing Bottom Hole Pressure	0.74	0.900	0.945	0.906	0.870	0.873
Average Reservoir Pressure	0.83	0.890	0.910	0.940	0.910	0.865
Boundary Reservoir Pressure	0.96	1.02	0.880	1.05	0.975	0.940
Gas Formation Volume Factor (Bg) - Cubic Feet/SCF	4.12×10^{-3}	5.02×10^{-3}	1.445×10^{-3}	4.90×10^{-3}	4.68×10^{-3}	5.295×10^{-3}
Well Bore Radius (r_w) - Feet	0.375	0.375	0.375			
Equivalent Liquid Rate of Test Gas Production ($Q_{RB/D}$) - Barrels	854	931	2913	693	1733	1138
Pseudo Flow Time at Test Date (T_a) - Hours	1063	72	244	152	94	325
Shut in Time of Reservoir Buildup Test (Δt) - Hours	152.5	127	65	168	87	120
Slope of Buildup Curve (Horner Technique) m psi/cycle	845	489	776	609	1156	774
Reservoir Boundary Pressure from Buildup (P_a) - psig	5139	5282	1804	5544	4639	4481
Transmissibility						
$(Kh/u) = \frac{162.2 \times Q_{RB/D}}{m}$ = Md - Ft/Cp	163.93	275.64	609.87	170	243.18	338.54
Productive Capacity (Kh/u)(ϕ) = (kh) = Md.Ft.	4.43	6.47	9.743	4.25	5.957	5.73
Permeability (kh/h) = K - Md.	0.01735	0.0212	0.032	0.01486	0.02206	0.0292
Radius of Investigation During Buildup Pressure Surveys						
$r_i = \sqrt{\frac{kT}{57600\ \phi u c}}$ - Feet	135	116.3	60	93	94	87.66
Where T is shut in time in minutes T = (ΔT)(60 minutes)						
Van Poollen Equation						
Estimated Damage Ratio (EDR)						
$EDR = \frac{P_a - P_{wf}}{m(\log T + 2.65)}$	0.52	1.34	0.25	1.15	0.29	0.59
Calculated Flow to Atmospheric Pressure For Various Drainage Radii - MCFD						
Using Darcy Radial Flow Equation for Gas						
$qsc = \frac{0.703\ kh\ (Pe^2 - P_{wf}^2)^n}{pTz\ ln\ (re/rw)}$	ri	1372	985	1303	630	1045	1497
	r @ 80 acres	1017	718	953	548	1075	964
	r @ 160 acres	974	681	790	548	1000	934
	r @ 320 acres	940	658	779	558	1017	891
	r @ 640 acres	911	638	744	519	1060	865

Where
P_e is Reservoir pressure at drainage boundary
P_w is flowing pressure at well bore

Setting P_{wf} = 0 represents maximum flow that formation matrix would deliver into well bore.

EXHIBIT 1 A
YATES AUSTIN MONTEITH #1
SEC 8, TWP 14S, R 35E
LEA COUNTY, NEW MEXICO

PRESSURE BUILD-UP ANALYSIS

POINTS USED	RADIUS FEET, FT	SLOPE PSI/CYC	K (MDS)	P.I. M/D/PSI	COMPL. EFF., %	SIBHP PSIG	AVG. P PSIG
1- 2	16.	1742.2	0.01	0.17	134.4	3314.	8596.
2- 3	22.	1097.9	0.01	0.25	141.7	3644.	6643.
3-19	147.	283.6	0.05	0.47	76.0	4012.	4424.
19-33	236.	555.2	0.03	0.41	122.5	4261.	4828.
33-39	268.	644.9	0.02	0.37	142.3	4374.	5139.

POINT	PRESSURE	CORRECTED PRESSURE@	DT (HOURS)	(T+DT)/DT	CORRECTED (T+DT)/DT@@
1	2790.	2790.	0.50	2153.111	2153.109
2	3314.	3314.	1.00	1077.056	1077.055
3	3644.	3644.	2.00	539.028	539.028
4	3705.	3705.	3.00	359.685	359.685
5	3741.	3741.	4.00	270.014	270.014
6	3768.	3768.	5.00	216.211	216.211
7	3788.	3788.	6.00	180.343	180.343
8	3804.	3804.	7.00	154.722	154.722
9	3819.	3819.	8.00	135.307	135.307
10	3831.	3831.	9.00	120.362	120.362
11	3843.	3843.	10.00	108.606	108.606
12	3882.	3882.	12.00	77.861	77.861
13	3898.	3898.	16.00	68.253	68.253
14	3913.	3913.	18.00	60.781	60.781
15	3927.	3927.	20.00	54.803	54.803
16	3951.	3951.	24.00	45.836	45.836
17	3973.	3973.	28.00	39.431	39.431
18	3994.	3994.	32.00	34.627	34.627
19	4012.	4012.	36.00	30.890	30.890
20	4032.	4032.	40.00	27.901	27.901
21	4049.	4049.	44.00	25.456	25.456
22	4065.	4065.	48.00	23.418	23.418
23	4083.	4083.	52.00	21.693	21.693
24	4098.	4098.	56.00	20.215	20.215
25	4113.	4113.	60.00	18.934	18.934
26	4134.	4134.	66.00	17.304	17.304
27	4154.	4154.	72.00	15.945	15.945
28	4174.	4174.	78.00	14.796	14.796
29	4191.	4191.	84.00	13.810	13.810
30	4210.	4210.	90.00	12.956	12.956
31	4229.	4229.	96.00	12.209	12.209
32	4246.	4246.	102.00	11.550	11.550
33	4261.	4261	108.00	10.963	10.963
34	4279.	4279.	114.00	10.439	10.439
35	4296.	4296.	120.00	9.967	9.967
36	4322.	4322.	130.00	9.277	9.277
37	4346.	4346.	140.00	8.686	8.686
38	4369.	4369.	150.00	8.174	8.174
39	4374.	4374.	152.30	8.056	8.056

@ CORRECTED FOR AFTERFLOW
@@ CORRECTED FOR SUPERPOSITION

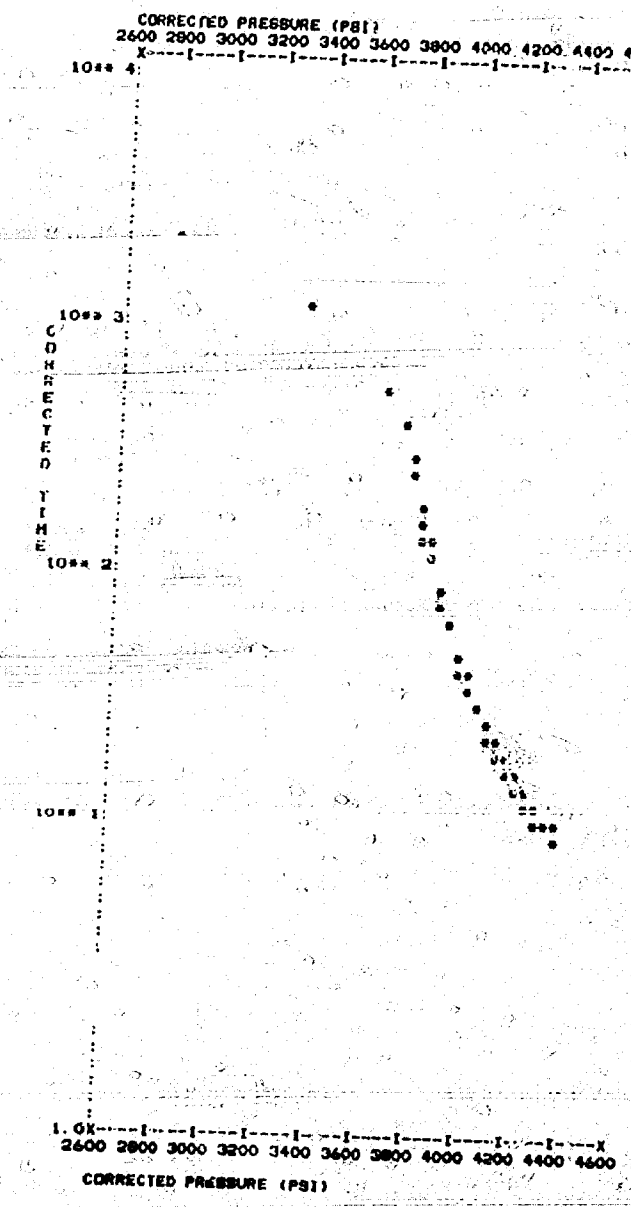


EXHIBIT 1 A

EXHIBIT I B
YATES BARBEE LL #1
SEC 18, TWP 14S, R 35E
LEA COUNTY, NEW MEXICO

PRESSURE BUILD-UP ANALYSIS

POINTS USED	RADIUS FELT,FT	SLOPE PSI/CYC	K (MDS)	P.I. M/D/PSI	COMPL. EFF., %	BIGHP PSIG	AVG. P PSIG
1- 2	10.	1986.8	0.00	0.18	171.2	2156.	6449.
2- 3	12.	3533.7	0.00	0.11	179.2	3209.	9792.
3- 4	17.	1660.6	0.00	0.18	151.1	3699.	6303.
4- 5	20.	5668.9	0.00	0.08	213.1	4664.	12587.
5- 6	23.	1012.4	0.00	0.16	140.6	4880.	7197.
6- 9	40.	225.2	0.03	0.23	42.6	4954.	5302.
9-13	95.	111.1	0.07	0.24	16.7	4985.	5069.
13-22	202.	300.3	0.03	0.24	40.5	5113.	5208.
22-28	216.	489.1	0.02	0.23	62.4	5129.	5282.
28-39	279.	489.1	0.02	0.23	62.4	5029.	5282.

POINT	PRESSURE	CORRECTED PRESSURE@	DT (HOURS)	(T+DT)/DT	CORRECTED (T+DT)/DT@
1	1561.	1561.	0.25	289.000	289.000
2	2156.	2156.	0.50	145.000	145.000
3	3209.	3209.	1.00	73.000	73.000
4	3699.	3699.	2.00	37.000	37.000
5	4664.	4664.	3.00	25.000	25.000
6	4880.	4880.	4.00	19.000	19.000
7	4924.	4924.	5.00	15.400	15.400
8	4942.	4942.	6.00	13.000	13.000
9	4954.	4954.	7.00	11.286	11.285
10	4957.	4957.	8.00	10.000	10.000
11	4961.	4961.	9.00	9.000	9.000
12	4967.	4967.	10.00	8.200	8.200
13	4985.	4985.	15.00	5.800	5.800
14	5010.	5010.	20.00	4.600	4.600
15	5029.	5029.	25.00	3.880	3.880
16	5045.	5045.	30.00	3.400	3.400
17	5056.	5056.	35.00	3.057	3.057
18	5070.	5070.	40.00	2.800	2.800
19	5081.	5081.	45.00	2.600	2.600
20	5092.	5092.	50.00	2.469	2.469
21	5103.	5103.	55.00	2.309	2.309
22	5113.	5113.	60.00	2.200	2.200
23	5124.	5124.	65.00	2.108	2.108
24	5126.	5126.	66.00	2.091	2.091
25	5127.	5127.	67.00	2.075	2.075
26	5129.	5129.	68.00	2.059	2.059
27	5130.	5130.	69.00	2.043	2.043
28	5129.	5129.	70.00	2.029	2.029
29	5127.	5127.	75.00	1.960	1.960
30	5106.	5106.	90.00	1.900	1.900
31	5078.	5078.	95.00	1.847	1.847
32	5075.	5075.	90.00	1.800	1.800
33	5075.	5075.	95.00	1.758	1.758
34	5069.	5069.	100.00	1.720	1.720
35	5050.	5050.	105.00	1.686	1.686
36	5035.	5035.	110.00	1.655	655
37	5033.	5033.	115.00	1.626	1.626
38	5031.	5031.	120.00	1.600	1.600
39	5029.	5029.	127.00	1.567	1.567

@ CORRECTED FOR AFTERFLOW

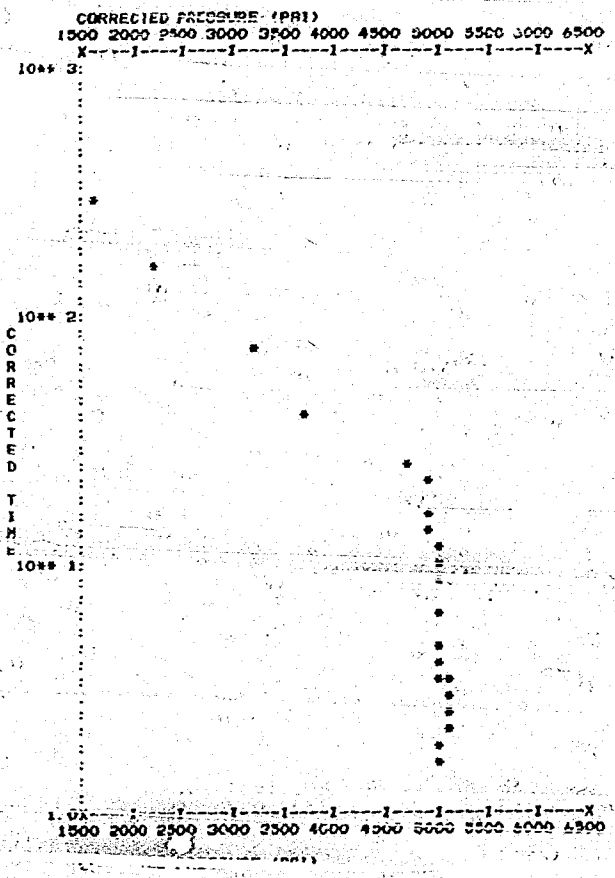


EXHIBIT I B

EXHIBIT 1 C
ADOBE STATE 16 #1
SEC 16 TWP 14S R 36E
LEA COUNTY, NEW MEXICO

PRESSURE BUILD-UP ANALYSIS

POINTS USED	DELT. FT	SLOPE PSI/CYC	A (PSI)	P.I. M/D/PSI	COMPR. EFF. %	STEP PSIG	AVG. P PSIG
1- 2	38.	76.5	0.47	4.78	200.6	680.	891.
2- 3	57	26.6	1.47	11.38	178.8	688.	754.
3- 5	83.	76.0	0.47	5.12	213.5	724.	875.
5-10	110.	192.4	0.16	2.51	247.1	804.	1105.
10-12	116.	229.8	0.38	1.70	273.9	833.	1320.
[illegible]	121.	125.3	0.24	3.10	205.3	840.	1013.
13-21	148.	405.7	0.06	1.48	290.6	977.	1419.
21-27	178.	693.6	0.03	1.05	337.5	1186.	1730.
27-37	185.	776.5	0.03	2.98	349.3	1205.	1814.

POINT	PRESSURE	CORRECTED PRESSURE*	DT (HOURS)	(T+DT)/DT	CORRECTED (T+DT)/DT**
1	657.	657.	0.25	1146.300	1146.300
2	680.	682.	0.50	573.650	573.650
3	688.	6?8.	1.00	287.325	287.325
4	715.	711.	2.00	144.163	144.163
5	724.	724.	3.00	96.444	96.442
6	746.	746.	4.00	72.581	72.381
7	768.	768.	5.00	58.265	58.265
8	777.	777.	6.00	48.721	48.721
9	795.	795.	7.00	41.904	41.904
10	804.	804.	8.00	[illegible]	36.7??
11	820.	820.	9.00	32.815	32.814
12	833.	[illegible]	10.00	29.633	29.632
13	840.	[illegible]	11.00	27.030	27.030
14	853.	853.	12.00	24.860	24.860
15	866.	866.	13.00	23.025	23.025
16	880.	880.	14.00	21.452	21.452
17	888.	888.	15.00	20.088	20.088
18	898.	893.	16.00	19.293	18.893
19	911.	911.	17.00	17.843	17.843
20	937.	937.	20.00	15.316	15.316
21	977.	977.	25.00	12.453	12.453
22	1017.	1017.	30.00	10.544	10.544
23	1057.	1037.	35.00	9.181	9.181
24	1093.	[illegible]	40.00	[illegible]	8.130
25	[illegible]	1128.	45.00	7.363	7.363
26	1153.	1155.	50.00	6.727	6.727
27	1166.	1186.	55.00	6.206	6.204
28	1193.	1195.	56.00	6.113	6.113
29	1200.	1200.	57.00	6.023	6.033
30	1204.	1204.	58.00	5.937	5.937
31	1208.	1208.	59.00	5.853	5.853
32	1213.	1213.	60.00	5.772	5.772
33	1217.	1217.	61.00	5.694	5.694
34	1222.	1222.	62.00	5.618	5.618
35	1226.	1226.	63.00	5.545	5.545
36	1231.	1231.	64.00	5.474	5.474
37	1235.	1235.	68.00	5.403	5.404

* CORRECTED FOR AFTERFLOW
** CORRECTED FOR SUPERPOSITION

EXHIBIT 1 C

EXHIBIT 1 D
ADOBE STATE 16 #2
SEC 16, TWP 14S, R 36E
LEA COUNTY, NEW MEXICO

PRESSURE BUILD-UP ANALYSIS

POINTS USED	RADIUS FELT, FT	SLOPE PSI/CYC	K (MDS)	P. I. M/D/PSI	COMPL. EFF., %	BIBHP PSIG	AVG. P PSIG
1- 2	9.	1048.5	0.01	0.22	153.0	2493.	5203.
2- 3	11.	1514.1	0.00	0.16	160.2	2947.	6407.
3- 4	15.	1888.0	0.00	0.13	165.7	3511.	7261.
4- 5	17.	3147.0	0.00	0.09	183.7	4058.	9762.
5- 6	19.	2217.0	0.00	0.12	167.8	4330.	8077.
6- 8	23.	1636.3	0.00	0.14	151.0	4612.	7090.
8-37	176.	602.6	0.01	0.20	85.9	5312.	5544.

POINT	PRESSURE	CORRECTED PRESSURE@	DT (HOURS)	(T+DT)/DT	CORRECTED (T+DT)/DT@@
1	2178.	2178.	0.25	769.000	769.000
2	2493.	2493.	0.50	385.000	385.000
3	2947.	2947.	1.00	193.000	193.000
4	3511.	3511.	2.00	97.000	97.000
5	4058.	4058.	3.00	65.000	65.000
6	4330.	4330.	4.00	49.000	49.000
7	4469.	4469.	5.00	39.400	39.400
8	4612.	4612.	6.00	33.000	33.000
9	4665.	4665.	7.00	28.429	28.429
10	4705.	4705.	8.00	25.000	25.000
11	4732.	4732.	9.00	22.333	22.333
12	4759.	4759.	10.00	20.200	20.200
13	4862.	4862.	15.00	13.800	13.800
14	4933.	4933.	20.00	10.600	10.600
15	4937.	4987.	25.00	8.680	8.680
16	5022.	5022.	30.00	7.400	7.400
17	5058.	5058.	35.00	6.486	6.486
18	5084.	5084.	40.00	5.800	5.800
19	5133.	5133.	50.00	4.840	4.840
20	5164.	5164.	60.00	4.200	4.200
21	5196.	5196.	70.00	3.743	3.743
22	5222.	5222.	80.00	3.400	3.400
23	5249.	5249.	90.00	3.133	3.133
24	5271.	5271.	100.00	2.920	2.920
25	5284.	5284.	110.00	2.745	2.745
26	5298.	5298.	120.00	2.600	2.600
27	5307.	5307.	130.00	2.477	2.477
28	5316.	5316.	140.00	2.371	2.371
29	5324.	5324.	150.00	2.280	2.280
30	5333.	5333.	160.00	2.200	2.200
31	5330.	5330.	162.00	2.185	2.185
32	5338.	5338.	163.00	2.178	2.178
[illegible]	[illegible]	5338.	164.00	2.171	2.171
34	5338.	5339.	165.00	2.164	2.164
35	5342.	5342.	166.00	2.157	2.157
36	5342.	5342.	167.00	2.150	2.150
37	5342.	5342.	168.00	2.143	2.143

@ CORRECTED FOR AFTERFLOW
@@ CORRECTED FOR SUPER[illegible]

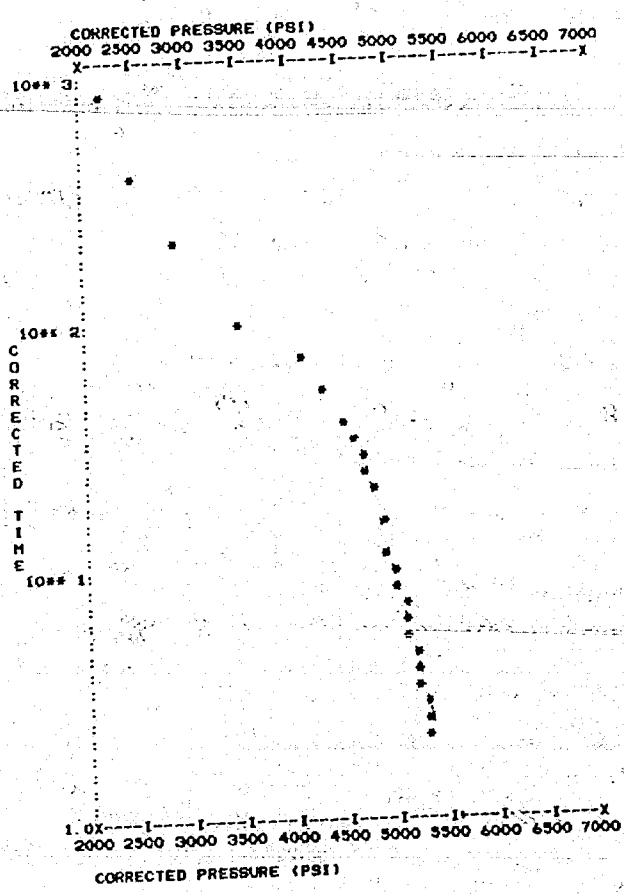


EXHIBIT 1 D

EXHIBIT 1 E
ADOBE HANNAH #1
SEC 17, TWP 14S, R 36E
LEA COUNTY, NEW MEXICO

PRESSURE BUILD-UP ANALYSIS

POINTS USED	RADIUS FELT, FT	SLOPE PSI/CYC	K (MDS)	P.I. M/D/PSI	COMPL. EFF., %	SIBHP PSIG	AVG. P PSIG
1- 2	21.	516.9	0.04	1.19	157.4	3184.	4361.
2- 3	31.	247.8	0.09	1.89	192.9	3258.	3748.
3-15	132.	455.9	0.05	1.33	157.0	3887.	4175.
15-17	151.	870.4	0.02	1.12	242.9	3984.	4475.
17-38	210.	1156.5	0.02	1.03	290.2	4259.	4639.
38-39	212.	1156.5	0.02	1.03	290.4	4259.	4639.

POINT	PRESSURE	CORRECTED PRESSURE@	DT (HOURS)	(T+DT)/DT	CORRECTED (T+DT)/DT@@
1	3029.	3029.	0.25	377.154	377.154
2	3184.	3184.	0.50	189.077	189.077
3	3258.	3258.	1.00	95.038	95.038
4	3429.	3429.	2.00	48.019	48.019
5	3504.	3504.	3.00	32.346	32.346
6	3552.	3552.	4.00	24.510	24.510
7	3587.	3587.	5.00	19.808	19.808
8	3610.	3610.	6.00	16.673	16.673
9	3639.	3639.	7.00	14.434	14.434
10	3656.	3658.	8.00	12.755	12.759
11	3681.	3681.	9.00	11.449	11.449
12	3697.	3697.	10.00	10.404	10.404
13	3775.	3775.	15.00	7.269	7.269
14	3836.	3836.	20.00	5.702	5.702
15	3887.	3887.	25.00	4.762	4.762
16	3936.	3936.	30.00	4.135	4.135
17	3934.	3984.	35.00	3.687	3.687
18	4007.	4007.	37.00	3.542	3.542
19	4032.	4032.	40.00	3.351	3.351
20	4048.	4048.	42.00	3.239	3.239
21	4071.	4071.	45.00	3.090	3.090
22	4093.	4093.	48.00	2.959	2.959
23	4106.	4106.	50.00	2.881	2.881
24	4125.	4125.	53.00	2.774	2.774
25	4138.	4138.	55.00	2.710	2.710
26	4147.	4147.	57.00	2.650	2.650
27	4163.	4163.	60.00	2.567	2.567
28	4179.	4179.	63.00	2.49	2.493
29	4192.	4192.	65.00	2.447	2.447
30	4208.	4208.	68.00	2.383	2.383
31	4224.	4224.	72.00	2.306	2.306
32	4237.	4237.	75.00	2.254	2.254
33	4248.	4248.	78.00	2.208	2.208
34	4250.	4250.	80.00	2.175	2.175
35	4253.	4253.	81.00	2.161	2.161
36	4253.	4253.	82.00	2.147	2.147
37	4256.	4256.	84.00	2.120	2.120
38	4259.	4259.	85.00	2.106	2.106
39	4259.	4259.	87.00	2.081	2.081

@ CORRECTED FOR AFTERFLOW
@@ CORRECTED FOR SUPERPOSITION

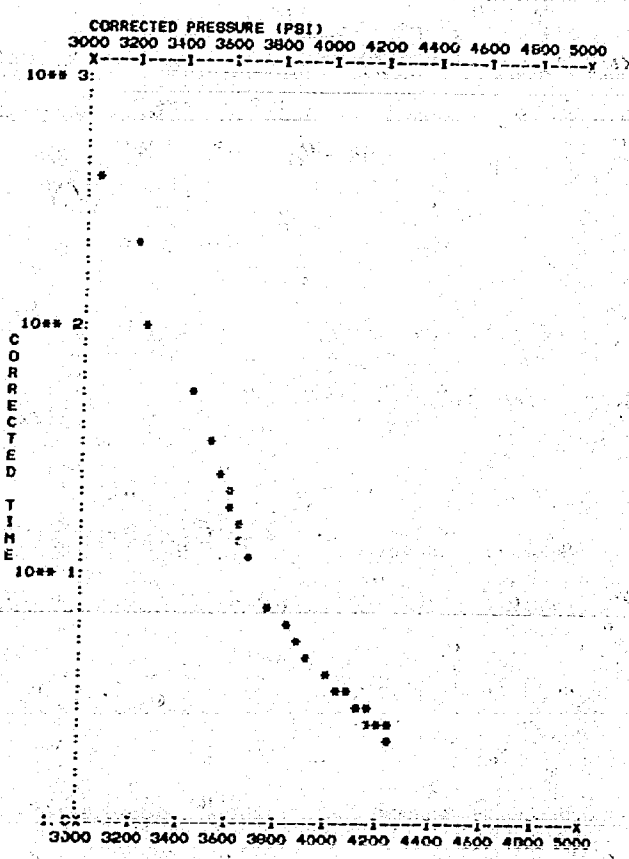


EXHIBIT 1 E

EXHIBIT 2
PRODUCTION STATISTICS
AUSTIN MISSISSIPPIAN (GAS) FIELD
LEA COUNTY, NEW MEXICO
Ralph H. Viney & Associates, Inc.
Engineering Consultants

Operator / Lease	1979 May	June	July	August	September	October	November	December	Totals for Year 1979	Cumulative Production 12-31-79	January
Adobe Oil & Gas											
Hannah #1											
Gas	27,625	15,853	16,077	13,838	12,678	10,108	8,482	14,560	119,221	119,221	11,478
Oil	486	303	275	208	162	195	83	196	1,908	1,908	126
Water	240	160	145	160	192	160	121	200	1,378	1,378	190
State 16 #1											
Gas	22,642	9,005	6,384	4,879	5,735	8,272	5,976	4,412	67,505	69,505	3,167
Oil	317		20			175	66	13	591	591	
Water	98	102	100	75	125	126	70	68	764		162
State 16 #2											
Gas						19,550	15,275	8,977	43,802	43,802	3,439
Oil						581	364		945	945	
Water						170	205	235	610	610	291
Harvey E. Yates Company											
Austin Monteith #1											
Gas											
Oil											
Water											
Yates Petroleum Corporation											
Barbee #1											
Gas											
Oil											
Water											

EXHIBIT 2
PRODUCTION STATISTICS
AUSTIN MISSISSIPPIAN (GAS) FIELD
LEA COUNTY, NEW MEXICO
Ralph H. Viney & Associates, Inc.
Engineering Consultants

1979							1980				
ugust	September	October	November	December	Totals for Year 1979	Cumulative Production 12-31-79	January	February	March	April	May
,838	12,678	10,103	8,482	14,560	119,221	119,221	11,478	6,058	8,229		
208	162	195	83	196	1,908	1,908	126	50	112		
160	192	160	121	200	1,378	1,378	190	188	117		
,879	5,735	8,272	5,976	4,412	67,505	69,505	3,167	2,716	3,314		
		175	66	13	591	591			51		
75	125	126	70	68	764		162	120	161		
		19,550	15,275	8,977	43,802	43,802	3,439	6,660	6,110		
		581	364		945	945		142	94		
		170	205	235	610	610	291	188	280		
								371	41,082		
								13	1,417		
									24,763		
									744		

EXHIBIT 2

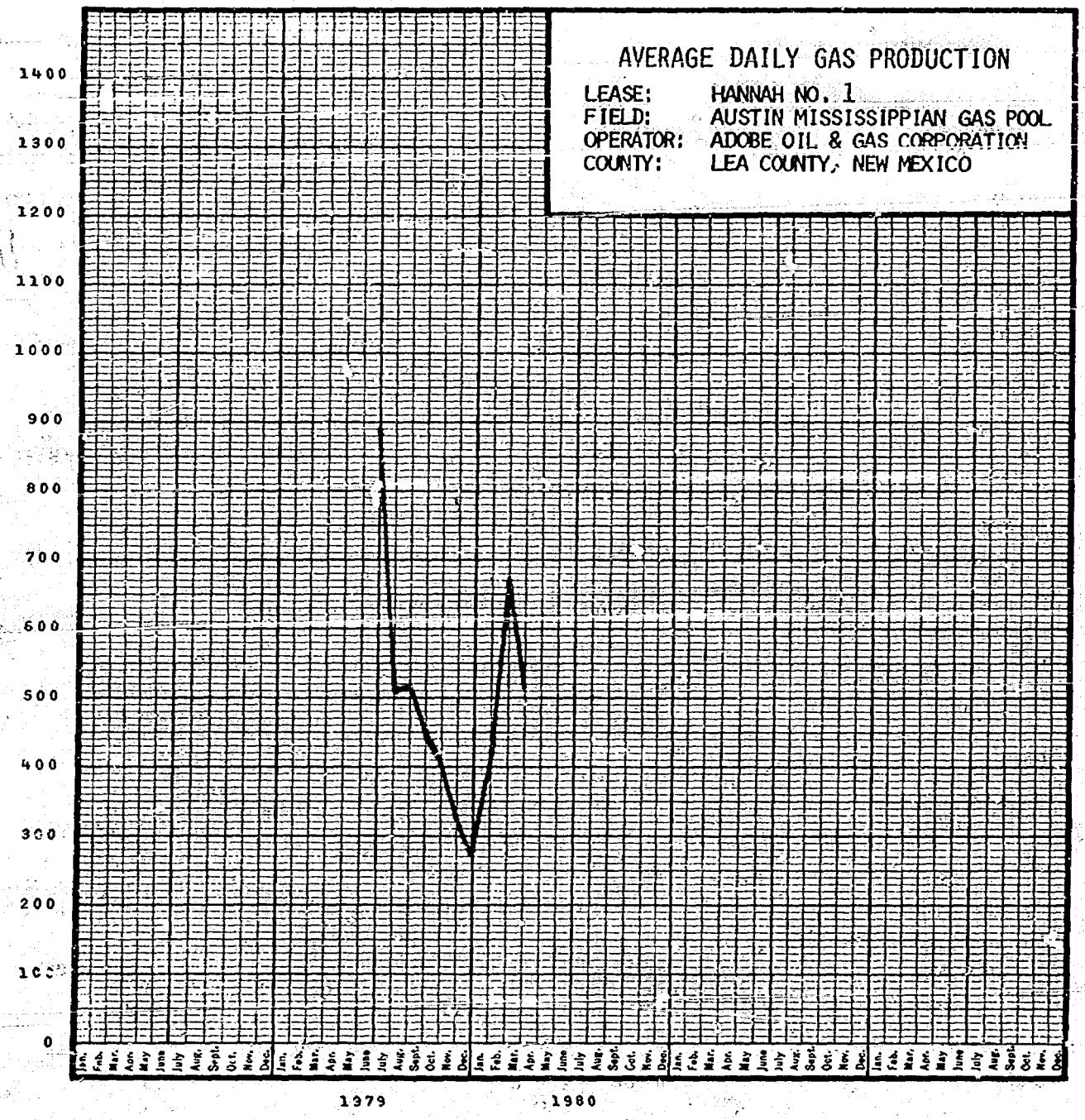

AVERAGE DAILY GAS PRODUCTION
LEASE: HANNAH NO. 1
FIELD: AUSTIN MISSISSIPPIAN GAS POOL
OPERATOR: ADOBE OIL & GAS CORPORATION
COUNTY: LEA COUNTY, NEW MEXICO
GAS PRODUCTION - MCF PER DAY
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
1979
1980

EXHIBIT 2 A

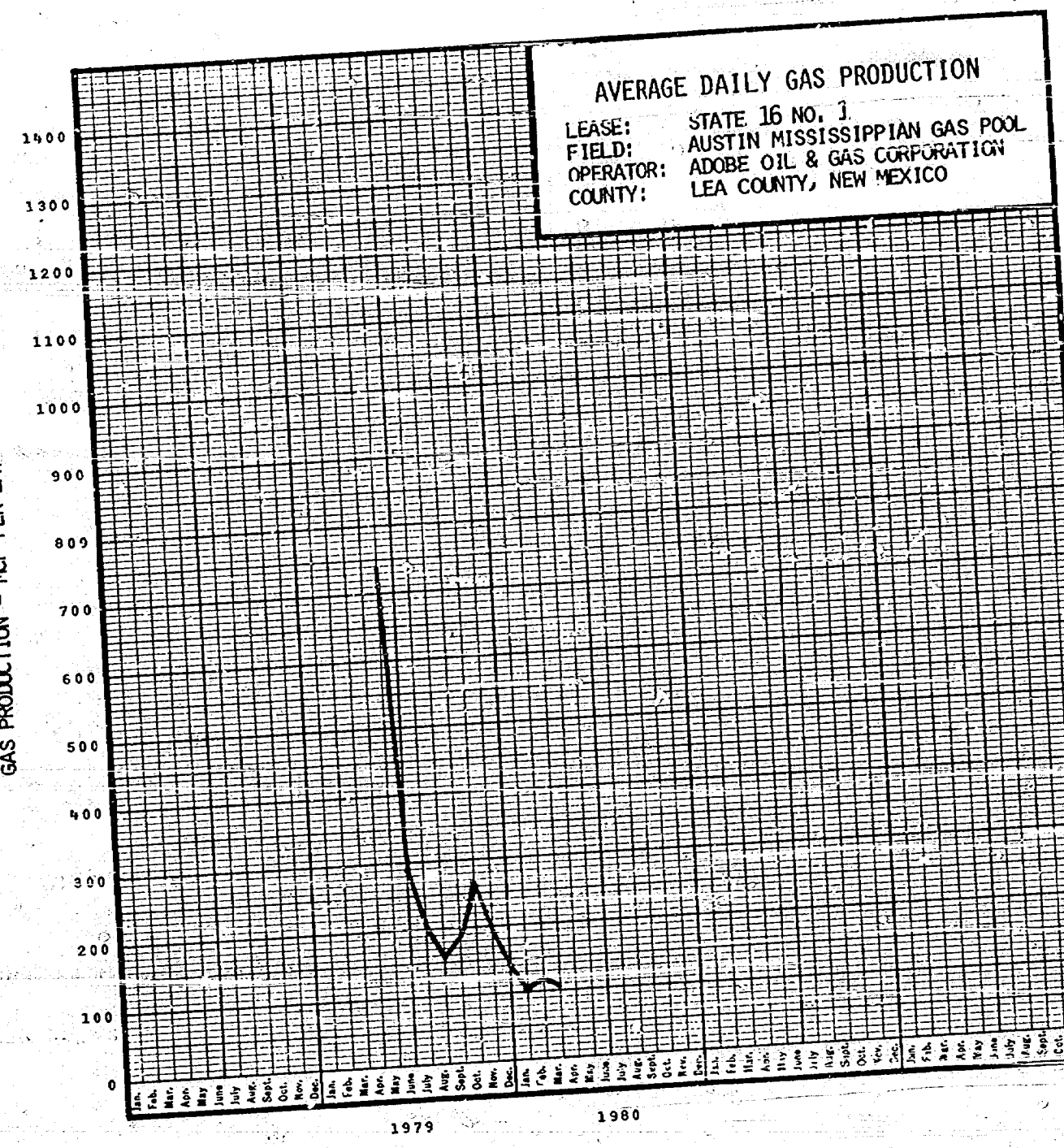

AVERAGE DAILY GAS PRODUCTION
LEASE: STATE 16 NO. 1
FIELD: AUSTIN MISSISSIPPIAN GAS POOL
OPERATOR: ADOBE OIL & GAS CORPORATION
COUNTY: LEA COUNTY, NEW MEXICO
GAS PRODUCTION - MCF PER DAY
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
1979
1980

EXHIBIT 2B

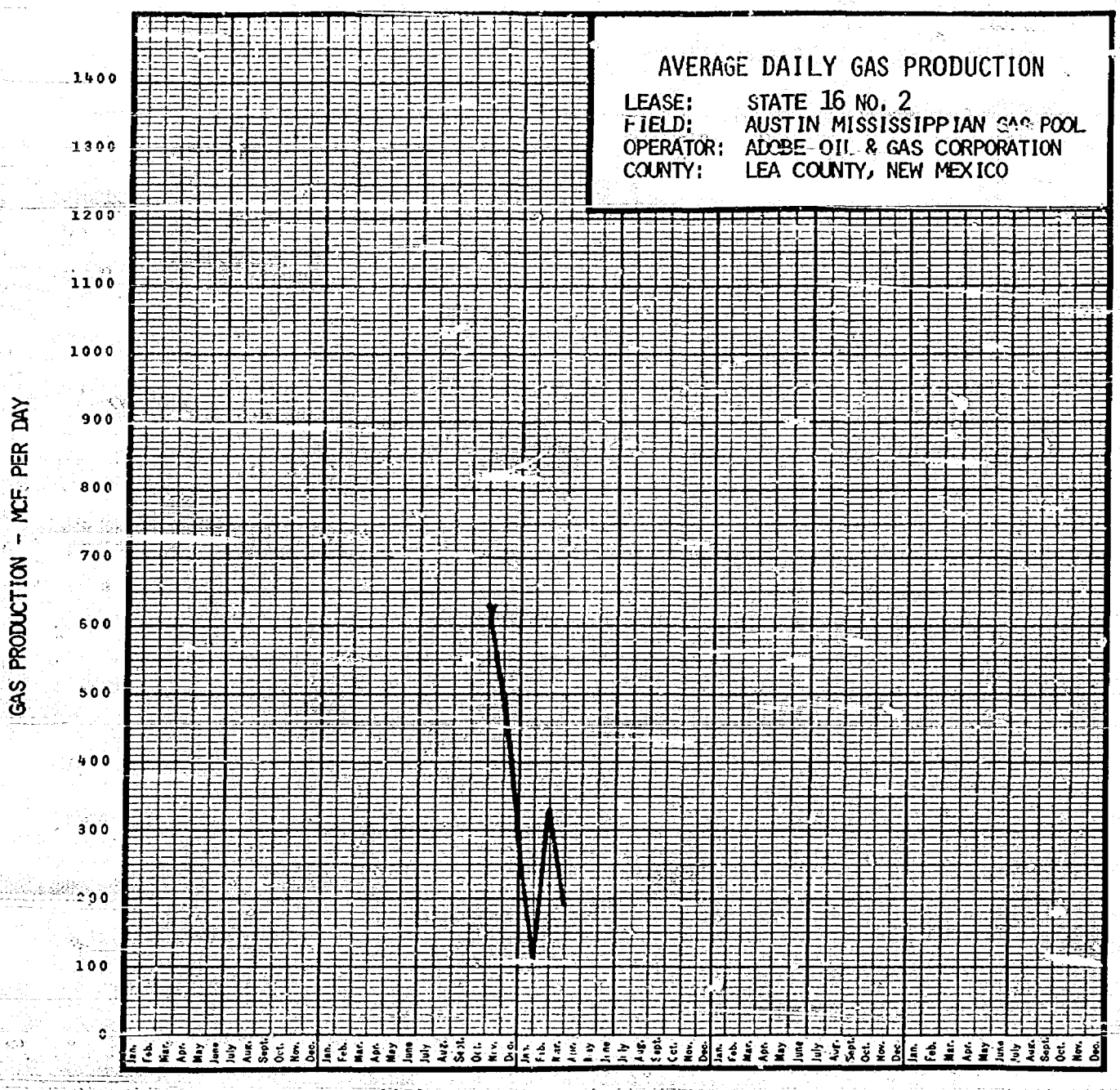

AVERAGE DAILY GAS PRODUCTION
LEASE: STATE 16 NO. 2
FIELD: AUSTIN MISSISSIPPIAN GAS POOL
OPERATOR: ADOBE OIL & GAS CORPORATION
COUNTY: LEA COUNTY, NEW MEXICO
GAS PRODUCTION - MCF PER DAY
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
1979
1980

EXHIBIT 2 C

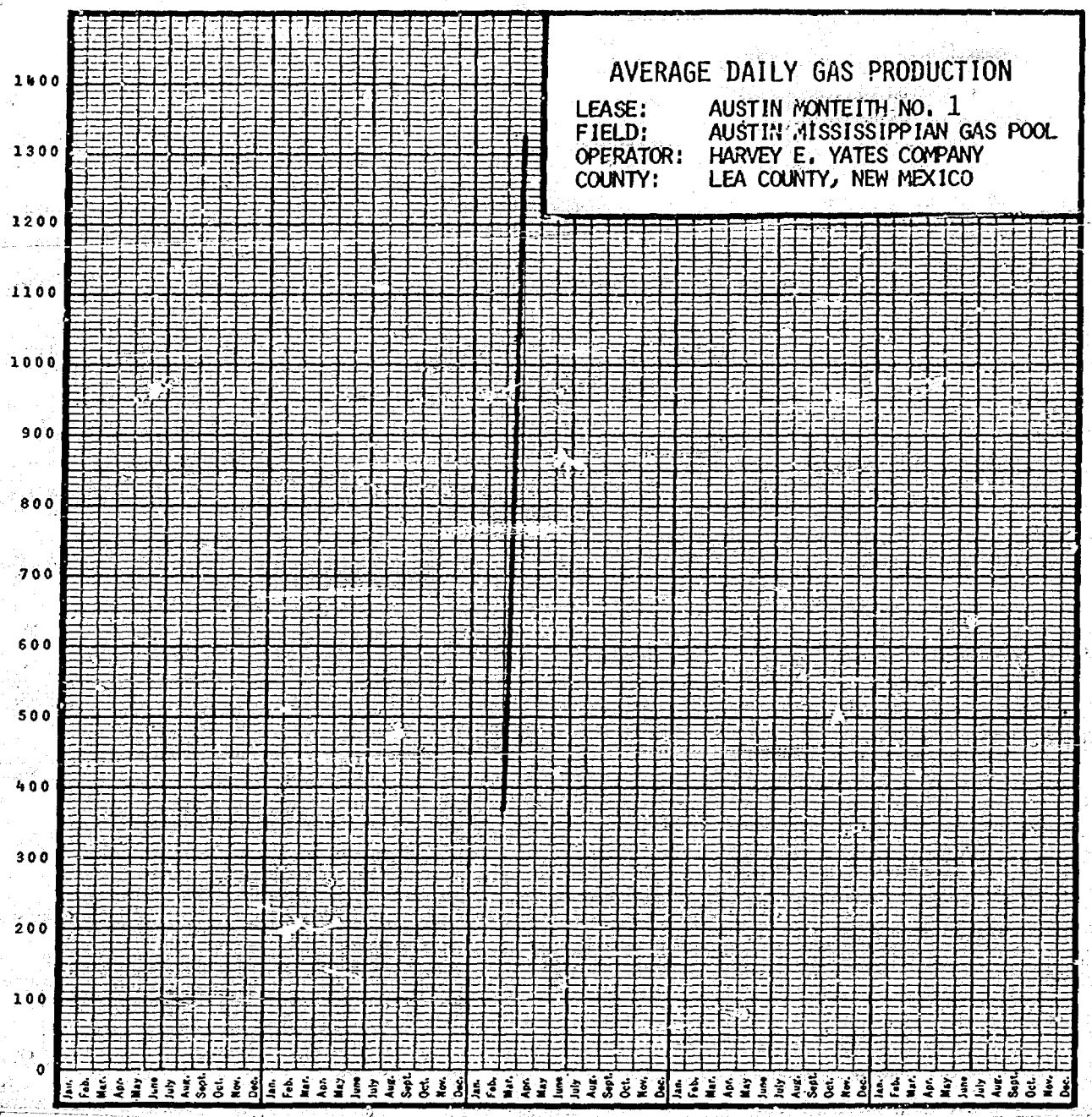
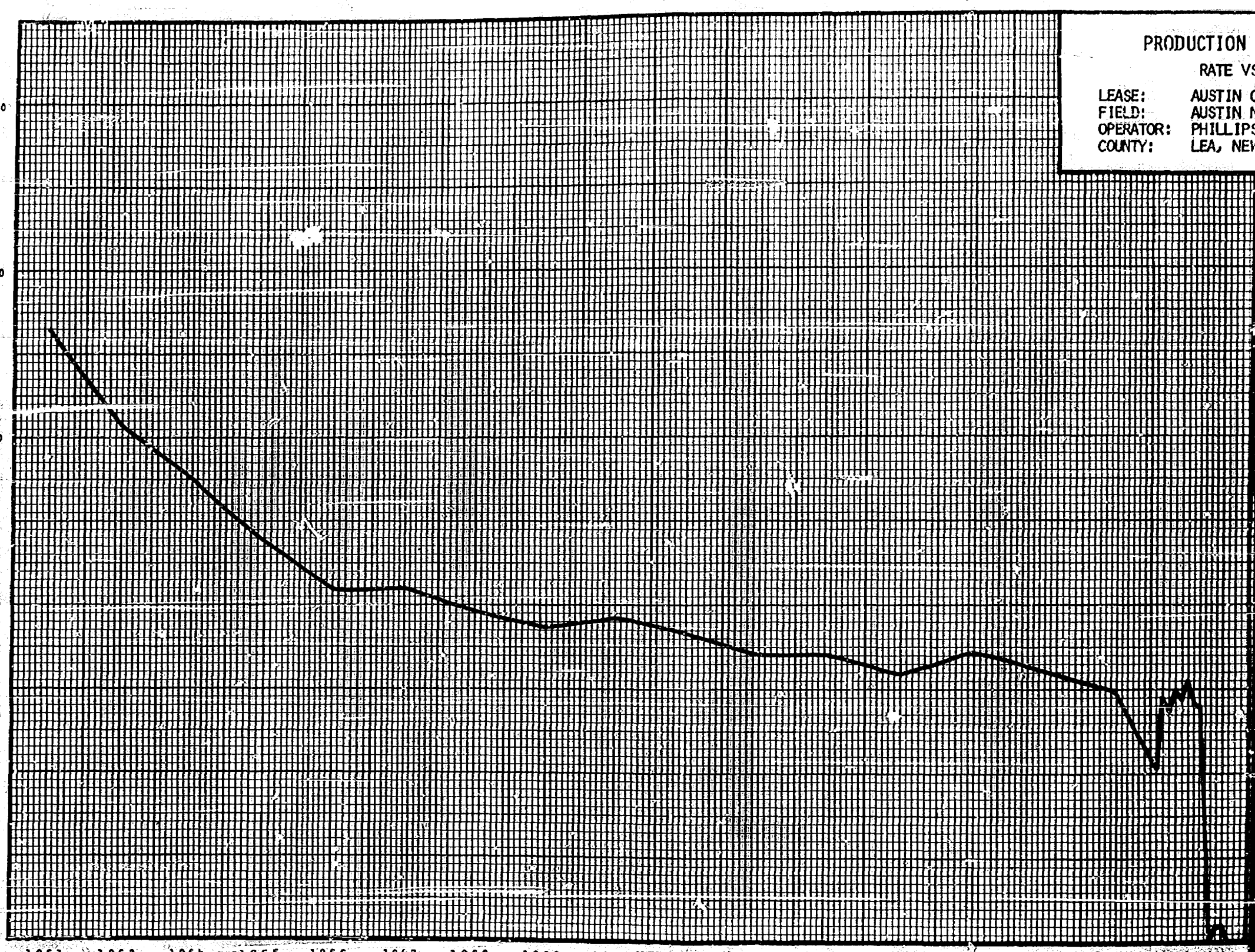

AVERAGE DAILY GAS PRODUCTION
LEASE: AUSTIN MONTEITH NO. 1
FIELD: AUSTIN MISSISSIPPIAN GAS POOL
OPERATOR: HARVEY E. YATES COMPANY
COUNTY: LEA COUNTY, NEW MEXICO
GAS PRODUCTION - MCF PER DAY
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
1980

EXHIBIT 2 D

PRODUCTION

RATE VS

LEASE: AUSTIN C
FIELD: AUSTIN N
OPERATOR: PHILLIPS
COUNTY: LEA, NEW

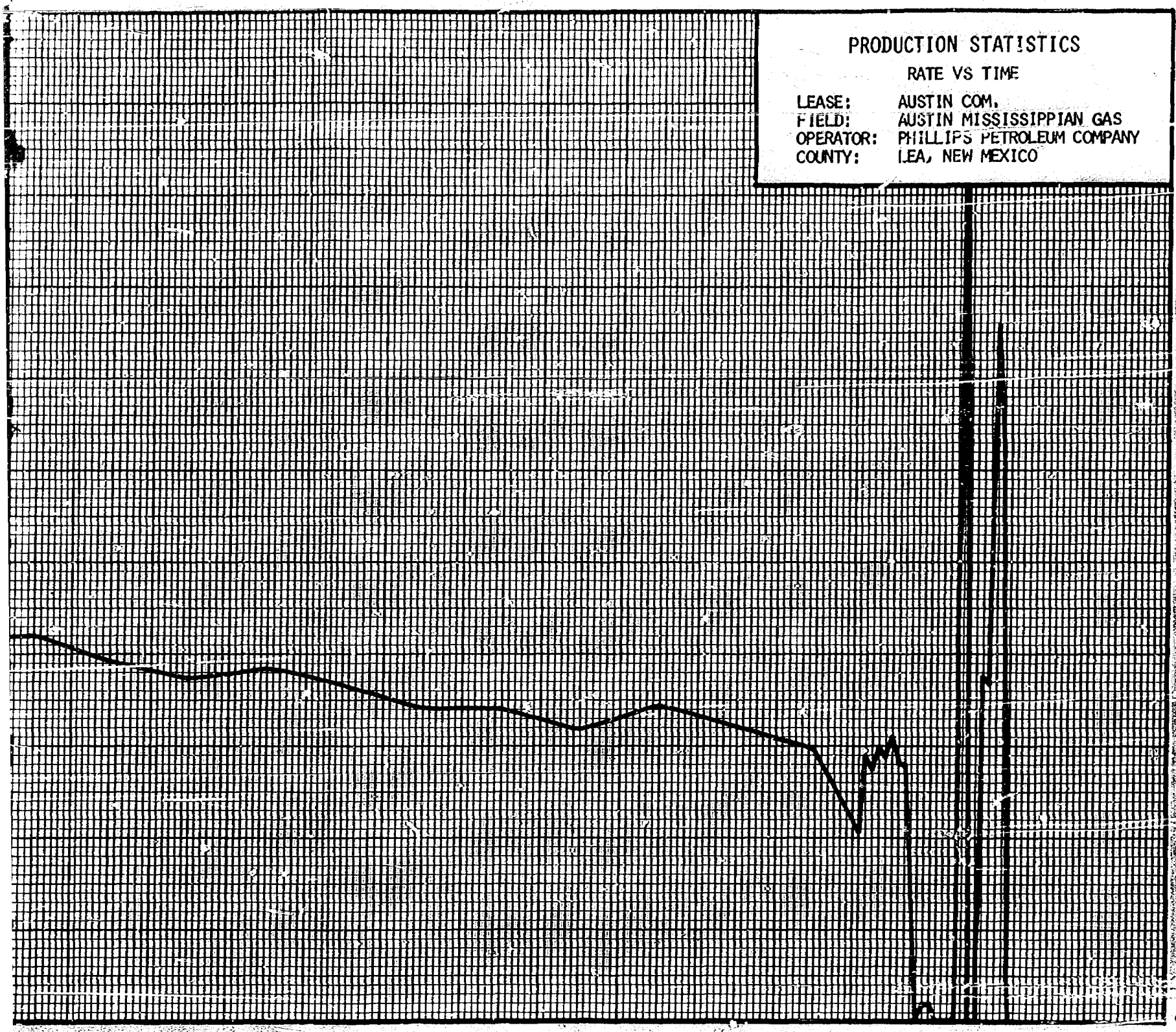


	1961	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
GAS PRODUCTION - MCF																	
ANNUAL	444397	368142	330253	268632	250137	254205	234611	264363	231751	220186	206248	206223	189743	207094	192758	176422	120228
CUMULATIVE	444397	812539	1142792	1429424	1679561	1933766	2168377	2392740	2624471	2844657	3050905	3257128	3446871	3653965	3846723	4023145	4143373

PRODUCTION STATISTICS

RATE VS TIME

LEASE: AUSTIN COM.
FIELD: AUSTIN MISSISSIPPIAN GAS
OPERATOR: PHILLIPS PETROLEUM COMPANY
COUNTY: LEA, NEW MEXICO

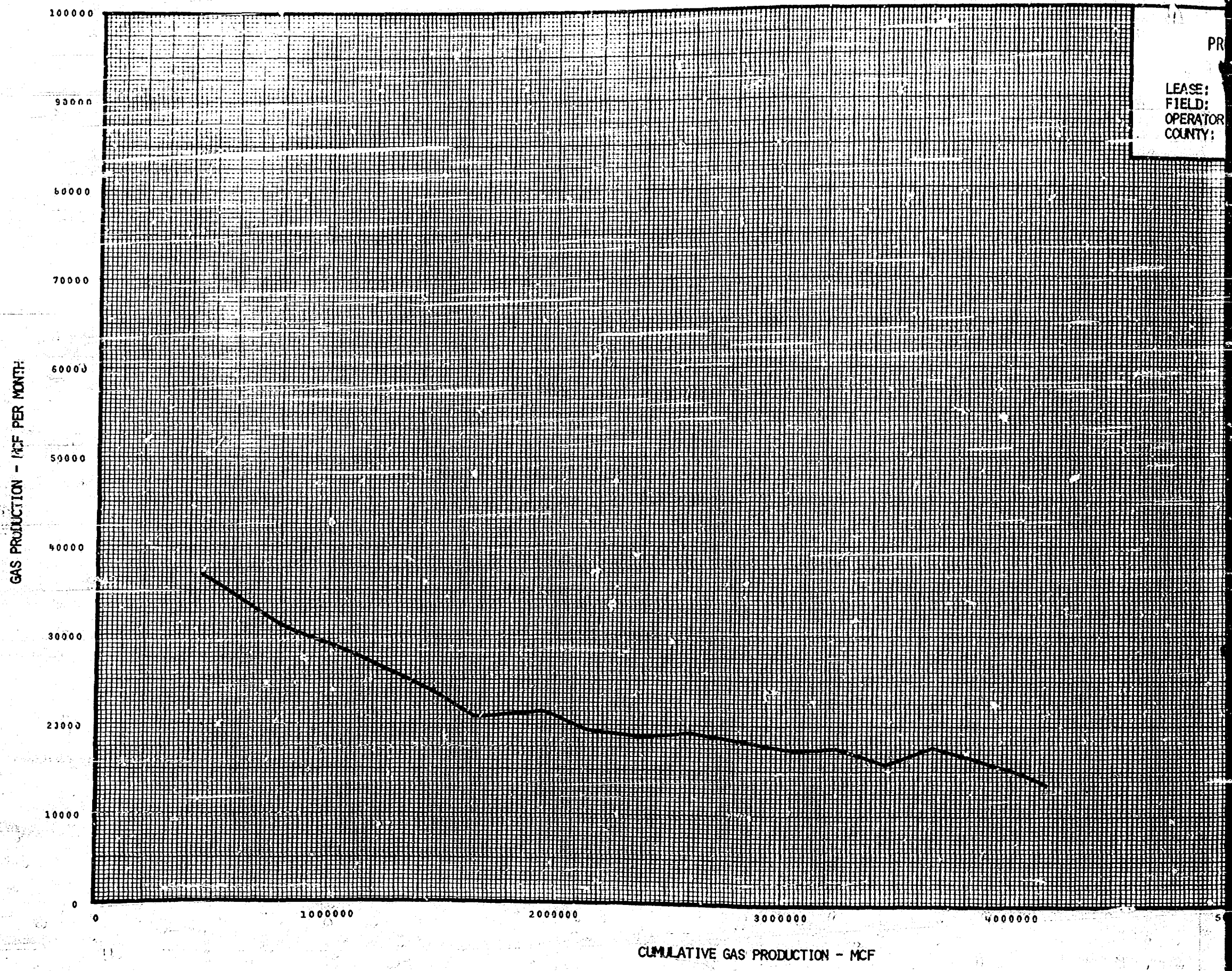


54205	234611	204363	231751	220166	206248	206223	189743	207094	192758	176422	120228	157105	
33766	2168377	2392740	2624471	2844657	3050905	3257128	3446871	3653965	3846723	4023145	4143373	4300478	

EXHIBIT 2 E

PR

LEASE:
FIELD:
OPERATOR
COUNTY:



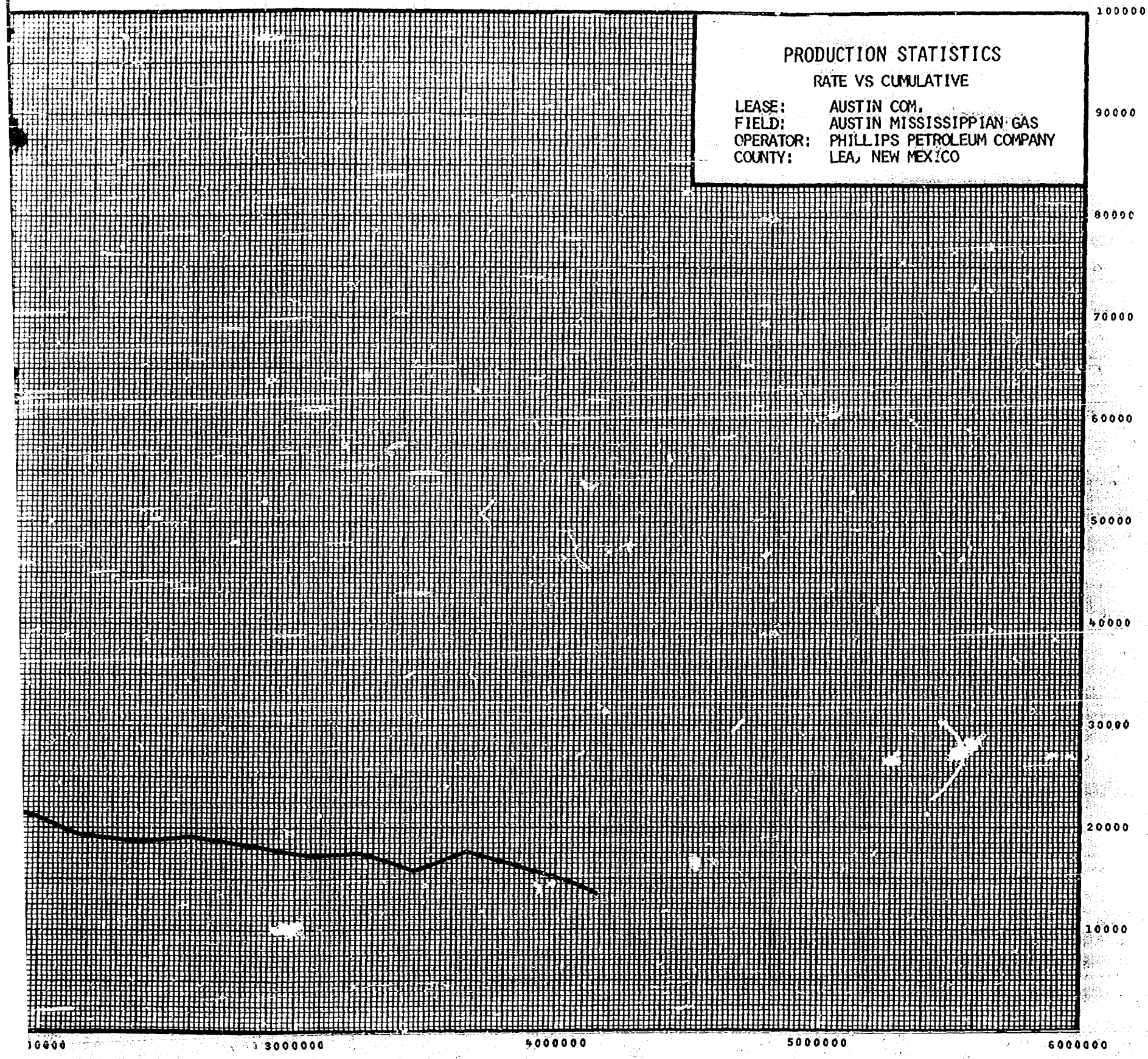

PRODUCTION STATISTICS
RATE VS CUMULATIVE
LEASE: AUSTIN COM,
FIELD: AUSTIN MISSISSIPPIAN GAS
OPERATOR: PHILLIPS PETROLEUM COMPANY
COUNTY: LEA, NEW MEXICO
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
GAS PRODUCTION - MCF PER MONTH
10000
3000000
4000000
5000000
6000000
CUMULATIVE GAS PRODUCTION - MCF

EXHIBIT 2 F

EXHIBIT 3
GAS
AUSTIN MISSISSIPPIAN
LEA COUNTY, NEW MEXICO
HARVEY E YATES COMPANY

RECOMBINATION
OF
SEPARATOR FLUID SAMPLES

INPUT DATA:

	STAGE 1	STAGE 2
PRESSURE,(PSIG)	133.0	0.
TEMPERATURE,(DEG.F.)	80.0	80.0
GAS RATE,(MSCF/D)	1175.0	

PRESSURE BASE = 14.696 PSIA. TEMPERATURE BASE = 60.0 DEG. F.

LIQUID AND GAS SAMPLE FROM STAGE 1

STAGE 1 GAS / STAGE 1 LIQ.D RATIO IS 29375 SCF/BBL
OR 34.0 BBL/MMSCF

BASIS FOR RECOMBINATION:

(1) SEPARATOR GOR = INPUT GOR / SHRINKAGE
= 29375 / 1.000 = 29375

(2) MOLES OF OIL = DENSITY / M.W.
= 262.2 / 100.5 = 2.417

(3) MOLES OF GAS = SEP. GOR / SCF PER MOLE
= 29375 / 379.51 = 77.402

(4) OIL FRACTION = .0303 ; GAS FRACTION = .9697

SEPARATOR RECOMBINATION

PAGE 2

COMPONENT NAME	SEPARATOR LIQ. MOL	SEPARATOR GAS MOL	SEPARATOR GAS GPM	WELL STREAM MOL	WELL STREAM GPM
NITROGEN	0.	.90	0.	.87	0.
CARBON DIOXIDE	0.	1.04	0.	1.01	0.
HYDROGEN SULFIDE	0.	0.	0.	0.	0.
METHANE	4.97	88.46	0.	85.93	0.
ETHANE	2.05	5.88	0.	5.76	0.
PROPANE	2.44	2.05	.56	2.06	.57
ISO-BUTANE	1.23	.43	.14	.45	.15
N-BUTANE	2.53	.61	.19	.67	.21
ISO-PENTANE	2.81	.27	.10	.35	.13
N-PENTANE	2.49	.20	.07	.27	.10
HEXANE	0.	.08	.03	.08	.03
HEPTANE	0.	0.	0.	0.	0.
OCTANE	0.	0.	0.	0.	0.
NONANE	0.	0.	0.	0.	0.
HEAVY ENDS*	81.48	.08	.04	2.55	1.28
	100.00	100.00	1.14	100.00	2.46

PROPERTIES OF THE HEAVY ENDS

SPECIFIC GRAV.	.770	.645	.770
MOLECULAR WT.	122.7	100.3	122.7

CALCULATED SEPARATOR GAS GRAVITY (AIR=1.00) = .644
CALCULATED GROSS HEATING VALUE FOR SEPARATOR GAS = 1116.3 BTU PER CUBIC FOOT OF DRY GAS AT 14.696 PSIA AND 60 DEG.

FLASH OF RECOMBINED FLUID GIVES:
STAGE 1 GAS TO STAGE 1 OIL RATIO = 29984 SCF/BBL
STAGE 1 OIL GRAVITY = 35.4 DEGREES API.

* THE HEAVY END IS HEPTANES+

THE FLUID IS A GAS-CONDENSATE SYSTEM WITH DEW POINT = 3792 PSI

EXHIBIT 3-A
AUBIN MISSISSIPPIAN
LEA COUNTY, NEW MEXICO
HARVEY E YATES COMPANY
07/02/80. 12.41.28.

FLUID ANALYSIS
BY
SIMULATION TECHNIQUE

Results

DATA

COMPONENT	MOL PER CENT
NITROGEN	.87
CARBON DIOXIDE	1.01
HYDROGEN SULFIDE	0.
METHANE	85.93
ETHANE	5.76
PROPANE	2.66
ISO-BUTANE	.43
N-BUTANE	.67
ISO-PENTANE	.35
N-PENTANE	.27
HEXANE	.08
HEPTANE	0.
OCTANE	0.
NONANE	0.
HEAVY ENDS	2.55
	100.00

PRESSURE BASE = 14.70 PSI/ATM
TEMP. BASE = 60.0 DEG. F.

SEPARATION CONDITIONS:
PRESSURE 133 0
TEMP. 80

THE HEAVY ENDS ARE HEPTANES+

HEAVY ENDS MOLECULAR WEIGHT : 123
SPECIFIC GRAVITY : .7699
CRITICAL PRESSURE : 384 PSIG
CRITICAL TEMP. : 1068 DEG. F.
NORM. BOILING PT. : 285 DEG. F.

RESERVOIR
GAS PVT PROPERTIES
SIMULATION TECHNIQUE

CONSTANT VOLUME LIBERATION

PRESSURE PSIG	Z-FACTOR	VISCOSITY CP	CO V/HHV/PSI	F-V-F RVB/MSCF	GASFAC SCF/RCF	DENSITY LBS/CF
7000	1.1655	.0333				
5400	1.0334	.0282	64.31	.559	318.77	17.786
3800	.9126	.0228	107.76	.642	277.29	15.645
			214.98	.806	221.01	12.470
3792	.9122	.0228	215.03	.807	220.63	12.449
3600	.9037	.0221	228.63	.842	211.44	11.913
3400	.8948	.0215	244.03	.883	201.67	11.347
3200	.8858	.0208	261.22	.929	191.75	10.773
3000	.8767	.0201	292.51	.981	181.63	10.190
2800	.8715	.0192	341.19	1.044	170.22	9.557
2600	.8711	.0183	396.44	1.124	158.42	8.892
2400	.8769	.0175	442.37	1.225	145.38	8.630
2200	.8801	.0168	474.85	1.342	132.68	6.866
2000	.8834	.0162	520.49	1.482	120.17	6.159
1800	.8902	.0157	595.69	1.659	107.33	5.467
1600	.8976	.0152	670.78	1.882	94.61	4.802
1400	.9046	.0147	766.40	2.173	81.96	4.154
1200	.9165	.0142	884.93	2.563	69.49	3.520
1000	.9263	.0137	1061.58	3.178	57.30	2.901
800	.9394	.0133	1322.33	3.940	45.20	2.289
700	.9466	.0131	1505.16	4.538	39.25	1.989

DEW-POINT PRESSURE 3792 PSIG AT 207 DEG.F.
GRAVITY .739 (AIR=1.0)
GPM 3.465 (TOTAL PROPANES+ IN WELL-STREAM GAS)

GAS CONDENSATE PVT
PROPERTIES

CONSTANT VOLUME LIBERATION

PRESSURE PSIG	Z-FACTOR 2-PHASE	LIQ.SAT. PCT. HPV	PROD.GAS GRAVITY	C.O+G V/HHV/PSI	LIQ.VIS. CP	LIQ.DENS. LBS/CF
3792	.9122	0.	.7458	215.03	.0124	0.
3600	.9037	0.	.7448	228.63	.0119	0.
3400	.8948	0.	.7438	244.03	.0113	0.
3200	.8858	0.	.7429	261.22	.0106	0.
3000	.8767	0.	.7416	285.26	.0097	0.
2800	.8689	1.19	.7253	328.38	.1244	31.277
2600	.8660	2.22	.7073	384.65	.1428	32.435
2230	.8690	2.81	.6937	431.67	.1610	33.416
2000	.8712	3.11	.6840	465.95	.1788	34.247
1800	.8782	3.23	.6775	520.42	.1957	34.849
1600	.8845	3.24	.6714	588.04	.2116	35.550
1400	.8919	3.22	.6610	663.52	.2265	36.073
1200	.9004	3.15	.6499	759.34	.2407	36.534
1000	.9087	3.08	.6495	879.08	.2542	36.960
800	.9202	3.00	.6493	1034.38	.2675	37.359
700	.9247	2.93	.6494	1315.17	.2804	37.739
600	.9331	2.89	.6499	1498.27	.2871	37.972
500	.9396	2.84	.6709	1735.58	.2935	38.104
400	.9466	2.79	.6728	2048.45	.2999	38.285
		2.74	.6760	2569.40	.3065	38.469

DEW POINT PRESSURE 3792 PSIG AT 207 DEG.F.
GPM 3.465 (PROPANES+ IN WELLSTREAM GAS)

EXHIBIT 3-A

For Program: FAST

Fluid Analysis by Simulation Technique

Input Data Form 4/27/71

Description:

Reservoir	101	Mississippi Gas - Monument
Field	102	Austin Mississippi
State & County	103	Lea County, New Mexico
Other	104	Harvey E. Yates Company

Reservoir and Units Data:

	Reservoir Temperature, °F	Max. Reservoir[1] Pressure, PSIG	Saturation Pres.[2] if Known, PSIG	Units (US=1,[3] Canadian=2	
201	207	5544	0	1	

Separator Conditions:

	Stage #1[4]	Stage #2	Stage #3	Stage #4	Standard Cond.[5]
203 Pressure, PSIG	133	0	0	0	14.696
204 Temperature, °F	80	80	0	0	60

Data For:[6] Gas Sample or Full Well Stream Mol Percent

	N_2	CO_2	H_2S	C_1	C_2
301	0.90	1.04	0	88.46	5.88
	C_3	iC_4	nC_4	iC_5	nC_5
302	2.05	0.43	0.61	0.27	0.20
	C_6	C_7	C_8	C_9	C_L
303	0.08	0	0	0	0.09
	Molecular Wt. of C_L	Sp. Gravity of C_L	Sample Source;[8] Sep. Stage No.	Prod. Rate, MSCF/D	
304	100.3	0.645	1	1175	

Data For: Liquid Sample (Omit if Full Well Stream Data Entered on Lines 301-304)

	N_2	CO_2	H_2S	C_1	C_2
401	0	0	0	4.97	2.05
	C_3	iC_4	nC_4	iC_5	nC_5
402	2.44	1.23	2.53	2.81	2.49
	C_6	C_7	C_8	C_9	C_L
403	0	0	0	0	81.48
	Molecular Wt. of C_L	Sp. Gravity of C_L	Measurement[9] Stage No.	Prod. Rate, B/D	Separator[10] Shrinkage Bbl/Bbl
404	122.71	0.77	1	40	4.0

ASTM Boiling Point Data:

	1	2	3	4	5	6	7	8	9	10
501 Volume Distilled, %	0	10	20	30	40	50	60	70	80	90
502 Temperature, °F	108	174	202	220	240	260	288	322	364	454

Lab Matching Data:[7] (Optional)

601 Pressures 1-10										
602 Pressures 11-20 (Descending Order)										
701 V/V_R's 1-10										
702 V/V_R's 11-20										

Notes:
(1) Should be at least 1000 PSI above expected saturation pressure.
(2) Enter zero if unknown.
(3) Used only in calculation of GPM.
(4) The first stage is the high pressure stage; the last stage is the stocktank. Enter zero for separators not used.
(5) Enter area pressure base, PSIA/ATM; and standard conditions temperature, °F.
(6) Enter zeros for components not utilized in analysis.
(7) Be sure to include data from both above and below the bubble point.
(8) Separator Stage where the samples were taken for compositional analysis.
(9) Separator Stage where the liquid volume was measured.
(10) Enter zero if unknown, otherwise this value describes the change in volume of the liquid sample from the separator where the samples were taken for compositional analysis to the separator where the liquid volume was measured.

EXHIBIT 3B

SOUTHWESTERN LABORATORIES
1703 West Industrial — P. O. Box 2150
MIDLAND, TEXAS 79701
(915) 683-3348

FRACTIONAL ANALYSIS REPORT

DATE RECEIVED 6-30-80

SAMPLE MARKED Austin Montieth #1 Separator Gas

133 psi @ 80° F.

FILE NO. C-1950-C

LAB. NO. 44311

SAMPLE FROM Harvey E. Yates

DATE SECURED 6-26-80

DATE OF RUN 6-30-80

SECURED BY Tefteller

COMPONENT	MOL. %	G. P. M.	LIQUID VOL. %
Oxygen			
Nitrogen	0.90		
Carbon Dioxide	1.04		
Methane	88.46		
Ethane	5.88	1.568	
Propane	2.05	0.563	
i-Butane	0.43	0.140	
n-Butane	0.61	0.192	
i-Pentane	0.27	0.099	
n-Pentane	0.20	0.072	
Hexanes	0.08	0.033	
Heptanes & Heavier	0.08	0.037	
Hydrogen Sulfide	*None Det.		
Helium			
Hydrogen			
Carbon Monoxide			
TOTALS	100.00	2.704	

CONDENSATE VALUES, G.P.M.

Propane
Butane
Gasoline

HEATING VALVE, B.T.U. Per Cu. Ft.*

Calculated from % Composition 1110
Calculated water saturated 1091

SULPHUR CONTENT, Grains Per 100 Cu. Ft.*

Hydrogen Sulfide
Mercaptans

SPECIFIC GRAVITY*

Calculated from % Composition 0.645

*14.696 lbs./sq. in., 60° F

REMARKS Propane + GPM — 1.136

*Determined on laboratory sample.

COPIES: 3cc Harvey E. Yates
1cc Tefteller
1cc R. Viney

SOUTHWESTERN LABORATORIES

EXHIBIT 3 C

SOUTHWESTERN LABORATORIES
1703 West Industrial — P. O. Box 2150
MIDLAND, TEXAS 79701
(915) 683-3348

FRACTIONAL ANALYSIS REPORT

SAMPLE MARKED: Austin Montieth No. 1

Separator Liquid, 133 psi @ 80° F.

SAMPLE FROM: Harvey E. Yates

DATE OF RUN: 7-1-80

DATE RECEIVED: 6-30-80

FILE NO.: C-1950-G

LAB. NO.: 44312

DATE SECURED: 6-26-80

SECURED BY: Tefteller, Inc.

COMPONENT	MOL. %	G. P. M.	LIQUID VOL. %
Oxygen			
Nitrogen			
Carbon Dioxide			
Methane	4.97		1.82
Ethane	2.05		1.12
Propane	2.44		1.45
I-Butane	1.23		0.87
N-Butane	2.53		1.72
I-Pentane	2.81		2.22
N-Pentane	2.49		1.95
Hexanes plus Heptanes & Heavier	81.48		88.95
Hydrogen Sulfide			
Helium			
Hydrogen			
Carbon Monoxide			
TOTALS	100.00		100.00

CONDENSATE VALUES, G.P.M.

Propane
Butane
Gasoline

HEATING VALVE, B.T.U. Per Cu. Ft.*

Calculated from % Composition
Calculated water saturated

SULPHUR CONTENT, Grains Per 100 Cu. Ft.*

Hydrogen Sulfide
Mercaptans

SPECIFIC GRAVITY*

Calculated from % Composition

*14.696 lbs /sq. in., 60° F

REMARKS: Molecular weight of hexanes plus--------- 122.71

Specific Gravity of hexanes plus--------- 0.770

COPIES: 3cc Harvey E. Yates
1cc Tefteller
1cc R. Viney

SOUTHWESTERN LABORATORIES

Analyst H. W.

EXHIBIT 3 D

SOUTHWESTERN LABORATORIES

FORT WORTH - DALLAS - HOUSTON - MIDLAND - BEAUMONT - TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland Texas 7-2-80 File No. C-1950-GD

Report of tests on Fluid

To Harvey E. Yates Date Rec'd. 6-30-80

Received from

Identification Marks Austin Montieth No. 1, Separator Liquid, 6-26-80, 133 psi @ 80° F., Flashed to Atmos.

DISTILLATION, ASTM D-86

Percent Distilled	Observed Temperature° F
I.B.P.	108
5	160
10	176
20	202
30	220
40	240
50	260
60	288
70	322
80	364
90	454
95	534
	454 (End Point)

Percent Recovery ------- 96.0
Percent Residue ------- 1.5
Percent Loss ---------- 2.5
Gravity ---------- 57.1 ° A.P.I. @ 60° F
Color ---------- Lt. Straw

Bar. Press. ---- 687 mm Hg

3cc Harvey Yates
1cc Tefteller
1cc R. Viney

SOUTHWESTERN LABORATORIES
Jack H Burton

Lab. No. 44312

EXHIBIT 3 E

SOUTHWESTERN LABORATORIES

FORT WORTH · DALLAS · HOUSTON · MIDLAND · BEAUMONT · TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland Texas 7-2-80 File No. C-1950-G

Report of tests on Fluid Date Rec'd. 6-30-80

To Harvey E. Yates

Received from

Identification Marks Austin Montieth No. 1, Separator Liquid

PRESS. & TEMP.	TOTAL VOL. ml	GAS VOL. Cu. Ft. @ t	RESIDUE VOL. ml
133 psi @ 80° F.	508.0	0.238 @ 82.5° F.	490.0

3cc Harvey E. Yates
1cc Tefteller
1cc R. Viney

SOUTHWESTERN LABORATORIES
Jack H Barton

Lab. No. 44312

EXHIBIT 3 F

SOUTHWESTERN LABORATORIES

FORT WORTH · DALLAS · HOUSTON · MIDLAND · BEAUMONT · TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 7-2-80 File No. C-1950-W

Report of tests on Water

To Harvey E. Yates

Received from

Date Rec'd. 6-30-80

Identification Marks Austin Montieth #1, Separator Water, 6-26-80, Sampled by Tefteller

	mg/L
Calcium	400
Magnesium	73
Sodium (Calc.)	4686
Iron	High, Greater than 5
Carbonate	None
Bicarbonate	362
Sulfate	186
Chloride	7801
Total Dissolved Solids (Calc.)	13327
Total Hardness (as $CaCO_3$)	1299
Resistivity	0.390 @ 87° F.
pH	6.22

3cc Harvey E. Yates
1cc Tofteller
1cc R. Viney

Lab. No. 31635

SOUTHWESTERN LABORATORIES
Jack H Barton

EXHIBIT 3 G

Field Operator	County and State Lease Name and Well Number	Legal Description	Elevation	Date of Completion or Recompletion	Total Depth and Plug Back	Casing Record Size	 Depth
Austin Field	**Lea County, New Mexico**						
Adobe Oil & Gas Corp.	Hannah #1	Parcel H, Section 17, T-14-S, R-36-E	3954' GR	3-26-79	13,832' 13,520'	13-3/8" 8-5/8" 5-1/2"	371' 4,640' 13,831'
	State 16 #1	Parcel M, Section 16, T-14-S, R-36-E	3944' GR	4-29-78	13,770' 13,687'	13-3/8" 9-5/18" 5-1/2"	366' 4,661' 13,770'
	State 16 #2	Parcel F, Section 16, T-14-S, R-36-E	3945' GR	9-11-79	13,875' 13,400'	13-3/8" 8-5/8" 5-1/2"	389' 4,675' 13,875'
Phillips Petroleum Company	Austin Com.	Parcel M, Section 17, T-14-S, R-36-E	3979' DF	7-22-57	14,796' 13,290'	13-3/8" 9-5/8" 7 "	392' 4,650' 13,425'
Harvey E. Yates Company	Austin-Monteith #1	Parcek K, Section 8, T-14-S, R-36-E	3966' GR	7-20-79	14,000' 13,478'	13-3/8" 8-5/8" 5-1/2"	388' 4,608' 14,000'
	Barbee "LL" #1	Parcel G, Section 18, T-14-S, R-36-E	3976' GR	11-29-79	13,930' 13,700'	13-3/8" 8-5/8" 4-1/2"	387' 4,650' 13,838'

EXHIBIT 4
WELL DATA
MISSISSIPPI GAS POOL
LEA COUNTY, NEW MEXICO
Ralph H. Viney & Associates, Inc.
Engineering Consultants

Casing Record						Initial Potential					
Size	Depth	Cement	Producing Zone	Perforated Interval	Well Stimulation	Choke Size	Test Interval	Gas MCFD	Condensate BOPD	Gas-Oil Ratio	Water BWPD
13-3/8"	371'	450 Sx			Acidized w/4000	6/64"	60 Min	810	-	31000	-
8-5/8"	4,640'	1880 Sx	Mississippian	13,397'-13,460'	Gals 20% Acid	12/64"	60 Min	1480	-	-	-
5-1/2"	13,631'	1300 Sx				16/64"	60 Min	2685	-	-	-
						18/64"	60 Min	3347	-	-	-
							CAOF	7176	-	-	-
13-3/8"	368'	450 Sx	Mississippian	13,199'-13,261'	Acidized w/4000	7/64"	60 Min	710	-	-	-
9-5/18"	4,661'	1600 Sx			Gals 15% Acid	8/64"	60 Min	890	-	-	-
5-1/2"	13,770'	1600 Sx				9/64"	60 Min	990	-	-	-
						10/64"	60 Min	1200	-	-	-
							CAOF	2740	-	77773	-
13-3/8"	389'	425 Sx	Mississippian	13,288'-13,373'	Acidized w/400	16/64"	-	1150	-	-	-
8-5/8"	4,C75'	2200 Sx			Gals Acid	14/64"	19 Hrs	767	30	-	-
5-1/2"	13,875'	1750 Sx				8/64"	13 Hrs	1125	34	-	-
13-3/8"	392'	375 Sx	Mississippian	13,194'-13,208'	-	-	CAOF	4925	152	-	-
9-5/8"	4,650'	710 Sx									
7 "	13,425'	590 Sx									
13-3/8"	388'	400 Sx	Mississippian	13,360'-13,391'	Natural	32/64"	24 Hrs	1211	-	-	-
8-5/8"	4,608'	1630 Sx									
5-1/2"	14,000'	1750 Sx									
13-3/8"	387'	400 Sx	Mississippian	13,360'-13,398'	Natural	1/2 "	24 Hrs	1075	4	26000	-
8-5/8"	4,650'	2350 Sx									
4-1/2"	13,838'	1150 Sx									

Initial Potential Test Data

Condensate BOPD	Gas-Oil Ratio	Water BWPD	Flowing Pressure: Tubing Pressure	Flowing Pressure: Bottom Hole Pressure	Flowing Pressure: Casing Pressure	Gravity: Gas Air = 1	Gravity: Condensate API	Remarks
-	31262	-	2375	-	-	0.68	-	Flowed 2700 MCFGPD for 4 hours on 19/64" ch w/tubing p
-	-	-	2330	-	-	-	-	
-	-	-	2225	-	-	-	-	
-	-	-	1980	-	-	-	-	
-	-	SIWHP	2915	-	-	-	-	
-	-	-	1980	-	-	-	-	
-	-	SIWHP	2915	-	-	-	-	
-	-	-	2490	-	-	-	-	
-	-	-	2405	-	-	-	-	DST (Miss) 13,186', op 2 hrs, GTS @ 103 MCFGPD 16/64"
-	-	-	2315	-	-	-	-	ch, rec 613' GCM (sampler rec 7.32 CFG @ 1200#) ISIP 382
-	-	-	2215	-	-	-	-	493#/hr 4 hrs, HP 6275-6275#; after perf flo @ 1800 MCFGP
-	77773	SIWHP	-	SIBHP	4157	-	54.7	45 min; flo @ 500 MCFGPD + 11 BC/10 hrs 10/64" ch, fl @ 2215#
-	-	-	2200	-	-	-	-	DST (Miss) 13,270-13,360', op 2 hrs 20 min w/strong blow
30	-	-	1100	-	-	-	-	thru 1/2" ch, TP 340# stab @ 1670 MCFGPD of FF, rec 240
34	-	-	1800	-	-	-	-	5823#, FP 553-774# 4 hr FSIP 5578#, HP 6427-6427#, BTH
152	-	-	-	-	-	-	52.0	DST (Miss) 13,195-13,305', op 2 hrs 35 min, rate 1541 MC 1316' GCWB & 316' GCM, FP 2310#, SIP 5313# perf 13,214-24 8 hrs 1/4" ch, gas vol 3152 MCFGPD, flwd 8 BD/hr, gas vol 37
-	-	-	500	-	-	-	-	DST (Miss 13,231-400' op 3 hrs 33 min, rec 518' cond + 200 FP 2571-1324# 4 hr FSIP 5739#, HP 6558-6493#, BHT 196°
4	26800	-	178	-	-	-	-	No DST was run on Mississippian formation

Gravity Condensate 1 API	Remarks
-	Flowed 2700 MCFGPD for 4 hours on 19/64" ch w/tubing pressure 1400 psi.
-	
-	
-	
-	
-	DST (Miss) 13,186', op 2 hrs, GTS & 103 MCFGPD 16/64" ch inc to 206 MCFGPD 24/64" ch, rec 813' GCM (sampler rec 7.32 CFG @ 1200#) ISIP 3824#/hr, FP 232-254#, FSIP 496#/hr 4 hrs, HP 6275-6275#; after perf flo @ 1800 MCFGPD 22/64" ch + 16 BC/4 hrs 45 min; flo @ 500 MCFGPD + 12 BC/10 hrs 10/64" ch, fl @ 1200 MCFGPD 10/64" ch FT 2215#
-	
-	
-	
54.7	
-	DST (Miss) 13,270-13,360', op 2 hrs 20 min w/strong blow GTS/7½ min @ 2250 MCFGD thru 1/2" ch, TP 340# stab @ 1670 MCFGPD of FF, rec 240' cond + CLGCM 1 hr ISIP 5823#, FP 553-774# 4 hr FSIP 5578#, HP 6427-6427#, BTH 181°
-	
-	
52.0	DST (Miss) 13,195-13,305', op 2 hrs 35 min, rate 1541 MCFGPD, rec 660' dist, gr 49°, 1316' GCWB & 316' GCM, FP 2310#, SIP 5313# perf 13,214-248', 13,270-286' (Miss) flwd 46 BD 8 hrs 1/4" ch, gas vol 3152 MCFGPD, flwd 8 BD/hr, gas vol 3789 MCFGPD, 3/8" ch
-	DST (Miss 13,231-400' op 3 hrs 33 min, rec 518' cond + 2000' GM, 1 hr 58 min ISIP 5785#, FP 2571-1324# 4 hr FSIP 5739#, HP 6558-6493#, BHT 196°
-	
-	No DST was run on Mississippian formation

EXHIBIT 4

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
23 July 1980

EXAMINER HEARING

IN THE MATTER OF:

Application of Harvey E. Yates Company for designation of a tight formation Lea County, New Mexico.

CASE 6984

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Ernest L. Padilla, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: Robert Strand, Esq.
Roswell, New Mexico

I N D E X

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

E X H I B I T S

MR. STAMETS: We will call next Case 6984.

MR. PADILLA: Application of Harvey E. Yates Company for designation of tight formation, Lea County, New Mexico.

MR. STAMETS: Call for appearances in this case.

MR. STRAND: Mr. Examiner, I'm Robert H. Strand, Attorney, from Roswell, representing the applicant, Harvey E. Yates Company.

We will have two witnesses, Mr. Andrew Lattu and Mr. Ralph Viney.

MR. STAMETS: I'd like to have both stand and be sworn at this time, please.

(Witnesses sworn.)

MR. STRAND: Mr. Examiner, for the record, Harvey E. Yates Company as applicant in this case is requesting the Division to recommend to the Federal Energy Regulatory Commission that the Austin-Mississippian formation underlying Township 13 South, Range 35 East, Township 13 South, Range 36 East, Township 14 South, Range 35 East, Township 14 South, Range 36 East, Township 15 South, Range 35 East, and Township 15 South, Range 36 East, six townships all in Lea County, New Mexico, be designated as a tight formation, pursuant to

Section 107 of the Natural Gas Policy Act, and 18 CFR Section 271.701-705.

Mr. Examiner, our first witness will be Mr. Andrew Lattu.

ANDREW LATTU

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. STRAND:

Q Mr. Lattu, state your full name for the record.

A Andrew Lattu.

Q What is your address and your occupation?

A I live in Midland, Texas. I'm a geologist for Harvey E. Yates Company.

Q Mr. Lattu, have you testified beforo the Division in the past and are your qualifications a matter of record?

A Yes, I have, and they are.

MR. STRAND: Mr. Examiner, is Mr. Lattu considered qualified?

MR. STAMETS: Mr. Lattu is -- has testified before this Examiner many times and is considered qualified.

Q Mr. Lattu, are you familiar with the application in Case Number 6984, which I have previously described, and have you prepared certain exhibits relating thereto?

A Yes, I am, and I have prepared two exhibits.

MR. STRAND: Mr. Examiner, it might be helpful if we put these up on the wall.

MR. STAMETS: Okay, that will be fine.

Q Mr. Lattu, would you just briefly describe these exhibits as to what they are and their basic purpose?

A Exhibit One is an Isopach map of the Austin-Mississippian zone in Lea County, New Mexico. The contour interval is 100 feet. The map scale is 1 inch equals 4000 feet. It is contoured on a land plat which shows some of the ownership at the time this map was made in this area.

Q Mr. Lattu, does that Exhibit Number One, the Isopach, also outline the cross section in red, which will be Exhibit Number Two?

A Yes, it does. There is a red line, A-A', across this Exhibit Number One, which is the outline of the cross section, which is Exhibit Number Two.

Q And what does that cross section show as far as coverage of formations?

A Exhibit Two is a stratigraphic cross

section.

This is a stratigraphic cross section and it's hung on the Kinderhook Mississippian, or Lower Mississippian limestone. I've broken it into two sections just so it wouldn't be excessively long.

The logs on here are electric logs that have been run on many wells across this area. It's a north/south cross section.

It shows the development in this Austin Mississippian zone, which is the top zone on the cross section. It also shows any DS -- drill stem tests or perforations, attempted completions within this zone on all the wells within this 6-township area.

The Austin Mississippian zone, as indicated on this cross section, consists of a shallow water limestone. It shows very, very quiet waters, a lot of coded grains and likes. It's a fairly consistent interval with some churdiness in it. And in approximately the center of this area is where the current development of this Austin Mississippian production is taking place.

Q Mr. Lattu, does the cross section A-A' that's shown on the map cover the thickest portion of the section?

A Yes, it does. It covers all the wells that had anything of significance with this Austin Mississippian

zone, really.

Q. Are there any other points within Township 13, 35, and 13, 36, which you utilized in drawing your Isopach?

A. Yes, there are a few points in each of these townships and they are not on the cross section, but we do have a representative of all --

Q. You do have the information available if that's requested by the Division?

A. Yes, I do.

Q. Mr. Lattu, all of the -- all of the wells shown on the cross section have penetrated the Austin Mississippian formation, is that correct?

A. Yes, they have.

Q. And it is your opinion that the wells that you have on the cross section and the other points that you mentioned are the relevant data to determine the geographical extent of the formation?

A. Yes, they are. As seen from the Isopach, they cover right through the heart of the development of this Austin Mississippian.

Q. Mr. Lattu, would you describe in a little more detail from your cross section the pay section involved?

A. Well, the pay section is this Austin Mississippian zone. As I said, it's a consistent interval

right through here. It's fairly easily correlated and mapable and consists of a shallow water shelf type lime.

Q. What is the average thickness of the pay section?

A. From the Isopach map here in the area of current development, it's approximately 200 to 300 feet thick.

Q. The thickest portion being approximately 300 feet?

A. It gets -- there are a few wells here that are a little over 300. There's one well that's about 360 feet, and 310, 304, 270.

Q. Mr. Lattu, on the average, what is the depth from the surface to the top of the Austin Mississippian formation that you've described?

A. Based on the control now it's 13,200 to 13,300 feet. Most of the wells drilled here are drilled on structural features, so in the areas where we have no structural points the top of this formation may be actually deeper than that.

Q. Mr. Lattu, could you point out on your cross section and on the map, also, the wells which have actually produced natural gas from the Austin Mississippian?

A. Okay, this would be in this interval right in here in Township 14, 36, of the Austin Mississippian fields, as designated, and it consists of wells on the cross section,

reading from the top down, Wells Nos. 13, 12, 11, 10, 9, 8, 7, 6, these right -- excuse me, the Peyton "PJ" was a dry hole. It had a DST but was not a successful well, and that's No. 12.

But the rest of them from 13 on down to No. 6, which is the Phillips No. 1 Austin, and was the discovery well in this area, all produced gas from the Austin Mississippian zone.

Then we skip further down to No. 4, that is the Superior Oil and Gas No. 1 Goodrich. Now this was a Devonian failure and had been plugged and abandoned. Harvey E. Yates Company re-entered it and attempted completion in the Austin Mississippian zone. We perforated the entire Austin Mississippian interval and on attempting to complete, treated, collapsed the casing above the Austin Mississippian. At that point we put in some 20 percent acid and it has been making gas but not very much.

Q. Mr. Lattu, based on your analysis of the geological formation designated as the Austin Mississippian, in your opinion does the formation underlie all of the 6-township area we're requesting the recommendation for?

A. Yes, it does.

Q. And is it further your opinion that the formation underlying the 6-township area is at least potentially productive under the entire area?

A. Yes, it is.

MR. STRAND: That's all I have of Mr. Lattu at present, Mr. Examiner, unless you have some questions.

MR. STAMETS: Yes.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Lattu, do you have a recommended type log or type section for the Austin Mississippian in this area?

A. I probably -- I haven't recommended one. I'd probably pick the Phillips discovery well. It's been -- it's the well that we have the most data on as far as production is concerned. If I had to pick a type well, I think that one.

Q. Could you supply us with the -- I know you've identified it on your Exhibit Number Two, and it's well number six on that exhibit.

A. Yes.

Q. Subsequent to the hearing, I wish you would submit detailed information on that as to the type log used as the type log, the top and bottom of the Austin on that log.

A. All right, I will.

Q. Are there other wells which have penetrated the Austin Mississippian zone in the area that has been proposed which are not shown on the cross section?

A. Yes, there are.

Q. How many of those would you say there are?

A. There are not too many. I can count them off the map or -- there are two wells in 13, 36, and there -- I don't believe there are any wells there I've left off.

In 14, 35, there is one, two wells.

In 14, 36 there is one well that went into the upper portion of the Austin Mississippian but didn't penetrate the entire section.

We have just recently drilled a well that was logged after these exhibits were prepared in Section 8, which would be the No. 2 Austin Monteith. It was a dry hole.

There is one well in Section 19. So there, that would make one -- really two wells penetrated the entire zone in 14, 36, and three wells at least reached it.

And dropping down to 15, 35, there is one, two, two wells.

There are several in 15, 36, the Devonian. I just picked one, which is the well number two here.

Q. Have you examined the logs of these wells, or a number of these wells?

A. Yes, I have.

Q. Is there, in your opinion, is there any significant variation between the evidence revealed by those logs and what you've testified to relative to the logs on your

cross section?

A. No, not as to the section as it exists.

Q. You would anticipate finding essentially the same type of formation wherever you drilled in this area?

A. Yes, I would. A few of those wells are plugged producers.

Q. The variation in thickness of this zone, is that due to an erosional feature at the top or bottom of the section?

A. I don't believe it's due to erosion. I think it's a shallow shelf lime, like up on the Caddell Field here where it's thinner, it maybe was some structure evident at that time where not as much lime was deposited there.

MR. STAMETS: Any other questions of this witness? Mr. Holland.

QUESTIONS BY MR. HOLLAND:

Q. What kind of lithology do you have immediately above the Austin Mississippian?

A. It's a shale, a lime and shale interval, somewhat scattered, fine grained sands.

Q. Is much of the hydrocarbon accumulation in the upper portion of it? (Inaudible)

A. I believe the hydrocarbon deposit is throughout the entire interval.

Q. But the interval itself, the lithology is consistent throughout?

A. Yes.

REDIRECT EXAMINATION

BY MR. STRAND:

Q. Mr. Lattu, in your cross section, your map does include all of the existing producing wells in the 6-township area from the Austin Mississippian, is that correct?

A. Yes, it does.

MR. STRAND: Mr. Examiner, one additional point I need to cover.

Q. Mr. Lattu, could you describe the fresh water aquifers that underlie this 6-township area?

A. There is one that is fresh water. That is the Ogallalah formation. It's depth would be 60 to 300 feet. And the Santa Rosa formation is also present in this area, although I'm told it's brackish in this particular area, and it is at a depth of 1000 to 1200 feet.

Q. Are these aquifers pretty much uniform under the entire area?

A. So far as I know. I haven't studied them in detail. For my information I just called the Commission there in Hobbs.

MR. STAMETS: Any other questions of this witness? He may be ---

MR. PADILLA: I have a couple.

MR. STAMETS: Excuse me, I'm sorry.

CROSS EXAMINATION

BY MR. PADILLA:

Q. Mr. Lattu, do you know what the production history has been on the wells that you've indicated were not on the cross section?

A. None of the wells that are not on the cross section are producers at all.

Q. Do you know whether they were ever perforated in the Austin Mississippian?

A. Yes, one well was in Section 5 of 14, 36, the Sinclair Richardson, ran a drill stem test of the Austin interval and then perforated a very few feet at the top and did not make a commercial, or even a producer, out of it.

Q. So all of those wells, while they penetrated the Austin Mississippian, did not produce from the Austin Mississippian, except for the one that was perforated, is that correct?

A. I don't know what you're asking. Would you --

Q. Well, what I'm saying is that ---

A. The wells that are not on the cross section do not produce from it --

Q. Right.

A. -- if that's what you're asking, yes.

Q. They just penetrated the Austin Mississippian except for the one well.

A. That --

Q. That are not on the cross section.

A. The wells that are not on the cross section did penetrate the zone. Is that what you're asking?

Q. But only one was perforated in the Austin Mississippian.

A. Oh, one did attempt completion but it did not make it.

Q. Do you think that current casing requirements are adequate to protect the fresh water aquifers?

A. Yes, I believe they are.

MR. PADILLA: I have nothing further.

RECROSS EXAMINATION

BY MR. STAMETS:

Q. Along that same line, do you see any conceivable way that any standard treatment technique which might be applied to the Austin Mississippian could -- below 13,000 feet could have any affect on the shallow water in the area?

A. No, not if the operator ran a prudent operation, which he had his casing properly cemented and in place. Then there'd be no risk to any of the shallow aquifers.

Q And you feel that the rules and regulations and policies of the Oil Conservation Division do provide for such a proper casing and cementing process?

A. Yes, they do.

Q Okay.

MR. STAMETS: Mr. Chavez, I believe you had a question.

MR. CHAVEZ: Yes.

QUESTIONS BY MR. CHAVEZ:

Q You say that Harvey E. Yates just recently drilled a dry hole in this formation?

A. Yes, he did.

Q Okay, where was that located again, in --

A. In Section 8.

Q -- relation to the producers?

A. It's fairly close to Well No. 13. That would be an east offset to this well.

Q Do you think they define a limit to the productive area of the -- of that formation?

A. No, we're still planning a well that will be on -- there's a dry hole between this producing well and

another well we're still planning on drilling.

I feel that at this point it's somewhat erratic as far as where it won't produce.

Q But where --

A We feel that overall where the formation is there you have a good opportunity to find production.

Q Well, it's just permeability characteristics in different areas that -- that make a difference whether you have a productive well or not?

A Yes, I think the dry hole was probably very close to where it could have made a well, based on drill stem tests and log analysis.

Q What's the difference of the characteristics on those logs and the log of the well --

A Well, the logs really don't measure the permeability. A drilling test was what caused us to decide it was a dry hole. It had very low shutin pressure and no gas flow.

Q And the characteristics of the logs, were they compatible with the characteristics of these logs?

A Yes, that's part of the frustration, trying to figure this zone out. A dry hole looks like a producer by logs.

Q Okay, that's all I have.

RECROSS EXAMINATION

BY MR. STAMETS:

Q. On the subject of logs, do available logs give you any indication of the porosity in the Austin zone?

A. Yes, they -- they show the porosity a[illegible] that was one of the -- this Yates Petroleum Peyton "PJ" No. 1 here, you see very similar porosity to what's producing on both sides of it. It looks good on the porosity log, but by drill stem test it was obviously new reservoir.

MR. STAMETS: Any other questions of Mr. Lattu? Would you identify yourself for the record, please?

QUESTIONS BY MR. BUCKINGHAM:

Q. Allen F. Buckingham, the U.S. Geological Survey, and my question to Mr. Lattu is, on all these wells has there been any crude oil production or is it all condensate and gas?

A. It's all condensate to my knowledge.

Q. Because on one exhibit which we received it shows gas and oil, not identified as condensate.

MR. STRAND: Mr. Examiner, if I might interject, we will be covering that in some detail with our

engineering testimony.

MR. STAMETS: Fine. We can reserve questions on that point.

MR. STRAND: As well as additional testimony on the fresh water production.

MR. STAMETS: Fine. Any other questions of Mr. Lattu? He will be excused; however, we may have additional questions, so stay close, Mr. Lattu.

MR. LATTU: Yes, sir.

RALPH VINEY

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. STRAND:

Q. Please state your full name for the record.

A. My name is Ralph Viney. I live in Midland and I have an engineering consulting service there.

Q. Mr. Viney, were you retained by Harvey E. Yates Company to present testimony in this case?

A. Yes, sir.

Q. Have you testified before the Division in the past?

A. Yes, sir.

the record that I have provided you with a replacement to Exhibit Three-1, which includes information on an additional well that was not available at the time this was printed.

MR. STAMETS: This is the page that I have here?

MR. STRAND: Yes, it is.

MR. STAMETS: Let me just put in that in, mark it properly and put it in the right place before we proceed.

MR. STRAND: All right.

MR. STAMETS: That is corrected Exhibit what?

MR. STRAND: Three-1.

MR. STAMETS: Three-1.

MR. STRAND: Mr. Viney has pointed out, rather than "corrected" page it should probably be referred to as a revised page or an addendum to Exhibit 1. There have been no corrections in the other figures on the exhibit.

MR STAMETS: Okay, we'll call this addendum Exhibit Three-1.

MR. STRAND: And I've also provided you with an additional exhibit, which will be designated as Exhibit Three-1F, which should be inserted in the book of exhibits, which also relates to this additional well.

MR. STAMETS: All right, let's get that

straightened out. This is Exhibit No. 1-F?

A. Three-1F, right. Exhibit Three-1F, right.

MR. STAMETS: And this will be another addendum?

A. Yes, sir.

MR. STRAND: Yes.

MR. STAMETS: Okay. And that will go in where, at page 22 in the original exhibit, Exhibit Three?

MR. STRAND: It should be right after page 8.

MR. STAMETS: Right after page eight?

MR. STRAND: We can designate it as page 8A, if you wish.

MR. STAMETS: Okay, and then that other addendum, what page would that be?

MR. VINEY: It will still remain the same page number, page 3.

MR. STRAND: Yes.

MR. STAMETS: We seem to be one short on Exhibit Three-1F.

MR. VINEY: I've got one here.

MR. STAMETS: Okay, thank you.

Q. Mr. Viney, referring to Exhibit Three-1, which is the summary of the basic data, would you please describe each well that you've listed on this Exhibit Three-1

in relationship to your permeability calculations?

A. Yes, sir. You will note on this exhibit that six wells have been listed as hving been analyzed. Of those six, five were analyzed using the conventional Horner build-up technique; the fifth -- or the sixth one, or the Southern Union was analyzed using a drawdown technique that was taken during a potential test for the State potential requirement.

On all of the wells, regardless of the technique or method used to derive the pressure information for permeability determination, the permeability calculations using the net Mississippi thickness, Austin Mississippian thickness, indicates a range of about .017 to a high of .03 millidarcies with the average in the field of all wells of about .02 millidarcies, which is approximately 20 times less than the 1/10th millidarcy requirement stipulated under the requirements for a tight gas reservoir.

Q. Mr. Viney, do Exhibits Three-1A through Three-1F consist of the pressure buildup analysis that you utilized in summarizing the data on Exhibit Three-1?

A. Yes, sir, they do. Rather than analyze each individual well, let's, I would suggest, look at page 4 of Exhibit Three and the conventional technique on any Horner buildup is to obtain a substantial buildup period pressure relationship, analyze that in the conventional Horner formulas

and try to determine permeability calculations, and those calculations are acceptable worldwide.

The technique is presented on each page of the -- each well, and rather than go into the individual well buildup performance, I don't think it would serve anything but take time.

Q. Unless, Mr. Examiner, you wish to go into detail on each well, we'll dispense with that.

MR. STAMETS: Well, let's take one well and run through it and give us the significant issues --

A. All right, sir.

MR. STAMETS: -- to demonstrate.

A. All right, you will note on page 4 of Exhibit Three-1A, that we are using the Yates Austin Monteith No. 1 Well, and that during this analysis this particular well was shut-in for a total time of 152 hours.

You will note that on the input, or computer output datum, we have listed 39 points, those points being time increments, and in the fourth column of that presentation, you will notice that the hours are presented as DT, or delta hours.

The well was shut-in a total time of 152 hours. The pressure data during each of these time increments is plotted and again we'll just say it's plotted versus time, it's a dimensionless time, pressure versus dimensionless time,

and the end points, or the later points of the build-up, are then projected to a dimensionless period to determine reservoir boundaries.

You will note in the upper portion, where we have build-up pressure analysis, there is an analysis of the pressure points by groupings, and I will refer you to the grouping that says points used 33-39, and you'll notice that the average pressure at that point is 5139.

You will also notice in the earlier parts of the curve that the average pressures calculated were something like 8600 pounds. All this reflects is that the well is going through some afterflow or wellbore storage fill-up or some turbulent conditions while we're getting stabilized reservoir pressures around that wellbore, and that from conventional techniques we would be forced to use the latest or the last points, and the last points show that the boundary pressure in this particular well at the time of this calculation indicate the pressure to be about 5140 pounds.

Now this technique is used worldwide. There are no variations between engineers if they use the technique properly, and aside from minor readings of points, the answers should be within plus or minus one percent.

MR. STAMETS: When you refer to a boundary pressure, what does that signify?

A. This signifies the pressure at which this

pressure test or any pressure test in a dimensionless time suggests that the well is capable of draining from a distance. Now this distance has to be calculated and is not calculated on this particular calculation or on this particular presentation.

You will notice that in the second column of the summary at the top of the page it shows radius felt. All this calculates and indicates to us, we had a radius felt of 268 feet, that during the 152 hours the maximum radius that was measured through this test was 268 feet. This does not signify the boundary pressure nor the boundary limit, and at that 268 feet, you'll notice we had a pressure of 4374, which was .39 at the bottom and the calculated boundary pressure is 5139. We did not calculate the radius, but if we calculate it, using conventional engineering techniques, we're probably draining 160 to 320 acres. But we did not calculate it here.

Q Mr. Viney, with respect to the Southern Union Exploration Company well in Section 17, did you use the same type of analysis to calculate estimated permeability?

A The Horner technique is used; however, we use it in a drawdown anomaly or analogy, and unfortunately, with most open flow potential tests, you don't flow them long enough to get as good a data as you should.

Normally in the tests that they have used here, the data is going to represent conditions that are ab-

normally high, and while it shows we've got a permeability here of .05 millidarcies, when we went back and calculated, it came back a .03, so that the techniques are the same but the test data is of such short duration that reliability is not necessarily dependable.

Q. To your knowledge is the 4-point test that you utilized to calculate the permeability the best evidence we have available for permeability calculations for that well?

A. Yes, sir, it is the only evidence, plus what private communications we had with the company after reviewing this data, which showed that the wells -- the well was actually producing even less than we had anticipated, so that the permeabilities calculated were probably in most instances optimistic.

MR. STAMETS: Let me ask you a question relative to data as shown on page 6 and 7.

A. Yes, sir.

MR. STAMETS: On the millidarcies figure, as we move vertically from top to bottom in the pressure build-up analysis --

A. Yes, sir.

MR. STAMETS: -- I think in each of those cases we move up a millidarcy figure of 1.47 and then that drops off eventually to a .03. What's the significance of

that 1.47?

A. Well, what happens in there is that in the early parts of the build-up curve you are measuring influences right around the wellbore. And in this particular well, this well has been stimulated. This Adobe Well has been stimulated, as you will see by the presentation of an exhibit-- presentation in this exhibit.

And what has probably happened, there's been a cavity around this wellbore and we're getting in immediate reflection of this storage capacity of this cavity around the wellbore; probably due to acidization. And it will actually cause turbulence and wellbore influence and give you a misleading permeability.

These early points in the pressure build-up analysis are not reliable. As you'll see, the slopes were very, very low and the first slope is greater than the second slope, and it's back to the same as the first one, and once you start seeing stabilized -- we do not have probably steady state conditions from the reservoir matrix to the wellbore until, I would say, somewhere after 35 hours or point 25, Dick.

MR. STAMETS: Okay, thank you.

Q. Mr. Viney, considering Mr. Lattu's geological testimony and your analysis that you've described relating to measurement of approximate permeability, is it

your opinion that the Austin Mississippian formation underlying the 6-township area we described would be expected to have an estimate average in situ gas permeability of less than 21 millidarcies?

A. Based on the evidence we have analyzed, we'd say that the average would be about .02 millidarcies.

Q. And you would expect, based on Mr. Lattu's testimony as to the extent of the Austin Mississippian formation that -- that this permeability would be reasonably standard throughout?

A. We would see no reason to expect any variation or improvement of this permeability.

Q. Mr. Viney, again going back to your summary on Exhibit Three-1, and also Exhibit Three-2, would you describe your analysis and calculations relating to production rates of these various wells against atmospheric pressure?

A. Normally there are two methods that can be used to project flow rates against atmospheric conditions that are wellhead conditions, well, actually surface wellhead conditions, and bottom hole or reservoir matrix conditions. No well is going to produce more at the wellhead than the matrix can deliver into the wellbore at the bottom of the hole. I mean, this is a basic analogy. So to look at the situation and to give the maximum possible flow rate, we use the bottom hole conditions that -- which then negate any

columnar weight of the gas column, and using the conventional Darcy flow equation for radial flow, we calculated the flow rates for different radii of the wellbore drainage.

We also calculated,and did not present this, wellhead conditions, and we found in case of the Harvey Yates Monteith Well that where we found a maximum flow rate against atmosphere of 1372 using bottom hole conditions, we'd calculate 1317 at surface conditions. So we used the bottom hole to give you the maximum rates.

Q. Mr. Viney, would you run through the various wells and comment as you wish on the flow rate that you did calculate?

A. Well, the flow rates that we observed, I think it is possibly desirous to discuss what flow rates were used at the time of build-up because these are a measure of -- these are the only measure we had to make rates of and pick out daily rates without any pressure substantiation.

Let's -- on the Yates Monteith Well, it was tested about 1164 Mcf a day prior to shut-in, and at that time it was making about 40 barrels of condensate a day. It is now normal, like every other well, and should not make more than about 5 to 15 barrels. We'll discuss that in a moment.

This well flowed 1164, calculates 1372 against atmosphere, maximum flow rate.

Q. Had that well been treated?

A. Negative, this well has not been treated.

The Yates Petroleum Barbee Well flowed 930 on test; calculates 985 against atmospheric pressure. This well also, Counselor, has not been treated.

Adobe Oil and Gas Well State 16 No. 1 flowed 1132; calculates 1300 against atmospheric.

16-2, 1725; calculates 820.

The Hannah flowed at 2080; calculates at 3045.

Of these three Adobe wells the Hannah has been substantially treated with acid.

Q. And does this flow rate reflect flow rate after treatment again to atmospheric pressure?

A. Yes, sir. Since the well had been stimulated, there was no way we could simulate what flow conditions would have been prior to any stimulation because no records were available showing the drill stem test data.

The Southern Union Well, State 17 Well, based on the 4-hour test filed on the potential, indicated capability of producing about 1700 Mcf a day, but going back and looking at the average flow rate during that test, the calculated open flow, or the calculated maximum rate against atmosphere would be about 1490 a day.

Now you will note in this exhibit, Mr.

Examiner, that we have shown the expected flow rates as the radius of drainage increases, and I think it will become very obvious that as we show the production that these flow rates are probably very realistic in view of what the wells are currently doing.

MR. STAMETS: I have one question at this point.

A. Yes, sir.

MR. STAMETS: When we were discussing the pressure build-up analysis we talked about the Adobe 16 and the reason for the 1.47 at the second set of points, as well as the -- okay, I see why I had two wells with 1.46, there --

A. Two pages?

MR. STAMETS: -- are two pages, two page sixes.

A. I'm sorry.

MR. STAMETS: That's all right, that -- that accounts for it. I thought I had two wells with acid jobs, and I only had one on exhibit number -- or page three, so that takes care of that.

A. Thank you.

MR. STAMETS: That's clarified.

Q. Mr. Viney, have you also included in your exhibit book Exhibit Three-2, which is a general statistical summary of production from the wells you've been describing?

A. Yes, sir, we have, and this is nothing more than a recitation of the production that has been reported to the Conservation Commission by operators.

Q. I note that this does not include the Southern Union Exploration well.

A. No, sir.

Q. To your knowledge are there any production figures available on that yet?

A. Yes, sir. We have some. The well did not go on production until April the 8th and that well is currently delivering about 890 Mcf per day. 891 has been the average for the week ending July 9th, 1980.

Q. And, Mr. Viney, do your Exhibits Three-2A through Three-2F demonstrate the production rates of these wells in graphic form?

A. Yes, sir.

Q. Mr. Viney, based on your analysis of the six wells, I believe, it is on Exhibit Number Three-1, is it your opinion that the stabilized production rate against atomospheric pressure of wells completed for production in the Austin Mississippian formation without any type stimulation would not exceed -- would not be expected to exceed 1,000,655 Mcf per day?

A. Yes, sir.

Q. And is it also your opinion that -- that

generally throughout this Austin Mississippian formation under the 6-township area that this would be the case?

A. Based on this evidence we could see no improvement, no, sir.

Q. Mr. Viney, referring to your Exhibit Three-3, will you please describe the analysis of the liquids produced from the formation and your conclusions as to the state of those liquids in the formation?

A. Yes, sir. In this particular well sample, which was from the Yates Monteith Well, we took separator liquids, both oil and gas, ran chromatigraph component analysis of both the gas-the liquids, made -- conducted an ASTM distillation, or an angular if you wish to use it, either one, of the liquids recovered, and then used the properties of these liquids to make a simulated PVT, or actual pressure/volume/temperature reservoir simulation fluid analysis.

This analysis method is recognized and I have reason to believe the Commission has used the Garrett analysis before and accepted it before, for this Commission.

This analysis indicated the fluids above 3900 or 3794 pounds would exist in the gaseous state; that this was a retrograde reservoir with a dewpoint of 3900 -- or 3792 pounds at 207 degrees, which simply means that all fluids in the reservoir exist to a gas until the pressure at a point in the reservoir drops below 3792, and then liquid

falls out or drops out and accumulates into the reservoir. There will not be a great deal of accumulation in -- of fluids in the reservoir, due to the retrograde, because of the analysis of the reservoir fluids. Approximate maximum saturation would be about 4 percent, 3 to 4 percent of liquids pore volume, I mean of pore volume.

Q. What would you estimate to be the reservoir pressure at this time?

A. Reservoir pressure appears at this time, if we base it on the analysis of all the wells, approximately 4500 pounds. I think the summary that we used on Exhibit Three-1, and we'd have to use that average, I think we used 4481, so approximately 4500 pounds would be the pressure at this time. Now this does not mean that pressure will be 4500 pounds on each wellbore.

Q. Mr. Viney, based on this analysis that's been done of the fluids from the reservoir, would it be your opinion that any wells drilled into the Austin Mississippian formation would be expected to produce more than 5 barrels of crude oil per day, crude oil being defined as being in a liquid state in the reservoir?

A. This is not crude oil and I don't think in any way can it be construed as crude oil. This is a retrograde condensate and there is no crude oil in this reservoir.

So I will not -- I would not agree that it is crude oil. I would say that it would be condensate liquids. There would be no -- and the amount of liquid, based on the analysis, I would expect wells should average between 5 and 15 barrels per day of condensate liquids.

Q. It would be your opinion, then, that there would either be absolutely no crude oil or at least very negligible amount produced from any well drilled into this formation?

A. Based on the fluids, I would say that there would be no crude oil. I'm not going to say you're not going to get liquids with some crude characteristics, because all condensate will have components with crude characteristics.

Q. Would it be safe to say that what liquid you did pump out of the reservoir would be probably less than 5 barrels per day for any well?

A. I would say 5 to 15, 5 to 10, and I would look for an average of about 9 to 10 barrels per day per well with deliverability of between 500 and a million feet a day.

Q. But in your professional opinion, you would classify it as condensate as opposed to crude oil?

A. Yes, sir, it is. Yes, sir.

Q. I don't mean to beat it to death but I want to make a point.

MR. STAMETS: Well, let me go ahead and

clarify it, one point.

Under original reservoir conditions you would not find this condensate as a liquid in the reservoir.

A. No, sir, it would be in the gaseous state.

MR. STAMETS: Thank you.

Q. Mr. Viney, for the record, your Exhibits Three-3A through 3G are the basis for your conclusion in respect to the analysis of the liquids?

A. Yes, sir, with one -- one notation there, Counselor. Three-3A is the results, to summarize results using the data 3B through 3G, and 3B through 3G is support data from the laboratory, showing how all the fluid was analyzed and then 3B shows how that analyzed data was used for inputting into the simulation or PVT technique into the program.

Q. Mr. Viney, Mr. Lattu has already been questioned to some degree concerning the protection of the fresh water aquifers, he testified to. Referring to your Exhibit Three-A.

A. Yes, sir.

Q. Does this set out casing programs used for the wells that have been drilled?

A. This sets out the casing that was reported set supposedly, and we'd have to assume that it was the recommended program by the State office.

Q. And in your professional opinion will this casing program and the cementing program, as set out in the Exhibit, adquately protect the fresh water aquifers testified to by Mr. Lattu?

A. Yes, sir, it would appear that the conductor casing protects the Ogallala, and that the intermediate more than protects the Santa Rosa, and any other waters that may be present down to about 4500 or 1800 feet.

Q. Mr. Viney, was the book designated as the Exhibit Three and the materials therein prepared by you or compiled by you or under your supervision?

A. Yes, sir.

MR. STRAND: Mr. Examiner, I would move the admission of Exhibits One through Three.

MR. STAMETS: Without objection Exhibits One through Three will be admitted.

MR. STRAND: I have no further questions of Mr. Viney.

MR. STAMETS: Are there questions of Mr. Viney? Mr. Chavez.

QUESTIONS BY MR. CHAVEZ:

Q. Mr. Viney, on your pressure build-up tests include -- well, first of all, did the Hannah Well that you said was substantially treated with acid, why -- why was

A. Yes, sir.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Viney, the permeability calculations which were performed in this case were all done -- appear to all be done in a relatively small area, maybe on the order of six sections at the most, located in the central portion of the area.

A. Yes, sir.

Q. Is there anything that you have done or that Mr. Lattu has reported to you which would make you believe that we should expect anything substantially different from this anywhere in the proposed area?

A. Mr. Stamets, unless we find a very unusual well, the formation characteristics as reviewed by Mr. Lattu and by ourselves, we would be surprised and it may be an unusual well, but we would expect the conditions that you'd find would probably be less than what we've seen here.

Q. Okay. Now you've referred to the Horner formula.

A. Yes, sir.

Q. Is there anything reasonably available, reasonably reproducable, which describes the formula and demonstrates that it is a formula which is in general use

it substantially treated with acid?

A. The operator, I guess, elected to do it, Mr. Chavez. Most people want to stimulate wells to get maximum producability.

Q. Okay, did any of the plots that you did for pressure build-up show that there was any wellbore damage, that the effective radius of the wellbore had been increased --

A. No.

Q. -- for example, the Hannah Well by this acid treatment?

A. No, sir. Of course, in the Hannah Well, only being able to analyze it after the stimulation, there's no way to see whether there was any damage prior to, and whether there has been any clean-up or removal of damage by the acid job, so we'd be in no way to do it, but if you will note on that exhibit, Three-1, we have what we call estimated damage ratio. And any time the damage ratio is less than one, you have no damage. And in only one case, or in two cases, did we have any wells that had damage ratio, and that was the Barbee Well, which is the Yates Petroleum Barbee, and the Adobe 16-2. The others -- the Hannah Well has the least damage ratio of any. So I suspect that we have a very clean condition around that wellbore and primarily due to the acid. But I can't prove it.

Q. And those two that showed some -- a

damage ratio, would you say that there was a little minor bit of skin damage, then?

A. Well, any time you have an excess of one, there is some skin damage, but in either case the wells performed so poorly that even if you removed the damage, you wouldn't improve the producability more than 10 or 15 percent.

MR. STAMETS: Mr. Buckingham?

MR. BUCKINGHAM. Yes.

QUESTIONS BY MR. BUCKINGHAM:

Q. Mr. Viney, on your Exhibit Three-2, just a point of clarification.

A. Yes, sir.

Q. Every time you use the word "oil" you mean condensate.

A. Yes. Unfortunately, the records are reported right from the Commission as oil.

Q. Okay, because I'm sure that question will come up when FERC looks at it.

A. Right.

Q. So I was trying to clarify it for USGS purposes.

A. Right, we may change that, if you don't mind, when we go to FERC.

Q. Thank you.

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

to determine permeability?

A. Yes, sir. I don't have any with me, Mr. Stamets, but we can give you copies of the original work and -- thirty years ago and right up to date. I think, probably, you'd want to -- if you would accept, I can give you the computer program that incorporated the -- the Horner method, and is used and marketed worldwide by Garrett Computing Company, and this is the same one we used, and everyone else does.

Q. I think, considering that this is the very first tight sand hearing that has been held in the state, and the fact that this Horner formula may come up from time to time in later hearings, that it would be well to submit some sort of demonstration that this is a generally accepted formula; some sort of a monograph, API publication, anything along these lines which you could submit subsequent to the hearing, and we will be holding the record open for that as well as the type log information that Mr. Lattu will be submitting.

A. Mr. Stamets, would it -- would it be possible to submit the Garrett manual that references all the material and being, let me say, I don't want to in any way present Garrett's material as salesmanship, but rather as evidence, because he is in the business of selling programs. But this program is fully described and all the techniques and all associations and references are included in it.

If that would, I could ask Mr. Garrett, but I don't want the State to accept it if it has the connotation of a sales promotion.

Q. Why don't you go ahead and submit that and let us take a look at it and if we think that some -- something else might be more appropriate, we will so advise you.

A. All right. We will do so.

MR. STAMETS: Are there --

Q. Oh, one other question, and this is related to protection of ground water.

Just simply drilling these wells, as you tended to show here by your casing data, doesn't represent a hazard -- doesn't appear to represent a hazard to ground water.

The only other thing that comes to mind that could threaten the ground water would be the treatment that these wells would undergo. What types of treatment would we expect to be applied to the Austin Mississippian zone?

A. Up until this date the maximum acid treatments that have been given have been 4000 gallons. 4000 gallons, what are we talking about, 100 barrels, so we're talking about 500 cubic feet. Well, 500 cubic feet, we're not going to get more than about 700 or 800 from up the out-

Q. Are your qualifications as a professional engineer a matter of record --

A. Yes, sir.

Q. --- before the Division?

MR. STRAND: Are Mr. Viney's qualifications acceptable?

MR. STAMETS: As with Mr. Lattu, Mr. Viney has testified before this examiner a number of times and is considered qualified.

Q. Mr. Viney, have you prepared a set of exhibits relating to the engineering aspects of the application?

A. Yes, sir, we have.

MR. STRAND: Mr. Examiner, for the record, the book of exhibits has been designated as Exhibit Number Three. Within the book are a series of exhibits which we will refer to in testimony as Exhibit Three-1, Three-2A, et cetera. The book was prepared prior to the time the other exhibits were prepared.

MR. STAMETS: I see, and that exhibit number, the second number is shown in the lower righthand corner of each page?

MR. STRAND: Yes, and also in the table of contents.

MR. STAMETS: Okay.

MR. STRAND: And I would also state for

side of the annulus above the treatment zone should be cement job against the proposed treatment zone be bad.

So I don't think there would be any possibility of getting fluids to any water, because at 13,000 feet and then coming 1000 feet up, why, I doubt whether we'd ever get treatment even if it escaped above 12,000 feet.

Q. The operator would recognize if something went wrong and have an opportunity to correct it before he ran another acid job.

A. Hopefully, yes, sir.

Q. What about fracture treatment?

A. Fracture treatment has not as yet been used, as far as I know, and I think this is something that may come up in the future, but as to how it will be handled, again I think your reference to operator prudence, he's not going to fracture a well unless he knows that he has the zone to be treated well sealed and confine his treatment to the Mississippian.

But here again, even if we use 40,000 gallons in a treatment, we're going to come up, what, 7000 feet. 7000 above 13,000, if all of it escaped, we're only up to 6000 feet and well below your surface protected or Santa Rosa protected fluids.

I think -- I think you'd have to have a tremendous treatment and one to be a complete failure before

you'd ever see any possibility of damage.

MR STAMETS: Are there any other questions of Mr. Viney? He may be excused.

Does anyone have any other questions relative to this matter or anything they wish to add?

The case will be taken under advisement.

(Hearing concluded.)

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd C.S.R.

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. _____, heard by me on _____ 19____.

_____, Examiner
Oil Conservation Division

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
23 July 1980

EXAMINER HEARING

IN THE MATTER OF:

Application of Harvey E. Yates Company for designation of a tight formation, Lea County, New Mexico. CASE 6984

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Ernest L. Padilla, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: Robert Strand, Esq.
Roswell, New Mexico

I N D E X

ANDREW LATTU

RALPH VINEY

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

E X H I B I T S

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

MR. STAMETS: We will call next Case 6984.

MR. PADILLA: Application of Harvey E. Yates Company for designation of tight formation, Lea County, New Mexico.

MR. STAMETS: Call for appearances in this case.

MR. STRAND: Mr. Examiner, I'm Robert H. Strand, Attorney, from Roswell, representing the applicant, Harvey E. Yates Company.

We will have two witnesses, Mr. Andrew Lattu and Mr. Ralph Viney.

MR. STAMETS: I'd like to have both stand and be sworn at this time, please.

(Witnesses sworn.)

MR. STRAND: Mr. Examiner, for the record, Harvey E. Yates Company as applicant in this case is requesting the Division to recommend to the Federal Energy Regulatory Commission that the Austin-Mississippian formation underlying Township 13 South, Range 35 East, Township 13 South, Range 36 East, Township 14 South, Range 35 East, Township 14 South, Range 36 East, Township 15 South, Range 35 East, and Township 15 South, Range 36 East, six townships all in Lea County, New Mexico, be designated as a tight formation, pursuant to

Q. Mr. Lattu, are you familiar with the application in Case Number 6984, which I have previously described, and have you prepared certain exhibits relating thereto?

A. Yes, I am, and I have prepared two exhibits.

MR. STRAND: Mr. Examiner, it might be helpful if we put these up on the wall.

MR. STAMETS: Okay, that will be fine.

Q. Mr. Lattu, would you just briefly describe these exhibits as to what they are and their basic purpose?

A. Exhibit One is an Isopach map of the Austin-Mississippian zone in Lea County, New Mexico. The contour interval is 100 feet. The map scale is 1 inch equals 4000 feet. It is contoured on a land plat which shows some of the ownership at the time this map was made in this area.

Q. Mr. Lattu, does that Exhibit Number One, the Isopach, also outline the cross section in red, which will be Exhibit Number Two?

A. Yes, it does. There is a red line, A-A', across this Exhibit Number One, which is the outline of the cross section, which is Exhibit Number Two.

Q. And what does that cross section show as far as coverage of formations?

A. Exhibit Two is a stratigraphic cross

section.

This is a stratigraphic cross section and it's hung on the Kinderhook Mississippian, or Lower Mississippian limestone. I've broken it into two sections just so it wouldn't be excessively long.

The logs on here are electric logs that have been run on many wells across this area. It's a north/south cross section.

It shows the development in this Austin Mississippian zone, which is the top zone on the cross section. It also shows any DS -- drill stem tests or perforations, attempted completions within this zone on all the wells within this 6-township area.

The Austin Mississippian zone, as indicated on this cross section, consists of a shallow water limestone. It shows very, very quiet waters, a lot of ~~oeded~~ coated grains and ~~likee~~ oolites. It's a fairly consistent interval with some ~~churdinees~~ cherts in it. And in approximately the center of this area is where the current development of this Austin Mississippian production is taking place.

Q. Mr. Lattu, does the cross section A-A' that's shown on the map cover the thickest portion of the section?

A. Yes, it does. It covers all the wells that had anything of significance with this Austin Mississippian

zone, really.

Q. Are there any other points within Township 13, 35, and 13, 36, which you utilized in drawing your Isopach?

A. Yes, there are a few points in each of these townships and they are not on the cross section, but we do have a representative of all --

Q. You do have the information available if that's requested by the Division?

A. Yes, I do.

Q. Mr. Lattu, all of the -- all of the wells shown on the cross section have penetrated the Austin Mississippian formation, is that correct?

A. Yes, they have.

Q. And it is your opinion that the wells that you have on the cross section and the other points that you mentioned are the relevant data to determine the geographical extent of the formation?

A. Yes, they are. As seen from the Isopach, they cover right through the heart of the development of this Austin Mississippian.

Q. Mr. Lattu, would you describe in a little more detail from your cross section the pay section involved?

A. Well, the pay section is this Austin Mississippian zone. As I said, it's a consistent interval

right through here. It's fairly easily correlated and mapable, and consists of a shallow water shelf type lime.

Q. What is the average thickness of the pay section?

A. From the Isopach map here in the area of current development, it's approximately 200 to 300 feet thick.

Q. The thickest portion being approximately 300 feet?

A. It gets -- there are a few wells here that are a little over 300. There's one well that's about 360 feet, and 310, 304, 270.

Q. Mr. Lattu, on the average, what is the depth from the surface to the top of the Austin Mississippian formation that you've described?

A. Based on the control now it's 13,200 to 13,300 feet. Most of the wells drilled here are drilled on structural features, so in the areas where we have no structural points the top of this formation may be actually deeper than that.

Q. Mr. Lattu, could you point out on your cross section and on the map, also, the wells which have actually produced natural gas from the Austin Mississippian?

A. Okay, this would be in this interval right in here in Township 14, 36, of the Austin Mississippian fields, as designated, and it consists of wells on the cross section,

reading from the top down, Wells Nos. 13, 12, 11, 10, 9, 8, 7, 6, these right -- excuse me, the Peyton "PJ" was a dry hole. It had a DST but was not a successful well, and that's No. 12.

But the rest of them from 13 on down to No. 6, which is the Phillips No. 1 Austin, and was the discovery well in this area, all produced gas from the Austin Mississippian zone.

Then we skip further down to No. 4, that is the Superior Oil and Gas No. 1 Goodrich. Now this was a Devonian failure and had been plugged and abandoned. Harvey E. Yates Company re-entered it and attempted completion in the Austin Mississippian zone. We perforated the entire Austin Mississippian interval and on attempting to complete, treated, collapsed the casing above the Austin Mississippian. At that point we put in some 20 percent acid and it has been making gas but not very much.

Q. Mr. Lattu, based on your analysis of the geological formation designated as the Austin Mississippian, in your opinion does the formation underlie all of the 6-township area we're requesting the recommendation for?

A. Yes, it does.

Q. And is it further your opinion that the formation underlying the 6-township area is at least potentially productive under the entire area?

A. Yes, it is.

MR. STRAND: That's all I have of Mr. Lattu at present, Mr. Examiner, unless you have some questions.

MR. STAMETS: Yes.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Lattu, do you have a recommended type log or type section for the Austin Mississippian in this area?

A. I probably -- I haven't recommended one. I'd probably pick the Phillips discovery well. It's been -- it's the well that we have the most data on as far as production is concerned. If I had to pick a type well, I think that one.

Q. Could you supply us with the -- I know you've identified it on your Exhibit Number Two, and it's well number six on that exhibit.

A. Yes.

Q. Subsequent to the hearing, I wish you would submit detailed information on that as to the type log used as the type log, the top and bottom of the Austin on that log.

A. All right, I will.

Q. Are there other wells which have penetrated the Austin Mississippian zone in the area that has been proposed which are not shown on the cross section?

A. Yes, there are.

Q. How many of those would you say there are?

A. There are not too many. I can count them off the map or -- there are two wells in 13, 36, and there -- I don't believe there are any wells there I've left off.

In 14, 35, there is one, two wells.

In 14, 36 there is one well that went into the upper portion of the Austin Mississippian but didn't penetrate the entire section.

We have just recently drilled a well that was logged after these exhibits were prepared in Section 8, which would be the No. 2 Austin Monteith. It was a dry hole.

There is one well in Section 19. So there that would make one -- really two wells penetrated the entire zone in 14, 36, and three wells at least reached it.

And dropping down to 15, 35, there is one, two, two wells.

There are several in 15, 36, the Devonian. I just picked one, which is the well number two here.

Q. Have you examined the logs of these wells, or a number of these wells?

A. Yes, I have.

Q. Is there, in your opinion, is there any significant variation between the evidence revealed by those logs and what you've testified to relative to the logs on your

cross section?

A. No, not as to the section as it exists.

Q. You would anticipate finding essentially the same type of formation wherever you drilled in this area?

A. Yes, I would. A few of those wells are plugged producers.

Q. The variation in thickness of this zone, is that due to an erosional feature at the top or bottom of the section?

A. I don't believe it's due to erosion. I think it's a shallow shelf lime, like up on the Caddell Field here where it's thinner, it maybe was some structure evident at that time where not as much lime was deposited there.

MR. STAMETS: Any other questions of this witness? Mr. Holland.

QUESTIONS BY MR. HOLLAND:

Q. What kind of lithology do you have immediately above the Austin Mississippian?

A. It's a shale, a lime and shale interval, somewhat scattered, fine grained sands.

Q. Is much of the hydrocarbon accumulation in the upper portion of it? (Inaudible)

A. I believe the hydrocarbon deposit is throughout the entire interval.

Q. But the interval itself, the lithology is consistent throughout?

A. Yes.

REDIRECT EXAMINATION

BY MR. STRAND:

Q. Mr. Lattu, in your cross section, your map does include all of the existing producing wells in the 6-township area from the Austin Mississippian, is that correct?

A. Yes, it does.

MR. STRAND: Mr. Examiner, one additional point I need to cover.

Q. Mr. Lattu, could you describe the fresh water aquifers that underlie this 6-township area?

A. There is one that is fresh water. That is the Ogallalah formation. It's depth would be 60 to 300 feet. And the Santa Rosa formation is also present in this area, although I'm told it's brackish in this particular area, and it is at a depth of 1000 to 1200 feet.

Q. Are these aquifers pretty much uniform under the entire area?

A. So far as I know. I haven't studied them in detail. For my information I just called the Commission there in Hobbs.

MR. STAMETS: Any other questions of this witness? He may be --

MR. PADILLA: I have a couple.

MR. STAMETS: Excuse me, I'm sorry.

CROSS EXAMINATION

BY MR. PADILLA:

Q. Mr. Iattu, do you know what the production history has been on the wells that you've indicated were not on the cross section?

A. None of the wells that are not on the cross section are producers at all.

Q. Do you know whether they were ever perforated in the Austin Mississippian?

A. Yes, one well was in Section 5 of 14, 36, the Sinclair Richardson, ran a drill stem test of the Austin interval and then perforated a very few feet at the top and did not make a commercial, or even a producer, out of it.

Q. So all of those wells, while they penetrated the Austin Mississippian, did not produce from the Austin Mississippian, except for the one that was perforated, is that correct?

A. I don't know what you're asking. Would you --

Q. Well, what I'm saying is that --

A. The wells that are not on the cross section do not produce from it --

Q. Right.

A. -- if that's what you're asking, yes.

Q. They just penetrated the Austin Mississippian except for the one well.

A. That --

Q. That are not on the cross section.

A. The wells that are not on the cross section did penetrate the zone. Is that what you're asking?

Q. But only one was perforated in the Austin Mississippian.

A. Oh, one did attempt completion but it did not make it.

Q. Do you think that current casing requirements are adequate to protect the fresh water aquifers?

A. Yes, I believe they are.

MR. PADILLA: I have nothing further.

RECROSS EXAMINATION

BY MR. STAMETS:

Q. Along that same line, do you see any conceivable way that any standard treatment technique which might be applied to the Austin Mississippian could -- below 13,000 feet could have any affect on the shallow water in the area?

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

A. No, not if the operator ran a prudent operation, which he had his casing properly cemented and in place. Then there'd be no risk to any of the shallow aquifers.

Q. And you feel that the rules and regulations and policies of the Oil Conservation Division do provide for such a proper casing and cementing process?

A. Yes, they do.

Q. Okay.

MR. STAMETS: Mr. Chavez, I believe you had a question.

MR. CHAVEZ: Yes.

QUESTIONS BY MR. CHAVEZ:

Q. You say that Harvey E. Yates just recently drilled a dry hole in this formation?

A. Yes, he did.

Q. Okay, where was that located again, in --

A. In Section 8,

Q. -- relation to the producers?

A. It's fairly close to Well No. 13. That would be an east offset to this well.

Q. Do you think they define a limit to the productive area of the -- of that formation?

A. No, we're still planning a well that will be on -- there's a dry hole between this producing well and

another well we're still planning on drilling.

I feel that at this point it's somewhat erratic as far as where it won't produce.

Q. But where --

A. We feel that overall where the formation is there you have a good opportunity to find production.

Q. Well, it's just permeability characteristics in different areas that -- that make a difference whether you have a productive well or not?

A. Yes, I think the dry hole was probably very close to where it could have made a well, based on drill stem tests and log analysis.

Q. What's the difference of the characteristics on those logs and the log of the well --

A. Well, the logs really don't measure the permeability. A ~~drilling~~ drill-stem test was what caused us to decide it was a dry hole. It had very low shutin pressure and no gas flow.

Q. And the characteristics of the logs, were they compatible with the characteristics of these logs?

A. Yes, that's part of the frustration, trying to figure this zone out. A dry hole looks like a producer by logs.

Q. Okay, that's all I have.

RECROSS EXAMINATION

BY MR. STAMETS:

Q. On the subject of logs, do available logs give you any indication of the porosity in the Austin zone?

A. Yes, they -- they show the porosity and that was one of the -- this Yates Petroleum Peyton "PJ" No. 1 here, you see very similar porosity to what's producing on both sides of it. It looks good on the porosity log, but by drill stem test it was obviously ~~new~~ no reservoir.

MR. STAMETS: Any other questions of Mr. Lattu?

Would you identify yourself for the record, please?

QUESTIONS BY MR. BUCKINGHAM:

Q. Allen F. Buckingham, the U.S. Geological Survey, and my question to Mr. Lattu is, on all these wells has there been any crude oil production or is it all condensate and gas?

A. It's all condensate to my knowledge.

Q. Because on one exhibit which we received it shows gas and oil, not identified as condensate.

MR. STRAND: Mr. Examiner, if I might interject, we will be covering that in some detail with our

engineering testimony.

MR. STAMETS: Fine. We can reserve questions on that point.

MR. STRAND: As well as additional testimony on the fresh water production.

MR. STAMETS: Fine. Any other questions of Mr. Lattu? He will be excused; however, we may have additional questions, so stay close, Mr. Lattu.

MR. LATTU: Yes, sir.

RALPH VINEY

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. STRAND:

Q. Please state your full name for the record.

A. My name is Ralph Viney. I live in Midland and I have an engineering consulting service there.

Q. Mr. Viney, were you retained by Harvey E. Yates Company to present testimony in this case?

A. Yes, sir.

Q. Have you testified before the Division in the past?

A. Yes, sir.

Q. Are your qualifications as a professional engineer a matter of record --

A. Yes, sir.

Q. -- before the Division?

MR. STRAND: Are Mr. Viney's qualifications acceptable?

MR. STAMETS: As with Mr. Lattu, Mr. Viney has testified before this examiner a number of times and is considered qualified.

Q. Mr. Viney, have you prepared a set of exhibits relating to the engineering aspects of the application?

A. Yes, sir, we have.

MR. STRAND: Mr. Examiner, for the record, the book of exhibits has been designated as Exhibit Number Three. Within the book are a series of exhibits which we will refer to in testimony as Exhibit Three-1, Three-2A, et cetera. The book was prepared prior to the time the other exhibits were prepared.

MR. STAMETS: I see, and that exhibit number, the second number is shown in the lower righthand corner of each page?

MR. STRAND: Yes, and also in the table of contents.

MR. STAMETS: Okay.

MR. STRAND: And I would also state for

the record that I have provided you with a replacement to Exhibit Three-1, which includes information on an additional well that was not available at the time this was printed.

MR. STAMETS: This is the page that I have here?

MR. STRAND: Yes, it is.

MR. STAMETS: Let me just put in that in, mark it properly and put it in the right place before we proceed.

MR. STRAND: All right.

MR. STAMETS: That is corrected Exhibit what?

MR. STRAND: Three-1.

MR. STAMETS: Three-1.

MR. STRAND: Mr. Viney has pointed out, rather than "corrected" page it should probably be referred to as a revised page or an addendum to Exhibit 1. There have been no corrections in the other figures on the exhibit.

MR. STAMETS: Okay, we'll call this addendum Exhibit Three-1.

MR. STRAND: And I've also provided you with an additional exhibit, which will be designated as Exhibit Three-1F, which should be inserted in the book of exhibits, which also relates to this additional well.

MR. STAMETS: All right, let's get that

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

straightened out. This is Exhibit No. 1-F?

A. Three-1F, right. Exhibit Three-1F, right.

MR. STAMETS: And this will be another addendum?

A. Yes, sir.

MR. STRAND: Yes.

MR. STAMETS: Okay. And that will go in where, at page 22 in the original exhibit, Exhibit Three?

MR. STRAND: It should be right after page 8.

MR. STAMETS: Right after page eight?

MR. STRAND: We can designate it as page 8A, if you wish.

MR. STAMETS: Okay, and then that other addendum, what page would that be?

MR. VINEY: It will still remain the same page number, page 3.

MR. STRAND: Yes.

MR. STAMETS: We seem to be one short on Exhibit Three-1F.

MR. VINEY: I've got one here.

MR. STAMETS: Okay, thank you.

Q. Mr. Viney, referring to Exhibit Three-1, which is the summary of the basic data, would you please describe each well that you've listed on this Exhibit Three-1

in relationship to your permeability calculations?

A. Yes, sir. You will note on this exhibit that six wells have been listed as having been analyzed. Of those six, five were analyzed using the conventional Horner build-up technique; the fifth -- or the sixth one, or the Southern Union was analyzed using a drawdown technique that was taken during a potential test for the State potential requirement.

On all of the wells, regardless of the technique or method used to derive the pressure information for permeability determination, the permeability calculations using the net Mississippi thickness, Austin Mississippian thickness, indicates a range of about .017 to a high of .03 millidarcies with the average in the field of all wells of about .02 millidarcies, which is approximately 20 times less than the 1/10th millidarcy requirement stipulated under the requirements for a tight gas reservoir.

Q. Mr. Viney, do Exhibits Three-1A through Three-1F consist of the pressure buildup analysis that you utilized in summarizing the data on Exhibit Three-1?

A. Yes, sir, they do. Rather than analyze each individual well, let's, I would suggest, look at page 4 of Exhibit Three and the conventional technique on any Horner buildup is to obtain a substantial buildup period pressure relationship, analyze that in the conventional Horner formulas

and try to determine permeability calculations, and these calculations are acceptable worldwide.

The technique is presented on each page of the -- each well, and rather than go into the individual well buildup performance, I don't think it would serve anything but take time.

Q. Unless, Mr. Examiner, you wish to go into detail on each well, we'll dispense with that.

MR. STAMETS: Well, let's take one well and run through it and give us the significant issues --

A. All right, sir.

MR. STAMETS: -- to demonstrate.

A. All right, you will note on page 4 of Exhibit Three-1A, that we are using the Yates Austin Monteith No. 1 Well, and that during this analysis this particular well was shut-in for a total time of 152 hours.

You will note that on the input, or computer output datum, we have listed 39 points, those points being time increments, and in the fourth column of that presentation, you will notice that the hours are presented as DT, or delta hours.

The well was shut-in a total time of 152 hours. The pressure data during each of these time increments is plotted and again we'll just say it's plotted versus time, it's a dimensionless time, pressure versus dimensionless time,

and the end points, or the later points of the build-up, are then projected to a dimensionless period to determine reservoir boundaries.

You will note in the upper portion, where we have build-up pressure analysis, there is an analysis of the pressure points by groupings, and I will refer you to the grouping that says points used 33-39, and you'll notice that the average pressure at that point is 5139.

You will also notice in the earlier parts of the curve that the average pressures calculated were something like 8600 pounds. All this reflects is that the well is going through some afterflow or wellbore storage fill-up or some turbulent conditions while we're getting stabilized reservoir pressures around that wellbore, and that from conventional techniques we would be forced to use the latest or the last points, and the last points show that the boundary pressure in this particular well at the time of this calculation indicate the pressure to be about 5140 pounds.

Now this technique is used worldwide. There are no variations between engineers if they use the technique properly, and aside from minor readings of points, the answers should be within plus or minus one percent.

MR. STAMETS: When you refer to a boundary pressure, what does that signify?

A. This signifies the pressure at which this

pressure test or any pressure test in a dimensionless time suggests that the well is capable of draining from a distance. Now this distance has to be calculated and is not calculated on this particular calculation or on this particular presentation.

You will notice that in the second column of the summary at the top of the page it shows radius felt. All this calculates and indicates to us, we had a radius felt of 268 feet, that during the 152 hours the maximum radius that was measured through this test was 268 feet. This does not signify the boundary pressure nor the boundary limit, and at that 268 feet, you'll notice we had a pressure of 4374, which was .39 at the bottom and the calculated boundary pressure is 5139. We did not calculate the radius, but if we calculate it, using conventional engineering techniques, we're probably draining 160 to 320 acres. But we did not calculate it here.

Q. Mr. Viney, with respect to the Southern Union Exploration Company well in Section 17, did you use the same type of analysis to calculate estimated permeability?

A. The Horner technique is used; however, we use it in a drawdown anomaly or analogy, and unfortunately, with most open flow potential tests, you don't flow them long enough to get as good a data as you should.

Normally in the tests that they have used here, the data is going to represent conditions that are ab-

normally high, and while it shows we've got a permeability here of .05 millidarcies, when we went back and calculated, it came back a .03, so that the techniques are the same but the test data is of such short duration that reliability is not necessarily dependable.

Q. To your knowledge is the 4-point test that you utilized to calculate the permeability the best evidence we have available for permeability calculations for that well?

A. Yes, sir, it is the only evidence, plus what private communications we had with the company after reviewing this data, which showed that the wells -- the well was actually producing even less than we had anticipated, so that the permeabilities calculated were probably in most instances optimistic.

MR. STAMETS: Let me ask you a question relative to data as shown on page 6 and 7.

A. Yes, sir.

MR. STAMETS: On the millidarcies figure, as we move vertically from top to bottom in the pressure build-up analysis --

A. Yes, sir.

MR. STAMETS: -- I think in each of those cases we move up a millidarcy figure of 1.47 and then that drops off eventually to a .03. What's the significance of

that 1.47?

A. Well, what happens in there is that in the early parts of the build-up curve you are measuring influences right around the wellbore. And in this particular well, this well has been stimulated. This Adobe Well has been stimulated, as you will see by the presentation of an exhibit-- presentation in this exhibit.

And what has probably happened, there's been a cavity around this wellbore and we're getting in immediate reflection of this storage capacity of this cavity around the wellbore; probably due to acidization. And it will actually cause turbulence and wellbore influence and give you a misleading permeability.

These early points in the pressure build-up analysis are not reliable. As you'll see, the slopes were very, very low and the first slope is greater than the second slope, and it's back to the same as the first one, and once you start seeing stabilized -- we do not have probably steady state conditions from the reservoir matrix to the wellbore until, I would say, somewhere after 35 hours or point 25, Dick.

MR. STAMETS: Okay, thank you.

Q. Mr. Viney, considering Mr. Lattu's geological testimony and your analysis that you've described relating to measurement of approximat permeability, is it

your opinion that the Austin Mississippian formation underlying the 6-township area we described would be expected to have an estimate average in situ gas permeability of less than ~~.21~~ .01 millidarcies?

A. Based on the evidence we have analyzed, we'd say that the average would be about .02 millidarcies.

Q. And you would expect, based on Mr. Lattu's testimony as to the extent of the Austin Mississippian formation that -- that this permeability would be reasonably standard throughout?

A. We would see no reason to expect any variation or improvement of this permeability.

Q. Mr. Viney, again going back to your summary on Exhibit Three-1, and also Exhibit Three-2, would you describe your analysis and calculations relating to production rates of these various wells against atmospheric pressure?

A. Normally there are two methods that can be used to project flow rates against atmospheric conditions that are wellhead conditions, well, actually surface wellhead conditions, and bottom hole or reservoir matrix conditions. No well is going to produce more at the wellhead than the matrix can deliver into the wellbore at the bottom of the hole. I mean, this is a basic analogy. So to look at the situation and to give the maximum possible flow rate, we use the bottom hole conditions that -- which then negate any

columnar weight of the gas column, and using the conventional Darcy flow equation for radial flow, we calculated the flow rates for different radii of the wellbore drainage.

We also calculated,and did not present this, wellhead conditions, and we found in case of the Harvey Yates Monteith Well that where we found a maximum flow rate against atmosphere of 1372 using bottom hole conditions, we'd calculate 1317 at surface conditions. So we used the bottom hole to give you the maximum rates.

Q. Mr. Viney, would you run through the various wells and comment as you wish on the flow rate that you did calculate?

A. Well, the flow rates that we observed, I think it is possibly desirous to discuss what flow rates were used at the time of build-up because these are a measure of -- these are the only measure we had to make rates of and pick out daily rates without any pressure substantiation.

Let's -- on the Yates Monteith Well, it was tested about 1164 Mcf a day prior to shut-in, and at that time it was making about 40 barrels of condensate a day. It is now normal, like every other well, and should not make more than about 5 to 15 barrels. We'll discuss that in a moment.

This well flowed 1164, calculates 1372 against atmosphere, maximum flow rate.

Q. Had that well been treated?

A. Negative, this well has not been treated.

The Yates Petroleum Barbee Well flowed 930 on test; calculates 985 against atmospheric pressure. This well also, Counselor, has not been treated.

Adobe Oil and Gas Well State 16 No. 1 flowed 1132; calculates 1300 against atmospheric.

16-2, 1725; calculates 820.

The Hannah flowed at 2080; calculates at 3045.

Of these three Adobe wells the Hannah has been substantially treated with acid.

Q. And does this flow rate reflect flow rate after treatment again to atmospheric pressure?

A. Yes, sir. Since the well had been stimulated, there was no way we could simulate what flow conditions would have been prior to any stimulation because no records were available showing the drill stem test data.

The Southern Union Well, State 17 Well, based on the 4-hour test filed on the potential, indicated capability of producing about 1700 Mcf a day, but going back and looking at the average flow rate during that test, the calculated open flow, or the calculated maximum rate against atmosphere would be about 1490 a day.

Now you will note in this exhibit, Mr.

Examiner, that we have shown the expected flow rates as the radius of drainage increases, and I think it will become very obvious that as we show the production that these flow rates are probably very realistic in view of what the wells are currently doing.

MR. STAMETS: I have one question at this point.

A. Yes, sir.

MR. STAMETS: When we were discussing the pressure build-up analysis we talked about the Adobe 16 and the reason for the 1.47 at the second set of points, as well as the -- okay, I see why I had two wells with 1.46, there --

A. Two pages?

MR. STAMETS: -- are two pages, two page sixes.

A. I'm sorry.

MR. STAMETS: That's all right, that -- that accounts for it. I thought I had two wells with acid jobs, and I only had one on exhibit number -- or page three, so that takes care of that.

A. Thank you.

MR. STAMETS: That's clarified.

Q Mr. Viney, have you also included in your exhibit book Exhibit Three-2, which is a general statistical summary of production from the wells you've been describing?

A. Yes, sir, we have, and this is nothing more than a recitation of the production that has been reported to the Conservation Commission by operators.

Q. I note that this does not include the Southern Union Exploration well.

A. No, sir.

Q. To your knowledge are there any production figures available on that yet?

A. Yes, sir. We have some. The well did not go on production until April the 8th and that well is currently delivering about 890 Mcf per day. 891 has been the average for the week ending July 9th, 1980.

Q. And, Mr. Viney, do your Exhibits Three-2A through Three-2F demonstrate the production rates of these wells in graphic form?

A. Yes, sir.

Q. Mr. Viney, based on your analysis of the six wells, I believe, it is on Exhibit Number Three-1, is it your opinion that the stabilized production rate against atomospheric pressure of wells completed for production in the Austin Mississippian formation without any type stimulation would not exceed -- would not be expected to exceed ~~1,000,655~~ 1,655 Mcf per day?

A. Yes, sir.

Q. And is it also your opinion that -- that

generally throughout this Austin Mississippian formation under the 6-township area that this would be the case?

A. Based on this evidence we could see no improvement, no, sir.

Q. Mr. Viney, referring to your Exhibit Three-3, will you please describe the analysis of the liquids produced from the formation and your conclusions as to the state of those liquids in the formation?

A. Yes, sir. In this particular well sample, which was from the Yates Monteith Well, we took separator liquids, both oil and gas, ran chromatigraph component analysis of both the gas-the liquids, made -- conducted an ASTM distillation, or an angular if you wish to use it, either one, of the liquids recovered, and then used the properties of these liquids to make a simulated PVT, or actual pressure/volume/temperature reservoir simulation fluid analysis.

This analysis method is recognized and I have reason to believe the Commission has used the Garrett analysis before and accepted it before, for this Commission.

This analysis indicated the fluids above 3900 or 3794 pounds would exist in the gaseous state; that this was a retrograde reservoir with a dewpoint of 3900 -- or 3792 pounds at 207 degrees, which simply means that all fluids in the reservoir exist to a gas until the pressure at a point in the reservoir drops below 3792, and then liquid

falls out or drops out and accumulates into the reservoir. There will not be a great deal of accumulation in -- of fluids in the reservoir, due to the retrograde, because of the analysis of the reservoir fluids. Approximate maximum saturation would be about 4 percent, 3 to 4 percent of liquids pore volume, I mean of pore volume.

Q. What would you estimate to be the reservoir pressure at this time?

A. Reservoir pressure appears at this time, if we base it on the analysis of all the wells, approximately 4500 pounds. I think the summary that we used on Exhibit Three-1, and we'd have to use that average, I think we used 4481, so approximately 4500 pounds would be the pressure at this time. Now this does not mean that pressure will be 4500 pounds on each wellbore.

Q. Mr. Viney, based on this analysis that's been done of the fluids from the reservoir, would it be your opinion that any wells drilled into the Austin Mississippian formation would be expected to produce more than 5 barrels of crude oil per day, crude oil being defined as being in a liquid state in the reservoir?

A. This is not crude oil and I don't think in any way can it be construed as crude oil. This is a retrograde condensate and there is no crude oil in this reservoir.

So I will not -- I would not agree that it is crude oil. I would say that it would be condensate liquids. There would be no -- and the amount of liquid, based on the analysis, I would expect wells should average between 5 and 15 barrels per day of condensate liquids.

Q. It would be your opinion, then, that there would either be absolutely no crude oil or at least very negligible amount produced from any well drilled into this formation?

A. Based on the fluids, I would say that there would be no crude oil. I'm not going to say you're not going to get liquids with some crude characteristics, because all condensate will have components with crude characteristics.

Q. Would it be safe to say that what liquid you did pump out of the reservoir would be probably less than 5 barrels per day for any well?

A. I would say 5 to 15, 5 to 10, and I would look for an average of about 9 to 10 barrels per day per well with deliverability of between 500 and a million feet a day.

Q. But in your professional opinion, you would classify it as condensate as opposed to crude oil?

A. Yes, sir, it is. Yes, sir.

Q. I don't mean to beat it to death but I want to make a point.

MR. STAMETS: Well, let me go ahead and

clarify it, one point.

Under original reservoir conditions you would not find this condensate as a liquid in the reservoir.

A. No, sir, it would be in the gaseous state.

MR. STAMETS: Thank you.

Q. Mr. Viney, for the record, your Exhibits Three-3A through 3G are the basis for your conclusion in respect to the analysis of the liquids?

A. Yes, sir, with one -- one notation there, Counselor. Three-3A is the results, to summarize results using the data 3B through 3G, and 3B through 3G is support data from the laboratory, showing how all the fluid was analyzed and then 3B shows how that analyzed data was used for inputting into the simulation or PVT technique into the program.

Q. Mr. Viney, Mr. Lattu has already been questioned to some degree concerning the protection of the fresh water aquifers, he testified to. Referring to your Exhibit Three-4.

A. Yes, sir.

Q. Does this set out casing programs used for the wells that have been drilled?

A. This sets out the casing that was reported set supposedly, and we'd have to assume that it was the recommended program by the State office.

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

Q. And in your professional opinion will this casing program and the cementing program, as set out in the Exhibit, adquately protect the fresh water aquifers testified to by Mr. Lattu?

A. Yes, sir, it would appear that the conductor casing protects the Ogallala, and that the intermediate more than protects the Santa Rosa, and any other waters that may be present down to about 4500 or 1800 feet.

Q. Mr. Viney, was the book designated as the Exhibit Three and the materials therein prepared by you or compiled by you or under your supervision?

A. Yes, sir.

MR. STRAND: Mr. Examiner, I would move the admission of Exhibits One through Three.

MR. STAMETS: Without objection Exhibits One through Three will be admitted.

MR. STRAND: I have no further questions of Mr. Viney.

MR. STAMETS: Are there questions of Mr. Viney? Mr. Chavez.

QUESTIONS BY MR. CHAVEZ:

Q. Mr. Viney, on your pressure build-up tests include -- well, first of all, did the Hannah Well that you said was substantially treated with acid, why -- why was

it substantially treated with acid?

A. The operator, I guess, elected to do it, Mr. Chavez. Most people want to stimulate wells to get maximum producability.

Q. Okay, did any of the plots that you did for pressure build-up show that there was any wellbore damage, that the effective radius of the wellbore had been increased --

A. No.

Q. -- for example, the Hannah Well by this acid treatment?

A. No, sir. Of course, in the Hannah Well, only being able to analyze it after the stimulation, there's no way to see whether there was any damage prior to, and whether there has been any clean-up or removal of damage by the acid job, so we'd be in no way to do it, but if you will note on that exhibit, Three-1, we have what we call estimated damage ratio. And any time the damage ratio is less than one you have no damage. And in only one case, or in two cases, did we have any wells that had damage ratio, and that was the Barbee Well, which is the Yates Petroleum Barbee, and the Adobe 16-2. The others -- the Hannah Well has the least damage ratio of any. So I suspect that we have a very clean condition around that wellbore and primarily due to the acid. But I can't prove it.

Q. And those two that showed some -- a

damage ratio, would you say that there was a little minor bit of skin damage, then?

A. Well, any time you have an excess of one, there is some skin damage, but in either case the wells performed so poorly that even if you removed the damage, you wouldn't improve the producability more than 10 or 15 percent.

MR. STAMETS: Mr. Buckingham?

MR. BUCKINGHAM. Yes.

QUESTIONS BY MR. BUCKINGHAM:

Q. Mr. Viney, on your Exhibit Three-2, just a point of clarification.

A. Yes, sir.

Q. Every time you use the word "oil" you mean condensate.

A. Yes. Unfortunately, the records are reported right from the Commission as oil.

Q. Okay, because I'm sure that question will come up when FERC looks at it.

A. Right.

Q. So I was trying to clarify it for USGS purposes.

A. Right, we may change that, if you don't mind, when we go to FERC.

Q. Thank you.

A. Yes, sir.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Viney, the permeability calculations which were performed in this case were all done -- appear to all be done in a relatively small area, maybe on the order of six sections at the most, located in the central portion of the area.

A. Yes, sir.

Q. Is there anything that you have done or that Mr. Lattu has reported to you which would make you believe that we should expect anything substantially different from this anywhere in the proposed area?

A. Mr. Stamets, unless we find a very unusual well, the formation characteristics as reviewed by Mr. Lattu and by ourselves, we would be surprised and it may be an unusual well, but we would expect the conditions that you'd find would probably be less than what we've seen here.

Q. Okay. Now you've referred to the Horner formula.

A. Yes, sir.

Q. Is there anything reasonably available, reasonably reproducable, which describes the formula and demonstrates that it is a formula which is in general use

to determine permeability?

A. Yes, sir. I don't have any with me, Mr. Stamets, but we can give you copies of the original work and -- thirty years ago and right up to date. I think, probably, you'd want to -- if you would accept, I can give you the computer program that incorporated the -- the Horner method, and is used and marketed worldwide by Garrett Computing Company, and this is the same one we used, and everyone else does.

Q. I think, considering that this is the very first tight sand hearing that has been held in the state, and the fact that this Horner formula may come up from time to time in later hearings, that it would be well to submit some sort of demonstration that this is a generally accepted formula; some sort of a monograph, API publication, anything along these lines which you could submit subsequent to the hearing, and we will be holding the record open for that as well as the type log information that Mr. Lattu will be submitting.

A. Mr. Stamets, would it -- would it be possible to submit the Garrett manual that references all the material and being, let me say, I don't want to in any way present Garrett's material as salesmanship, but rather as evidence, because he is in the business of selling programs. But this program is fully described and all the techniques and all associations and references are included in it.

If that would, I could ask Mr. Garrett, but I don't want the State to accept it if it has the connotation of a sales promotion.

Q. Why don't you go ahead and submit that and let us take a look at it and if we think that some -- something else might be more appropriate, we will so advise you.

A. All right. We will do so.

MR. STAMETS: Are there --

Q. Oh, one other question, and this is related to protection of ground water.

Just simply drilling these wells, as you tended to show here by your casing data, doesn't represent a hazard -- doesn't appear to represent a hazard to ground water.

The only other thing that comes to mind that could threaten the ground water would be the treatment that these wells would undergo. What types of treatment would we expect to be applied to the Austin Mississippian zone?

A. Up until this date the maximum acid treatments that have been given have been 4000 gallons. 4000 gallons, what are we talking about, 100 barrels, so we're talking about 500 cubic feet. Well, 500 cubic feet, we're not going to get more than about 700 or 800 from up the out-

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

side of the annulus above the treatment zone should be cement job against the proposed treatment zone be bad.

So I don't think there would be any possibility of getting fluids to any water, because at 13,000 feet and then coming 1000 feet up, why, I doubt whether we'd ever get treatment even if it escaped above 12,000 feet.

Q. The operator would recognize if something went wrong and have an opportunity to correct it before he ran another acid job.

A. Hopefully, yes, sir.

Q. What about fracture treatment?

A. Fracture treatment has not as yet been used, as far as I know, and I think this is something that may come up in the future, but as to how it will be handled, again I think your reference to operator prudence, he's not going to fracture a well unless he knows that he has the zone to be treated well sealed and confine his treatment to the Mississippian.

But here again, even if we use 40,000 gallons in a treatment, we're going to come up, what, 7000 feet. 7000 above 13,000, if all of it escaped, we're only up to 6000 feet and well below your surface protected or Santa Rosa protected fluids.

I think -- I think you'd have to have a tremendous treatment and one to be a complete failure before

you'd ever see any possibility of damage.

MR. STAMETS: Are there any other questions of Mr. Viney? He may be excused.

Does anyone have any other questions relative to this matter or anything they wish to add?

The case will be taken under advisement.

(Hearing concluded.)

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6984 heard by me on 7-23 1980.

Richard L. Stamets, Examiner
Oil Conservation Division

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 6984
Order No. R-6475

APPLICATION OF HARVEY E. YATES
COMPANY FOR DESIGNATION OF A
TIGHT FORMATION, LEA COUNTY,
NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on July 23, 1980, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 22nd day of September, 1980, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Harvey E. Yates Company, requests that the Division in accordance with Section 107 of the Natural Gas Policy Act, and 18 C.F.R. §271.705 of the interim regulations recommend to the Federal Energy Regulatory Commission that the Mississippian formation underlying the following described lands situated in Lea County, New Mexico, hereinafter referred to as the Austin-Mississippian formation, be designated as a tight formation in said Federal Energy Regulatory Commission's regulations:

Township 13 South, Range 35 East, NMPM
Township 13 South, Range 36 East, NMPM
Township 14 South, Range 35 East, NMPM
Township 14 South, Range 36 East, NMPM
Township 15 South, Range 35 East, NMPM
Township 15 South, Range 36 East, NMPM

containing 138,240 acres, more or less.

(3) That the Austin-Mississippian formation underlies all of the above described lands; that the formation consists of a shallow water limestone; that the top of such formation is found at depths of from 13,200 feet to 13,300 feet within the area set out in Finding No. (2) above; and that the thickness of such formation is from 200 to 300 feet within said area.

(4) That the type section for the "Austin" Mississippian formation for the proposed tight sand designation is found at a depth of from approximately 13,180 feet to 13,494 feet on the Gamma Ray-Neutron log of the Phillips Petroleum Company Austin Well No. 1 located in Unit M of Section 17, Township 14 South, Range 36 East, Lea County, New Mexico.

(5) That the following wells produce or have produced natural gas from the Austin-Mississippian formation within the proposed area:

Harvey E. Yates Company Austin Monteith No. 1	1650 feet from South line and 1980 feet from West line of Section 8, Township 14 South, Range 36 East, NMPM
Southern Union Exploration Company State 17 No. 1	1980 feet from North line and 1980 feet from West line of Section 17, Township 14 South, Range 36 East, NMPM
Yates Petroleum Corporation Barbee LL No. 1	1980 feet from North line and 1980 feet from East line of Section 18, Township 14 South, Range 36 East, NMPM
Adobe Oil Corporation Hannah No. 1	1980 feet from North line and 660 feet from East line of Section 17, Township 14 South, Range 36 East, NMPM
Phillips Petroleum Company Austin No. 1	661 feet from South line and 661 feet from West line of Section 17, Township 14 South, Range 36 East, NMPM

Adobe Oil Corporation State 16 No. 1	990 feet from South line and 660 feet from West line of Section 16, Township 14 South, Range 36 East, NMPM
Adobe Oil Corporation State 16 No. 2	1980 feet from North line and 1980 feet from West line of Section 16, Township 14 South, Range 36 East, NMPM

(6) That the Austin-Mississippian formation underlying the above described lands has been penetrated by a number of other wells, none of which produced natural gas in commercial quantities from the Austin-Mississippian or any other formation.

(7) That the evidence presented in this case demonstrated that no well formerly or currently completed in the Austin-Mississippian formation within the proposed area exhibited permeability, gas productivity, or crude oil productivity in excess of the following parameters:

(a) average in situ gas permeability throughout the pay section of 0.1 millidarcy; and

(b) stabilized production rates, against atmospheric pressure, as found in the table set out in 18 C.F.R. §271.705(b)(i)(ii) of the interim regulations; and

(c) production of more than five barrels of crude oil per day.

(8) That based on analysis of available data from existing wells within the proposed area and utilizing generally and customarily accepted petroleum engineering techniques and measurements:

(a) The estimated average in situ gas permeability throughout the pay section of the Austin-Mississippian formation is expected to be 0.1 millidarcy or less; and

(b) The stabilized production rate, against atmospheric pressure, of wells contemplated for production in the Austin-Mississippian formation,

without stimulation, is not expected to exceed production levels determined by reference to well depth, as found in the table set out in 18 C.F.R. §271.705(b)(1)(ii) of the interim regulations; and

(c) No well drilled into the formation is expected to produce more than five barrels of crude oil per day.

(9) That within the proposed area there are two recognized aquifers being the Ogallala, a fresh water aquifer found at depths of from 60 feet to 300 feet, and the Santa Rosa, a brackish water aquifer found at depths of from 1000 feet to 1200 feet.

(10) That existing State of New Mexico and Federal Regulations relating to casing and cementing of wells will assure that development of the Austin-Mississippian formation will not adversely affect said water zones.

(11) That the Austin-Mississippian formation, or any portion thereof, as described herein, is not currently being developed by infill drilling as defined in 18 C.F.R. §271.703(b)(6) of the final regulations as promulgated by FERC Order No. 99.

(12) That the Austin-Mississippian formation within the proposed area should be recommended to the Federal Energy Regulatory Commission for designation as a tight formation.

IT IS THEREFORE ORDERED:

(1) That it be and hereby is recommended to the Federal Energy Regulatory Commission pusuant to Section 107 of the Natural Gas Policy Act of 1978, and 18 C.F.R. §271.705 of the interim regulations , and 18 C.F.R. §271,703 of the final regulations that the Austin-Mississippian formation underlying the following described lands in Lea County, New Mexico, be designated as a tight formation:

Township 13 South, Range 35 East, NMPM
Township 13 South, Range 36 East, NMPM
Township 14 South, Range 35 East, NMPM
Township 14 South, Range 36 East, NMPM
Township 15 South, Range 35 East, NMPM
Township 15 South, Range 36 East, NMPM

containing 138,240 acres, more or less.

(2) That jurisdiction of this cause is hereby retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove described.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

SEAL

fd/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 6984
Order No. R-6475

APPLICATION OF HARVEY E. YATES COMPANY FOR DESIGNATION OF A TIGHT FORMATION, LEA COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on July 23, 1980, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 22nd day of September, 1980, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Harvey E. Yates Company, requests that the Division in accordance with Section 107 of the Natural Gas Policy Act, and 18 C.F.R. §271.705 of the interim regulations recommend to the Federal Energy Regulatory Commission that the Mississippian formation underlying the following described lands situated in Lea County, New Mexico, hereinafter referred to as the Austin-Mississippian formation, be designated as a tight formation in said Federal Energy Regulatory Commission's regulations:

Township 13 South, Range 35 East, NMPM
Township 13 South, Range 36 East, NMPM
Township 14 South, Range 35 East, NMPM
Township 14 South, Range 36 East, NMPM
Township 15 South, Range 35 East, NMPM
Township 15 South, Range 36 East, NMPM

Adobe Oil Corporation State 16 No. 1	990 feet from South line and 660 feet from West line of Section 16, Township 14 South, Range 36 East, NMPM
Adobe Oil Corporation State 16 No. 2	1980 feet from North line and 1980 feet from West line of Section 16, Township 14 South, Range 36 East, NMPM

(6) That the Austin-Mississippian formation underlying the above described lands has been penetrated by a number of other wells, none of which produced natural gas in commercial quantities from the Austin-Mississippian or any other formation.

(7) That the evidence presented in this case demonstrated that no well formerly or currently completed in the Austin-Mississippian formation within the proposed area exhibited permeability, gas productivity, or crude oil productivity in excess of the following parameters:

(a) average in situ gas permeability throughout the pay section of 0.1 millidarcy; and

(b) stabilized production rates, against atmospheric pressure, as found in the table set out in 18 C.F.R. §271.705(b)(i)(ii) of the interim regulations; and

(c) production of more than five barrels of crude oil per day.

(8) That based on analysis of available data from existing wells within the proposed area and utilizing generally and customarily accepted petroleum engineering techniques and measurements:

(a) The estimated average in situ gas permeability throughout the pay section of the Austin-Mississippian formation is expected to be 0.1 millidarcy or less; and

(b) The stabilized production rate, against atmospheric pressure, of wells contemplated for production in the Austin-Mississippian formation,

containing 138,240 acres, more or less.

(2) That jurisdiction of this cause is hereby retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year herein-above described.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

S E A L

fd/

EXHIBIT 1 F
SOUTHERN UNION STATE 17
SEC. 17, TWP 14S, R 36E
LEA COUNTY, NEW MEXICO

PRESSURE DRAWDOWN ANALYSIS

POINTS USED	SLOPE PSI/CYCL	RADIUS REACHED FT	PORE VOLUME MB	HYDROCAR VOLUME	K (MDS)	COMPL. EFF. %
UNSTEADY-STATE ANALYSIS:						
1- 2	251.0	37.	5.675	4.197	0.05	221.6
SEMI-STEADY STATE ANALYSIS:						
2- 4	103.0		6.417	4.654		

POINT	HOURS	RATE	PRESSURE	DP/DN	PLOT
1	1.00	907.0	3707.0	0.286	0.000
2	2.00	1251.0	3554.0	0.329	0.218
3	3.00	1887.0	3465.0	0.266	0.284
4	4.00	2739.0	3348.0	0.226	0.329

~~GAS WELL~~ ~~BACK~~ PRESSURE TEST

COMPLETION OR RECOMPLETION REPORT AND LOG

1. FIELD NAME: NEW MEXICO	2. LEASE NAME: STATE 17
3. OPERATOR	
4. ADDRESS	
5. LOCATION (Section, Block, and Survey): SEC. 17, T 14S, R 36E	5b. Distance and Direction from nearest town in this county.
6. If Operator has changed within last 60 days - Give former Operator.	12. If Workover or Reclass, give former Field (with Reservoir) & Gas ID or Oil Lease #. FIELD & RESERVOIR / GAS ID or OIL LEASE # / Oil - O Gas - G / WELL #
13. Pipe Line Connection	
15. List of Offset Operators Notified and Date of Notification	Any Condensate on hand at time of Workover or Recompletion? ☐ Yes ☐ No

7.

8. Identification Number

9. Well Number: 1

10. County: LEA

11. Purpose of Test
- Initial Potential: X
- Retest: ☐
- Reclass: ☐

14. Completion or Recompletion Date

16. Type of Electric or other Log Run.

Section I — GAS MEASUREMENT DATA

Date of Test: 5-11-80

Gas Measurement Method (Check One): Orifice Meter [X] Positive Choke ☐ Orifice Vent Meter ☐ Pitot Tube ☐ Critical-flow Prover ☐

Gas produced during test: 283. MCF

Run No.	Line Size	Orifice or Choke Size	24 Hr. Coeff. Orif or Choke	Static P_m or Choke Press	Diff. h_w	Flow Temp. °F	Temp. Factor F_{tf}	Gravity Factor F_g	Compress Factor F_{pv}	Volume MCF/DAY
1	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	907.
2	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	1251.
3	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	1887.
4	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	2739.

Section II — FIELD DATA AND PRESSURE CALCULATIONS

Gravity (Dry Gas)	Gravity Liquid Hydrocarbon	Gas-Liquid Hydro Ratio	Gravity of Mixture	Avg. Shut-in Temp.	Bottom Hole Temp.
0.700	56.0 Deg. API	94222. CF/Bbl	G_{mix} = 0.728	132. °F	205°F @ 13125 (Depth)

$D_{eff}^{8/3}$ = 6.27 | $\sqrt{T_f}$ = $\sqrt{615.}$ = 24.80 | $\sqrt{GL}$ = $\sqrt{9556.}$ = 97.76

$C = \frac{1118 \times (D_{eff})^{8/3}}{\sqrt{T}}$ = 282. | $\frac{\sqrt{GL}}{C}$ = 0.34613

Run No.	Time of Run Min.	Choke Size	Wellhead Press P_w PSIA	Wellhead Flow Temp. °F	P_w^2 (Thousands)	R	R^2 (Thousands)	P_f	P_w/P_f
Shut-in			2750.	60.	7561.				
1	60.	0.000	2605.	110.	6784.	313.9	98.6	2623.	0.993
2	60.	0.000	2475.	104.	6124.	433.0	187.5	2512.	0.985
3	60.	0.000	2365.	102.	5592.	653.2	426.6	2453.	0.964
4	60.	0.000	2185.	105.	4773.	948.1	898.8	2381.	0.917

Run No.	F	K	$S = \frac{1}{n}$	e^{Ks}	P_f and P_c	P_f^2 and P_c^2	$P_f^2 - P_c^2$
Shut-In		0.3024	1.211	1.442	3966.	15730.	
1	0.9955	0.2899	1.193	1.413	3707.	13745.	1986.
2	0.9952	0.2888	1.201	1.415	3554.	12633.	3097.
3	0.9961	0.2857	1.209	1.413	3465.	12007.	3723.
4	0.9958	0.2791	1.221	1.406	3348.	11210.	4520.

Angle of Slope

θ = 45.0

n = 1.000

Absolute Open Flow: 9531. MCF/DAY

Husky

Husky Oil Company

600 South Cherry Street
Denver, Colorado 80222
(303) 370-1300

October 31, 1980

Russell M. Davidson
Vice President

Leslie J. Lawner, Esq.
FEDERAL ENERGY REGULATORY COMMISSION
Office of General Counsel
825 North Capitol Street, N.E.
Washington, D.C. 20426

Dear Ms. Lawner:

Re: Docket No. RM79-76 (New Mexico-1)
NOTICE OF PROPOSED RULEMAKING
BY DIRECTOR, OPPR

Husky Oil Company ("Husky") is active in exploration and production in the Rocky Mountain Region. Husky currently has oil and gas production in portions of Lea County, New Mexico.

Husky wishes to support the recommendation of the State of New Mexico Oil and Gas Conservation Commission that the Austin-Mississippian formation be designated a tight formation under the Commission's final regulation, Section 271-703. Husky believes that such a designation will offer the needed economic stimulus for further natural gas exploration in this area. Husky further believes that the technology required to protect the environment is currently available.

Thank you for the opportunity to comment.

Sincerely,

R. M. Davidson
Vice President

cc: New Mexico State Oil & Gas
Conservation Commission

HEYCO
PETROLEUM PRODUCERS

HARVEY E. YATES COMPANY
401 NORTH COLORADO • SUITE 202 • MIDLAND, TEXAS 79701 • (915) 683-6444
P.O. BOX 1933 • SUITE 300, SECURITY NATIONAL BANK BUILDING • ROSWELL, N. M. 88201 • (505) 623-6601

August 5, 1980

Mr. Richard Stamets
State of New Mexico
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Re: Case No. 6984

Dear Richard:

Enclosed is the type log of the "Austin-Mississippian" you requested during the hearing. Let me know if you need anything else.

Very truly yours,

HARVEY E. YATES COMPANY

Andrew C. Lattu

ACL:amp

Enclosure

EXHIBIT 1 F
SOUTHERN UNION STATE 17
SEC. 17, TWP 14S, R 36E
LEA COUNTY, NEW MEXICO

Addendum 3-1F

84

PRESSURE DRAWDOWN ANALYSIS

POINTS USED	SLOPE PSI/CYCL	RADIUS REACHED FT	PORE VOLUME MB	HYDROCAR VOLUME	K (MDS)	COMPL. EFF. %
UNSTEADY-STATE ANALYSIS:						
1- 2	251.0	37.	5.675	4.197	0.05	221.6
SEMI-STEADY STATE ANALYSIS:						
2- 4	103.0		5.417	4.654		

POINT	HOURS	RATE	PRESSURE	DP/QN	PLOT
1	1.00	907.0	3707.0	0.286	0.000
2	2.00	1251.0	3554.0	0.329	0.218
3	3.00	1887.0	3465.0	0.266	0.284
4	4.00	2739.0	3348.0	0.226	0.329

NM No. M
Artesia

GAS WELL BACK PRESSURE TEST
COMPLETION OR RECOMPLETION REPORT AND LOG

1. FIELD NAME: NEW MEXICO
2. LEASE NAME: STATE 17
3. OPERATOR:
4. ADDRESS:
5. LOCATION (Section, Block, and Survey): SEC. 17, T 14S, R 36E
5b. Distance and Direction from nearest town in this county.
6. If Operator has changed within last 60 days - Give former Operator.
7.
8. Identification Number
9. Well Number: 1
10. County: LEA
11. Purpose of Test: Initial Potential [X] Retest [ ] Reclass [ ]
12. If Workover or Reclass, give former Field (with Reservoir) & Gas ID or Oil Lease #.
FIELD & RESERVOIR | GAS ID or OIL LEASE # | Oil - C / Gas - C | WELL #
13. Pipe Line Connection
14. Completion or Recompletion Date
15. List of Offset Operators Notified and Date of Notification
Any Condensate on hand at time of Workover or Recompletion? [ ] Yes [ ] No
16. Type of Electric or other Log Run.

GAS MEASUREMENT DATA

Section I

Date of Test: 4-11-80
Gas Measurement Method (Check One): Orifice Meter [X] Positive Choke [ ] Orifice Vent Meter [ ] Pitot Tube [ ] Critical-flow Prover [ ]
Gas produced during test: 283. MCF

Run No.	Line Size	Orifice or Choke Size	24 Hr. Coeff. Orif or Choke	Static P_m or Choke Press	Diff. h_w	Flow Temp. °F	Temp. Factor F_{tf}	Gravity Factor F_g	Compress Factor F_{pv}	Volume MCF/DAY
1	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	907.
2	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	1251.
3	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	1887.
4	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	2739.

FIELD DATA AND PRESSURE CALCULATIONS

Section II

Gravity (Dry Gas)	Gravity Liquid Hydrocarbon	Gas-Liquid Hydro Ratio	Gravity of Mixture	Avg. Shut-In Temp.	Bottom Hole Temp.
0.700	56.0 Deg. API	94222. CF/Bbl	G_{mix} = 0.728	132. °F	205°F @ 13125 (Depth)

$D_{eff}^{8/3}$ = 6.27
$\sqrt{T_f} = \sqrt{615.}$ = 24.80
$\sqrt{GL} = \sqrt{9556.}$ = 97.76
$C = \frac{1118 \cdot (D_{eff})^{8/3}}{\sqrt{T}}$ = 282.
$\frac{\sqrt{GL}}{C}$ = 0.34613

Run No.	Time of Run Min	Choke Size	Wellhead Press P_w PSIA	Wellhead Flo Temp. °F	P_w^2 (Thousands)	R	R^2 (Thousands)	P_f	P_w/P_f
Shut-In			2750.	60.	7561.				
1	60.	0.000	2605.	110.	6784.	313.9	98.6	2623.	0.993
2	60.	0.000	2475.	104.	6124.	433.0	187.5	2512.	0.985
3	60.	0.000	2365.	102.	5592.	653.2	426.6	2453.	0.964
4	60.	0.000	2185.	105.	4773.	948.1	898.8	2381.	0.917

Run No.	F	K	$S = \frac{1}{s}$	g^{ks}	P_f and P_s	P_f^2 and P_c^2	$P_f^2 - P_s^2$
Shut-In		0.3024	1.211	1.442	3966.	15730.	
1	0.995	0.2899	1.193	1.413	3707.	13745.	1986.
2	0.992	0.2888	1.201	1.415	3554.	12633.	3097.
3	0.981	0.2857	1.209	1.413	3465.	12007.	3723.
4	0.958	0.2791	1.221	1.406	3348.	11210.	4520.

Angle of Slope
θ = 45.0
n = 1.000
Absolute Open Flow
9531. MCF/DAY

EXHIBIT 1 F
SOUTHERN UNION STATE 17
SEC. 17, TWP 14S, R 36E
LEA COUNTY, NEW MEXICO

PRESSURE DRAWDOWN ANALYSIS

POINTS USED	SLOPE PSI/CYCL	RADIUS REACHED FT	PORE VOLUME MB	HYDROCAR VOLUME	K (MDS)	COMPL. EFF. %
UNSTEADY-STATE ANALYSIS:						
1- 2	251.0	37.	5.675	4.197	0.05	221.6
SEMI-STEADY STATE ANALYSIS:						
2- 4	103.0		6.417	4.654		

POINT	HOURS	RATE	PRESSURE	DP/QN	PLOT
1	1.00	907.0	3707.0	0.286	0.000
2	2.00	1251.0	3554.0	0.329	0.218
3	3.00	1887.0	3465.0	0.266	0.284
4	4.00	2739.0	3348.0	0.226	0.329

API No. if Available

7.

GAS WELL BACK PRESSURE TEST
COMPLETION OR RECOMPLETION REPORT AND LOG

8. Identification Number

1. FIELD NAME: NEW MEXICO
2. LEASE NAME: STATE 17
9. Well Number: 1
3. OPERATOR
10. County: LEA
4. ADDRESS
11. Purpose of Test: Initial Potential [X] Retest [ ] Recloss [ ]
5. LOCATION (Section, Block, and Survey): SEC. 17, T 14S, R 36E
5b. Distance and Direction from nearest town in this county.
6. If Operator has changed within last 60 days - Give former Operator.
12. If Workover or Recloss, give former Field (with Reservoir) & Gas ID or Oil Lease #.

FIELD & RESERVOIR	GAS ID or OIL LEASE #	Oil - O Gas - G	WELL #

13. Pipe Line Connection
14. Completion or Recompletion Date
15. List of Offset Operators Notified and Date of Notification
Any Condensate on hand at time of Workover or Recompletion? [ ] Yes [ ] No
16. Type of Electric or other Log Run

Section I — GAS MEASUREMENT DATA

Date of Test: 4-11-80
Gas Measurement Method (Check One): Orifice Meter [X] Positive Choke [ ] Orifice Vent Meter [ ] Pitot Tube [ ] Critical-flow Prover [ ]
Gas produced during test: 283. MCF

Run No.	Line Size	Orifice or Choke Size	24 Hr. Coeff. Orif or Choke	Static P_m or Choke Press	Diff. h_w	Flow Temp. °F	Temp. Factor F_{tf}	Gravity Factor F_g	Compress Factor F_{pv}	Volume MCF/DAY
1	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	907.
2	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	1251.
3	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	1887.
4	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	2739.

Section II — FIELD DATA AND PRESSURE CALCULATIONS

Gravity (Dry Gas)	Gravity Liquid Hydrocarbon	Gas-Liquid Hydro Ratio	Gravity of Mixture	Avg. Shut-in Temp.	Bottom Hole Temp.
0.700	56.0 Deg. API	94222. CF/Bbl	G_{mix} = 0.728	132. °F	205 °F @ 13125 (Depth)

$D_{eff}^{8/3}$ = 6.27
$\sqrt{T_f}$ = $\sqrt{615.}$ = 24.80
$\sqrt{GL}$ = $\sqrt{9556.}$ = 97.76
$C = \frac{1118 \times (D_{eff})^{8/3}}{\sqrt{1}}$ = 282.
$\frac{\sqrt{GL}}{C}$ = 0.34613

Run No.	Time of Run Min	Choke Size	Wellhead Press P_w PSIA	Wellhead Flow Temp. °F	P_w^2 (Thousands)	R	R^2 (Thousands)	P_f	P_w/P_f
Shut-in			2750.	60.	7561.				
1	60.	0.000	2605.	110.	6784.	313.9	98.6	2623.	0.993
2	60.	0.000	2475.	104.	6124.	433.0	187.5	2512.	0.985
3	60.	0.000	2365.	102.	5592.	653.2	426.6	2453.	0.964
4	60.	0.000	2185.	105.	4773.	948.1	898.8	2381.	0.917

Run No.	F	K	$S = \frac{1}{n}$	gks	P_f and P_s	P_f^2 and P_s^2	$P_f^2 - P_s^2$
Shut-In		0.3024	1.211	1.442	3966.	15730.	
1	0.995	0.2899	1.193	1.413	3707.	13745.	1986.
2	0.992	0.2888	1.201	1.415	3554.	12633.	3097.
3	0.981	0.2857	1.209	1.413	3465.	12007.	3723.
4	0.958	0.2791	1.221	1.406	3348.	11210.	4520.

Angle of Slope
θ = 45.0
n = 1.000
Absolute Open Flow
9531. MCF/DAY

United States Department of the Interior

GEOLOGICAL SURVEY
South Central Region
P. O. Box 26124
Albuquerque, New Mexico 87125

SEP 29 1980

Federal Energy Regulatory Commission
825 North Capitol Street, N. E.
Washington, D. C. 20426

Gentlemen:

This jurisdictional agency concurs in the recommendation of the State of New Mexico, Case No. 6984, Order No. R-6475, dated September 22, 1980, that the described lands in subject order in Lea County, New Mexico be designated as a tight formation.

Sincerely yours,

Jack Willock

Jack Willock
Acting Deputy Conservation
Manager, Oil and Gas

cc: NMOCD, State of New Mexico

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

September 24, 1980

Re: CASE NO. 6984
ORDER NO. R-6475

Mr. Robert Strand, Attorney
Harvey E. Yates Company
Post Office Box 1933
Roswell, New Mexico 88201

Applicant:

Harvey E. Yates Company

Dear Sir:

Enclosed herewith are two copies of the above-referenced Division order recently entered in the subject case.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD

Other

HEYCO **HARVEY E. YATES COMPANY**

PETROLEUM PRODUCERS

P. O. BOX 1933 SUITE 300, SECURITY NATIONAL BANK BUILDING 505/623-6601
ROSWELL, NEW MEXICO 88201

July 7, 1980

State of New Mexico
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. Richard Stamets

Re: Case No. 6984
Tight Formation Designation
Lea County, New Mexico

Gentlemen:

Pursuant to the Divisions rules relating to tight formation designation under §107 of the Natural Gas Policy Act of 1978, I enclose three copies of the Exhibits we intend to introduce in the above referenced case set for hearing on July 23, 1980.

Sincerely,

Robert H. Strand
Attorney

RHS/lh
NGPA #3-1

cc: United States Geological Survey
P. O. Box 26124
Albuquerque, New Mexico 87125

RECEIVED
JUL 8 1980
Oil Conservation

RECEIVED
OCT 14 1980
OIL CONSERVATION DIVISION
SANTA FE

HEYCO

PETROLEUM PRODUCERS

HARVEY E. YATES COMPANY

P. O. BOX 1933 SUITE 300, SECURITY NATIONAL BANK BUILDING 505/623-6601

ROSWELL, NEW MEXICO 88201

July 7, 1980

United States Geological Survey
P. O. Box 26124
Albuquerque, New Mexico 87125

Attention: Allen Buckingham

Re: New Mexico Oil Conservation
Case No. 6984
Tight Formation Designation
Lea County, New Mexico

Gentlemen:

Pursuant to the rules of your agency and the New Mexico Oil Conservation Division relating to tight formation designations under §107 of the Natural Gas Policy Act of 1978, I enclose a copy of the Application in the above referenced case, and a set of the exhibits we intend to introduce at the examiner hearing thereof set for 9:00 a.m. on July 23, 1980, at the New Mexico Oil Conservation Division hearing room in Santa Fe.

Sincerely,

Robert H. Strand
Attorney

RHS/lh
NGPA #3-1

cc: New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

RECEIVED
JUL 3 1980
Oil Conservation

STATE OF NEW MEXICO
ENERGY & MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN MATTER OF THE HEARING
CALLED BY THE
OIL CONSERVATION DIVSION
FOR THE PURPOSE
OF CONSIDERING:

APPLICATION OF
HARVEY E. YATES COMPANY
FOR DESIGNATION OF A
TIGHT FORMATION
LEA COUNTY, NEW MEXICO

CASE NO. 6984

ORDER NO.

ORDER OF THE DIVISION

BY THE DIVISION

This Cause came on for hearing at 9:00 a.m. on July 23, 1980, at Santa Fe, New Mexico, before Examiner Richard Stamets.

Now, on this _____ day of September, 1980, the Division Director, having considered the testimony, the record, and the recommendation of the Examiner, and being fully advised in the premises

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the Applicant, Harvey E. Yates Company requests that the Division in accordance with Section 107 of the Natural Gas Policy Act, and 18 C.F.R. §271.705 recommend to the Federal Energy Regulatory Commission that the Austin-Mississippian formation underlying the following described lands situated in Lea County, New Mexico be

designated as a tight formation in said Federal Energy Regulatory Commission's regulations:

Township 13 South, Range 35 East, N.M.P.M.
Township 13 South, Range 36 East, N.M.P.M.
Township 14 South, Range 35 East, N.M.P.M.
Township 14 South, Range 36 East, N.M.P.M.
Township 15 South, Range 35 East, N.M.P.M.
Township 15 South, Range 36 East, N.M.P.M.

Containing 138,240 acres mor or less.

(3) That the Austin-Mississippian formation underlies all of the above described lands and consists of a shallow water limestone with the top of such formation being found at 13,200' - 13,300' below the surface with the thickness of such formation being 200 - 300 feet.

(4) That the following wells produce or have produced natural gas from the Austin Mississippian formation:

Harvey E. Yates Company Austin Monteith #1	1650 feet from South Line and 1980 feet from West Line of Section 8, Township 14 South, Range 36 East, N.M.P.M.
Southern Union Exploration Company State 17 #1	1980 feet from North Line and 1980 feet from West Line of Section 17, Township 14 South, Range 36 East, N.M.P.M.
Yates Petroleum Corporation Barbee LL #1	1980 feet from North Line and 1980 feet from East Line of Section 18, Township 14 South, Range 36 East, N.M.P.M.
AJobe Oil Corporation Hannah #1	1980 feet from North Line and 660 feet from East Line of Section 17, Township 14 South, Range 36 East, N.M.P.M.
Phillips Petroleum Corporation Austin #1	661 feet from South Line and 661 feet from West Line of Section 17, Township 14 South, Range 36 East, N.M.P.M.

Adobe Oil Corporation
State 16 #1

990 feet from South Line and 660 feet from West Line of Section 16, Township 14 South, Range 36 East, N.M.P.M.

Adobe Oil Corporation
State 16 #2

1980 feet from North Line and 1980 feet from West Line of Section 16, Township 14 South, Range 36 East, N.M.P.M.

(5) That the Austin Mississippian formation underlying the above described lands has been penetrated by a number of other wells, none of which produced natural gas in commercial quantities from the Austin Mississippian or any other formation.

(6) That based on analysis of available data from existing wells, and utilizing generally and customarily accepted petroleum engineering techniques and measurements:

(a) The estimated average <u>in situ</u> gas permeability throughout the pay section of the Austin Mississippian formation is expected to be 0.1 millidarcy or less; and

(b) The stabilized production rate, against atmospheric pressure, of wells contemplated for production in the Austin Mississippian formation, without stimulation, is not expected to exceed production levels determined by reference to well depth, as found in the table set out in 18 C.F.R. §271.705(b)(i)(ii); and

(c) No well drilled into the formation is expected to produce more than five barrels of crude oil per day.

(7) That the only fresh water aquifer underlying the area sought for designation is the Ogalalla formation found at a depth of approximately 60-300 feet below the surface and a brackish water formation, the Santa Rosa is found underlying said lands at a depth of approximately 1,000 - 1,200 feet below the surface.

(8) That existing State of New Mexico and Federal Regulations relating to casing and cementing of wells will assure that development of the Austin Mississippian formation will not adversely affect said water zones.

IT IS THEREFORE ORDERED:

(1) That it be and hereby is recommended to the Federal Energy Regulatory Commission pursuant to Section 107 of the Natural Gas Policy Act of 1978, and 18 C.F.R. §271.705, that the Austin Mississippian formation underlying the following described lands in Lea County, New Mexico be designated as a tight formation:

Township 13 South, Range 35 East, N.M.P.M.
Township 13 South, Range 36 East, N.M.P.M.
Township 14 South, Range 35 East, N.M.P.M.
Township 14 South, Range 36 East, N.M.P.M.
Township 15 South, Range 35 East, N.M.P.M.
Township 15 South, Range 36 East, N.M.P.M.

Containing 138,240 acres more or less.

(2) That jurisdiction of this cause is hereby retained for the entry of such further orders as the Division may deem necessary.

Done at Santa Fe, New Mexico on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

Joe D. Ramey
Director

NEW MEXICO OIL CONSERVATION DIVISION

EXAMINER HEARING JULY 23, 1980

DOCKET NO.

PREPARED FOR:

HARVEY E. YATES COMPANY
SUITE 300
SECURITY NATIONAL BANK BUILDING
ROSWELL, NEW MEXICO 88201

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

AUSTIN MISSISSIPPI (GAS) POOL

In the matter of the determination of the Mississippi formation underlying certain lands in Lea County, New Mexico, as a "Tight Formation" pursuant to regulations of the Federal Energy Commission, Section 107(b) of the Natural Gas Policy Act of 1978 (15 USC 3317) and regulations thereunder, the certain exhibits will be evidence presented which demonstrates that the Mississippi gas reservoir beneath lands located in Townships 13, 14 and 15 South and Ranges 35 and 36 East, N.M.P.M., Lea County, New Mexico, qualifies as a "Tight Formation".

The producing Mississippi zone is a dense limestone, dolomite, with some possible conglomerates, and quartzites. The matrix is characterized as being very fine-grained with low porosity (less than 5%), and the formation is highly cemented. The producing zone is encountered at an average depth of 13,300 feet.

Operators in the Austin Mississippi (Gas) Pool have conducted reservoir buildup pressure surveys on their wells, the results of which show the average in-situ gas permeability throughout the Mississippi pay section averages 0.0202 millidarcies and is not expected to exceed 0.1 millidarcy. The results of the buildup surveys together with all pertinent data are summarized on Exhibit No. 1. The individual Horner calculations, data and buildup curves are included as sub-parts to Exhibit No. 1.

The stabilized production rates, against atmospheric pressure of wells completed for production in the Mississippi zone at an average depth of 13,300 feet with or without stimulation, are not expected to exceed a maximum of 1300 MCF of gas per day.

Exhibit No. 2 is a summary of gas production by operator and wells of the Austin Mississippi (Gas) Pool. Individual graphic presentation of the production history by wells are included as sub-parts to Exhibit No. 2. The declining daily delivery rates are typical of wells producing gas from a "Tight", low permeability reservoir. Specific reference is made to Adobe Oil and Gas Corporation's Hannah No. 1 Well which demonstrated a high production rate at the time of the buildup pressure survey; however, the subsequent production performance indicates that matrix flow rates are controlling, and it is doubtful that this well would now produce more than 800 MCFD against atmospheric pressure. The Phillips Petroleum Company Austin Comm well produced 4,300,000 MCF of gas through December 31, 1979. The well is no longer producing because of a down hole casing collapse condition. It is of interest to note, while the Phillips well was acidized, that at no time during its producing life did production rates exceed 1250 to 1300 MCFD. It should also be noted that the Mississippi zone in the Adobe Oil and Gas Corporation wells was stimulated with acid; however, the low permeability matrix is now the controlling factor of gas flow to the well bores.

The liquid hydrocarbons produced usually do not exist as a liquid in the Mississippi gas reservoir. None of the wells in the Austin Mississippi (Gas) Pool are expected to produce more than five to six barrels of condensate per day once stabilized reservoir flow rates are reached.

A recombination of the separator fluids, condensate and gas, utilizing a computer simulation Pressure-Volume-Temperature (PVT) technique (Garrett Computing System) indicates that above a reservoir pressure of 3792 psig all fluids exist in a single gas phase. See Exhibit 3. As gas is produced and recovered at each well and the reservoir drainage area pressures decline, a severe reduction in gas production rates could occur as the retrograde condensation phenomena occurs when the reservoir pressure passes through the Dew-Point pressure.

Exhibit 4 is a Well Data Table and includes all pertinent well information. The casing design of the wells drilled and completed indicates that the fresh water aquifers in the area as required by rules and regulations of the New Mexico Conservation Commission have been fully protected.

EXHIBIT 1
AUSTIN - MISSISSIPPI GAS RESERVOIR
LEA COUNTY, NEW MEXICO
SUMMARY OF RESERVOIR BUILDUP SURVEYS
PRODUCTION TEST DATA, FORMATION RESERVOIR FLUID
CHARACTERISTICS, PERMEABILITIES, RADIUS OF INVESTIGATION,
DAMAGE RATIOS AND CALCULATED FLOW RATES TO ATMOSPHERE
USING SURVEY TEST DATA AND RESULTS
Ralph H. Viney & Associates, Inc.
Engineering Consultants

Owner-Operator / Lease Name / Well Number	Harvey E. Yates Company Austin Monteith Well No. 1	Yates Petroleum Corporation Barbee LL Well No. 1	Adobe Oil & Gas Corporation State 16 Well No. 1	Adobe Oil & Gas Corporation State 16 Well No. 2	Adobe Oil & Gas Corporation Hannah Well No. 1	An Average of All Wells at Time of Their Respective Pressure Buildup Surveys
Location: Section, Township and Range	Sec. 8, T-14-S, R-36-E	Sec. 18, T-14-S, R-36-E	Sec. 16, T-14-S, R-36-E	Sec. 16, T-14-S, R-36-E	Sec. 17, T-14-S, R-36-E	
Productive Mississippi Formation Interval Measured Depth - Feet	13,356' to 13,611'	13,350' to 13,655'	13,197' to 13,49.'	13,265' to 13,552'	13,220' to 13,490'	
Test Data						
Date of Flow Tests and Reservoir Buildup Survey	4-7-1980	11-30-1979	5-11-1979	9-20-1979	3-26-1979	
Flowing Tubing Pressure - psig	1400	879	1100	1100	2290	1317
Flowing Bottom Hole Pressure (Pwf) -psig	2000	1258	654	1889	2612	1638
Choke Size - Inches	15/64"	12/64"	18/64"	13/64"	14/64"	
Gas Gathering Line Operating Pressure - psig	640	NR	250	672	820	596
Production Data						
Gas Production on Test - MCFD	1164	930	1132	735	2080	1207
Condensate Production - Barrels	40	-	19	33	59	40
Water Production - Barrels	-	-	-	-	-	-
Cumulative Gas Production at Test Date - MCF	51,561	2,790	13,505	5,800	8,150	16,361
Formation, Reservoir and Physical Characteristics Data						
Net Mississippi Zone Thickness - Feet	255	205	304	256	270	283
Porosity (Ø) % of Bulk Volume	2.15	1.81	3.02	2.800	2.66	2.69
Interstitial Water (S_w) % of Pore Space	40	40	40	40	40	40
Reservoir Temperature °F/°R	186°F/646°R	192°F/652°R	230°F/690°R	225°F/685°R	203°F/663°R	207°F/667°R
Specific Gravity of Gas (SG) Air = 1.00	0.897	0.67	0.723	0.643	0.680	0.72
Gas Viscosity (μ_g) at Average Reservoir Pressure During Test - Centipoises	0.0270	0.0235	0.026	0.025	0.0245	0.0240
Critical Pressure (Pc) - psia	678	670	688	670	674	676
Critical Temperature (Tc) - °R	444	375	374	373	373	388
Gas Compressibility (Cg) - psi^{-1}	2.80×10^{-4}	3.058×10^{-4}	2.14×10^{-4}	2.69×10^{-4}	2.758×10^{-4}	2.34×10^{-4}
Water Compressibility (Cw) - psi^{-1}	3.10×10^{-6}	3.300×10^{-6}	3.30×10^{-6}	3.30×10^{-6}	3.30×10^{-6}	3.30×10^{-6}
Rock Compressibility (Cf) - psi^{-1}	8.50×10^{-6}	10.500×10^{-6}	8.60×10^{-6}	8.50×10^{-6}	8.50×10^{-6}	8.58×10^{-6}
Total Compressibility (Ct) - psi^{-1}	1.77×10^{-4}	1.95×10^{-4}	4.5832×10^{-4}	1.718×10^{-4}	1.753×10^{-4}	2.046×10^{-4}
Gas Deviation Factor (Z) @						
Flowing Bottom Hole Pressure	0.74	0.900	0.945	0.906	0.870	0.870
Average Reservoir Pressure	0.80	0.890	0.910	0.940	0.910	0.865
Boundary Reservoir Pressure	0.96	1.02	0.880	1.05	0.975	0.940
Gas Formation Volume Factor (Bg) - Cubic Feet/SCF	4.12×10^{-3}	5.02×10^{-3}	1.445×10^{-3}	4.90×10^{-3}	4.68×10^{-3}	5.195×10^{-3}
Well Bore Radius (r_w) - Feet	0.375	0.375	0.375			
Equivalent Liquid Rate of Test Gas Production (Q_{RBPD}) - Barrels	856	831	2913	832	1783	1138
Pseudo Flow Time at Test Date (T_e) - Hours	1063	72	286	192	94	335
Shut in Time of Reservoir Buildup Test (Δt) - Hours	152.5	137	65	168	87	120
Slope of Buildup Curve (Horner Technique) m psi/cycle	845	489	776	603	1156	774
Reservoir Boundary Pressure from Buildup (P_e) - psig	5139	5282	1804	5544	4639	4451
Transmissibility						
$(Kh/u) = \frac{162.6 \times Q_{RBPD}}{M}$ = Md - Ft/Cps	163.93	13.64	608.87	176	243.16	232.51
Productive Capacity (Kh/u)(u) = (kh) = Md.Ft.	4.43	6.67	8.742	6.25	5.557	5.73
Permeability (kh/h) = K - Md.	0.01735	0.0312	0.032	0.01486	0.02206	0.0202
Radius of Investigation During Buildup Pressure Surveys						
$r_i = \sqrt{\frac{kT}{1688 \phi u c}}$ - Feet	135	116.5	60	93	84	97.44
Where T is shut in time in minutes T = (ΔT)(60 minutes) Van Poolen Equation						
Estimated Damage Ratio (EDR)						
$EDR = \frac{P_s - P_{wf}}{m(\log T + 3.65)}$	0.52	1.34	0.15	1.15	0.28	0.58
Calculated Flow to Atmospheric Pressure For Various Drainage Radii - MCFD						
Using Darcy Radial Flow Equation for Gas						
$q_{MCF} = \frac{0.703\ kh\ (P_e^2 - P_{wf}^2)^n}{\mu T z \ln (re/rw)}$	ri	1372	985	1303	830	3043	1406
	r @ 80 acres	1017	712	833	569	2075	984
	r @ 160 acres	974	682	798	546	1989	934
	r @ 320 acres	940	656	770	526	1917	891
	r @ 640 acres	911	636	744	510	1860	885

Where
P_e is Reservoir pressure at drainage boundary
P_{wf} is flowing pressure at well bore

Setting P_{wf} = 0 represents maximum flow that formation matrix would deliver into well bore.

~~GAS WELL~~ BACK PRESSURE TEST
COMPLETION OR RECOMPLETION REPORT AND LOG

1. FIELD NAME: NEW MEXICO	2. LEASE NAME: STATE 17
3. OPERATOR	
4. ADDRESS	
5. LOCATION (Section, Block, and Survey): SEC. 17, T 14S, R 36E	5b. Distance and Direction from nearest town in this county.
6. If Operator has changed within last 60 days - Give former Operator.	12. If Workover or Recluse, give former Field (with Reservoir) & Gas ID or Oil Lease #. FIELD & RESERVOIR / GAS ID or OIL LEASE # / Oil - O Gas - G / WELL #
13. Pipe Line Connection	
15. List of Offset Operators Notified and Date of Notification	Any Condensate on hand at time of Workover or Recompletion? ☐ Yes ☐ No

7.
8. Identification Number
9. Well Number: 1
10. County: LEA
11. Purpose of Test: Initial Potential [X] Retest [ ] Recloss [ ]
14. Completion or Recompletion Date
16. Type of Electric or other Log Run.

Section I — GAS MEASUREMENT DATA

Date of Test: 4-11-80
Gas Measurement Method (Check One): Orifice Meter [X] Positive Choke [ ] Orifice Vent Meter [ ] Pitot Tube [ ] Critical-flow Prover [ ]
Gas produced during test: 283. MCF

Run No.	Line Size	Orifice or Choke Size	24 Hr. Coeff. Orif or Choke	Static P_m or Choke Press	Diff. h_w	Flow Temp. °F	Temp. Factor F_{tf}	Gravity Factor F_g	Compress Factor F_{pv}	Volume MCF/DAY
1	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	907.
2	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	1251.
3	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	1887.
4	4.0	0.000	0.0000	15.	0.0	0.	1.0632	0.9258	1.0021	2739.

Section II — FIELD DATA AND PRESSURE CALCULATIONS

Gravity (Dry Gas)	Gravity Liquid Hydrocarbon	Gas-Liquid Hydro Ratio	Gravity of Mixture	Avg. Shut-In Temp.	Bottom Hole Temp.
0.700	56.0 Deg. API	94222. CF/Bbl	G_{mix} = 0.728	132. °F	205°F @ 13125 (Depth)

$D_{eff}^{8/3}$ = 6.27
$\sqrt{T_f}$ = $\sqrt{615.}$ = 24.80
$\sqrt{GL}$ = $\sqrt{9556.}$ = 97.76
$C = \frac{1118 \times (D_{eff})^{8/3}}{\sqrt{T}}$ = 282.
$\frac{\sqrt{GL}}{C}$ = 0.34613

Run No.	Time of Run Min	Choke Size	Wellhead Press P_w PSIA	Wellhead Flow Temp. °F	P_w^2 (Thousands)	R	R^2 (Thousands)	P_f	P_w/P_f
Shut-In			2750.	60.	7561.				
1	60.	0.000	2605.	110.	6784.	313.9	98.6	2623.	0.993
2	60.	0.000	2475.	104.	6124.	433.0	187.5	2512.	0.985
3	60.	0.000	2365.	102.	5592.	653.2	426.6	2453.	0.964
4	60.	0.000	2185.	105.	4773.	948.1	898.8	2381.	0.917

Run No.	F	K	$S = \frac{1}{s}$	$g^{1/s}$	P_f and P_s	P_f^2 and P_s^2	$P_f^2 - P_s^2$
Shut-In		0.3024	1.211	1.442	3966.	15730.	
1	0.9955	0.2899	1.193	1.413	3707.	13745.	1986.
2	0.9952	0.2888	1.201	1.415	3554.	12633.	3097.
3	0.9951	0.2857	1.209	1.413	3465.	12007.	3723.
4	0.9948	0.2791	1.221	1.406	3348.	11210.	4520.

Angle of Slope
θ = 45.0
n = 1.000
Absolute Open Flow
9531. MCF/DAY

Dockets No. 24-80 and 25-80 are tentatively set for August 6 and 20, 1980. Applications for hearing must be filed at least 22 days in advance of hearing date.

Docket No. 22-80

DOCKET: COMMISSION HEARING - MONDAY - JULY 21, 1980

OIL CONSERVATION COMMISSION - 9 A.M. - MORGAN HALL
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

CASE 6967: Application of Amoco Production Company for a carbon dioxide gas unit agreement, Union, Harding, and Quay Counties, New Mexico. Applicant, in the above-styled cause, seeks approval for the Bravo Dome Carbon Dioxide Gas Unit Area, comprising 1,174,225 acres, more or less, of State, Federal, and fee lands situate in all or portions of the following townships: in Union County: Township 18 North, Ranges 34 thru 37 East; Township 19 North, Ranges 34, 35, and 36 East; Townships 20 and 21 North, Ranges 34 and 35 East; Townships 22 and 23 North, Ranges 30 thru 35 East; Township 24 North, Ranges 31 thru 34 East; in Harding County: Townships 17 thru 21 North, Ranges 29 thru 33 East; and in Quay County: Township 16 North, Ranges 34, 35, and 36 East; and Township 17 North, Ranges 34 thru 37 East.

The lands proposed to be included in said Bravo Dome Carbon Dioxide Gas Unit Area are more specifically described in documents on file with, and available for public inspection in, the offices of the Oil Conservation Division, State Land Office Building, Santa Fe, New Mexico.

****

DOCKET: EXAMINER HEARING - WEDNESDAY - JULY 23, 1980

Docket No. 23-80

9 A.M. - OIL CONSERVATION DIVISION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Richard L. Stamets, Examiner, or Daniel S. Nutter, Alternate Examiner:

CASE 6968: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Bloomfield Oil and Gas Company and all other interested parties to appear and show cause why the Sheetz Well No. 1 located in Unit M of Section 14, Township 29 North, Range 11 West, San Juan County, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 6969: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Associated Oil & Gas Company of New Mexico, Inc., Houston Fire and Casualty Insurance Company, and all other interested parties to appear and show cause why the Vigil Well No. 1 located in Unit J of Section 14, Township 12 North, Range 6 East, Sandoval County, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 6970: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Union Oil and Mining and all other interested parties to appear and show cause why the Carl Lanier Well No. 1 located in Unit B of Section 6, Township 29 North, Range 9 West, San Juan County, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 6971: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Aztec Development Company and all other interested parties to appear and show cause why the Finch Well No. 1 located in Unit O of Section 15, Township 29 North, Range 11 West, San Juan County, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 6972: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Coal Creek Oil Company and all other interested parties to appear and show cause why the W. E. Duggen Well No. 2 located in Unit H of Section 20, Township 29 North, Range 11 West, San Juan County, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 6973: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit all interested parties to appear and show cause why a well drilled by unknown parties and located in Unit E of Section 16, Township 30 North, Range 11 West, San Juan County, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 6974: Application of C & K Petroleum, Inc. for a unit agreement, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks approval for the White Draw Unit Area, comprising 13,404 acres, more or less, of State, Federal, and fee lands in Township 3 South, Ranges 27 and 28 East.

Docket No. 23-80

CASE 6975: Application of Jack Grynberg and Associates for a unit agreement, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks approval for the Rio Felix Unit Area, comprising 7,675 acres, more or less, of Federal, State, and fee lands in Township 14 South, Ranges 24 and 25 East.

CASE 6976: Application of R. N. Hillin for an NGPA determination, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks a new onshore reservoir determination in the Wolfcamp formation for a well located 800 feet from the South line and 2000 feet from the East line of Section 34, Township 19 South, Range 28 East.

CASE 6977: Application of Benson Mineral Group, Inc. for salt water disposal, Sandoval County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Chacra formation in the interval from 1636 feet to 1743 feet in its Navajo Well No. 1 in Unit F of Section 9, Township 22 North, Range 7 West, Rusty-Chacra Pool.

CASE 6978: Application of Benson Mineral Group, Inc. for salt water disposal, Sandoval County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Pictured Cliffs formation in the interval from 800 feet to 963 feet in its Federal Well No. 1 in Unit I of Section 4, Township 21 North, Range 7 West.

CASE 6979: Application of Wolfson Oil Company for salt water disposal, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres formation in the interval from 4108 feet to 4164 feet in its Mountain-Federal Well No. 1 in Unit G of Section 30, Township 7 South, Range 32 East, Tomahawk-San Andres Pool.

CASE 6940: (Continued from June 25, 1980, Examiner Hearing)

Application of Adobe Oil Company for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests down through the Wolfcamp formation underlying the NW/4 SE/4 for oil and the SE/4 for gas, Section 23, Township 20 South, Range 38 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 6961: (Continued from July 9, 1980, Examiner Hearing)

Application of Conoco Inc. for a dual completion and unorthodox well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion of its Meyer A-29 Well No. 11 to be drilled at an unorthodox location 990 feet from the North line and 660 feet from the East line of Section 29, Township 22 South, Range 36 East, to produce gas from the Langley-Devonian and -Eilenburger Pools thru parallel strings of tubing, the E/2 of said Section 29 to be dedicated to the well.

CASE 6980: Application of Bass Enterprises Production Company for a dual completion, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion of its Palmillo State Well No. 1 located in Unit J of Section 1, Township 19 South, Range 28 East, to produce gas from the North Turkey Track-Morrow Pool and oil from an undesignated Wolfcamp pool thru the casing-tubing annulus and tubing, respectively.

CASE 6960: (Continued from July 9, 1980, Examiner Hearing)

Application of Bass Enterprises Production Company for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests down to and including the Strawn formation underlying the S/2 SE/4 of Section 13, Township 16 South, Range 36 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 6950: (Continued from July 9, 1980, Examiner Hearing)

Application of Bass Enterprises Production Company for an unorthodox gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a Morrow test well to be drilled 660 feet from the North line and 1980 feet from the East line of Section 4, Township 25 South, Range 31 East, the E/2 of said Section 4 to be dedicated to the well.

CASE 6981: Application of Bass Enterprises Production Company for a special gas-oil ratio limitation, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks a special gas-oil ratio limitation of 8000 to one for the Palmillo-Bone Springs Pool.

CASE 6982: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Aminoil USA to appear and show cause why its 1980 Plan of Operation/Development for its Willow Lake Unit Area, Eddy County, New Mexico, should not be disapproved.

CASE 6901: (Continued from June 25, 1980, Examiner Hearing)

Application of Harvey E. Yates Company for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp thru Mississippian formations underlying the E/2 of Section 19, Township 14 South, Range 36 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6954: (Continued from July 9, 1980, Examiner Hearing)

Application of Harvey E. Yates Company for amendment of Order No. R-6303, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-6303 which authorized the directional drilling of a well, the surface location of which is 660 feet from the North line and 1980 feet from the West line of Section 32, Township 13 South, Range 36 East. Applicant seeks approval for the bottom hole location of the well at a point 654 feet from the North line and 2158 feet from the West line of said Section 32.

CASE 6921: (Continued from July 9, 1980, Examiner Hearing)

Application of Harvey E. Yates Company for complusory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp-Mississippian formations underlying the S/2 of Section 33, Township 13 South, Range 36 East, to be dedicated to a well to be drilled at an unorthodox location 660 feet from the South line and 990 feet from the East line of Section 33. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 6983: Application of Harvey E. Yates Company for an NGPA determination, Lea County, New Mexico. Applicant, in the above-styled cause, seeks a new onshore reservoir determination in the Mississippian formation for its Betenbough Well No. 1 located in Unit C of Section 32, Township 13 South, Range 36 East.

CASE 6984: Application of Harvey E. Yates Company for designation of a tight formation, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Mississippian formation underlying Townships 13, 14, and 15 South, Ranges 35 and 36 East, containing 138,240 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271.701-705.

CASE 6929: (Readvertised)

Application of Consolidated Oil & Gas, Inc. for downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Blanco Mesaverde and Basin-Dakota production in the wellbore of its NCRA Well No. 1-E located in Unit G of Section 22, Township 26 North, Range 7 West, by using the Dakota gas for gas lift of Mesaverde liquids after metering on the surface.

CASE 6985: In the matter of the hearing called by the Oil Conservation Division on its own motion for an order extending certain pools in McKinley, Rio Arriba, San Juan, and Sandoval Counties, New Mexico:

(a) EXTEND the Aztec-Farmington Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 30 NORTH, RANGE 11 WEST, NMPM
Section 18: SE/4

(b) EXTEND the Aztec-Fruitland Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 29 NORTH, RANGE 11 WEST, NMPM
Section 34: W/2

(c) EXTEND the Aztec-Pictured Cliffs Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 29 NORTH, RANGE 10 WEST, NMPM
Section 1: SW/4

TOWNSHIP 30 NORTH, RANGE 10 WEST, NMPM
Section 35: S/2

(d) EXTEND the Ballard-Pictured Cliffs Pool in San Juan, Rio Arriba, and Sandoval Counties, New Mexico, to include therein:

TOWNSHIP 26 NORTH, RANGE 8 WEST, NMPM
Section 8: NE/4
Section 9: NW/4

(e) EXTEND the Barker Creek Paradox Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 32 NORTH, RANGE 14 WEST, NMPM
Section 19: All

(f) EXTEND the Bisti-Lower Gallup Oil Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 24 NORTH, RANGE 10 WEST, NMPM
Section 5: N/2 NW/4

TOWNSHIP 25 NORTH, RANGE 10 WEST, NMPM
Section 31: N/2 SW/4

TOWNSHIP 25 NORTH, RANGE 11 WEST, NMPM
Section 36: N/2 NW/4

(g) EXTEND the Blanco Mesaverde Pool in Rio Arriba and San Juan Counties, New Mexico, to include therein:

TOWNSHIP 26 NORTH, RANGE 2 WEST, NMPM
Section 5: All
Section 6: All (Partial Section)

TOWNSHIP 26 NORTH, RANGE 4 WEST, NMPM
Section 18: All
Section 19: All

TOWNSHIP 26 NORTH, RANGE 5 WEST, NMPM
Section 24: E/2

(h) EXTEND the Blanco-Pictured Cliffs Pool in San Juan and Rio Arriba Counties, New Mexico, to include therein:

TOWNSHIP 29 NORTH, RANGE 8 WEST, NMPM
Section 4: SW/4

TOWNSHIP 30 NORTH, RANGE 9 WEST, NMPM
Section 4: SW/4

TOWNSHIP 30 NORTH, RANGE 10 WEST, NMPM
Section 22: SW/4

TOWNSHIP 32 NORTH, RANGE 12 WEST, NMPM
Section 36: S/2

(i) EXTEND the South Blanco-Pictured Cliffs Pool in Rio Arriba, Sandoval, and San Juan Counties, New Mexico, to include therein:

TOWNSHIP 28 NORTH, RANGE 8 WEST, NMPM
Section 11: W/2

(j) EXTEND the Chaco Wash-Mesaverde Oil Pool in McKinley County, New Mexico, to include therein:

TOWNSHIP 20 NORTH, RANGE 9 WEST, NMPM
Section 28: N/2 NE/4

(k) EXTEND the Chacon-Dakota Associated Pool in Rio Arriba and Sandoval Counties, New Mexico, to include therein:

TOWNSHIP 24 NORTH, RANGE 3 WEST, NMPM
Section 28: W/2

(l) EXTEND the Fulcher Kutz-Pictured Cliffs Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 28 NORTH, RANGE 11 WEST, NMPM
Section 23: SW/4

(m) EXTEND the South Gallegos-Fruitland Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM
Section 2: N/2
Section 3: NE/4
Section 11: NE/4

TOWNSHIP 27 NORTH, RANGE 12 WEST, NMPM
Section 35: NE/4

(n) EXTEND the Gavilan-Pictured Cliffs Pool in Rio Arriba County, New Mexico, to include therein:

TOWNSHIP 27 NORTH, RANGE 4 WEST, NMPM
Section 12: SE/4
Section 13: NE/4

(o) EXTEND the Kutz-Farmington Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 28 NORTH, RANGE 11 WEST, NMPM
Section 26: S/2

(p) EXTEND the West Kutz-Pictured Cliffs Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 28 NORTH, RANGE 12 WEST, NMPM
Section 10: W/2

TOWNSHIP 29 NORTH, RANGE 12 WEST, NMPM
Section 33: NW/4

(q) EXTEND the West Lindrith Gallup-Dakota Oil Pool in Rio Arriba County, New Mexico, to include therein:

TOWNSHIP 24 NORTH, RANGE 3 WEST, NMPM
Section 7: S/2
Section 17: SW/4

TOWNSHIP 24 NORTH, RANGE 4 WEST, NMPM
Section 7: SE/4

TOWNSHIP 25 NORTH, RANGE 4 WEST, NMPM
Section 26: W/2
Section 35: NW/4

(r) EXTEND the South Los Pinos Fruitland-Pictured Cliffs Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 32 NORTH, RANGE 7 WEST, NMPM
Section 34: SW/4
Section 35: E/2

(s) EXTEND the Lybrook-Gallup Oil Pool in Rio Arriba County, New Mexico, to include therein:

TOWNSHIP 23 NORTH, RANGE 7 WEST, NMPM
Section 6: NE/4 NE/4

(t) EXTEND the Otero-Gallup Oil Pool in Rio Arriba County, New Mexico, to include therein:

TOWNSHIP 24 NORTH, RANGE 5 WEST, NMPM
Section 1: W/2 NW/4 and SE/4 NW/4

(u) EXTEND the Salt Creek-Dakota Oil Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 30 NORTH, RANGE 17 WEST, NMPM
Section 4: SE/4 NW/4 and SW/4 NE/4

(v) EXTEND the Star-Mesaverde Oil Pool in McKinley County, New Mexico, to include therein:

TOWNSHIP 19 NORTH, RANGE 6 WEST, NMPM
Section 9: SE/4 SW/4

CASE 6986: In the matter of the hearing called by the Oil Conservation Division on its own motion for an order creating and extending vertical and horizontal limits of certain pools in Chaves, Eddy, Lea, and Roosevelt Counties, New Mexico:

(a) CREATE a new pool in Eddy County, New Mexico, classified as an oil pool for Bone Spring production and designated as the Forty Niner Ridge-Bone Spring Pool. The discovery well is Getty Oil Company Forty Niner Ridge Unit Well No. 2 located in Unit G of Section 21, Township 23 South, Range 30 East, NMPM. Said pool would comprise:

TOWNSHIP 23 SOUTH, RANGE 30 EAST, NMPM
Section 21: NE/4

(b) CREATE a new pool in Lea County, New Mexico, classified as an oil pool for Mississippian production and designated as the Gladiola-Mississippian Pool. The discovery well is Skelton Oil Company Z. Taylor Well No. 2 located in Unit G of Section 7, Township 12 South, Range 38 East, NMPM. Said pool would comprise:

TOWNSHIP 12 SOUTH, RANGE 38 EAST, NMPM
Section 7: NE/4

(c) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Strawn production and designated as the Pawnee-Strawn Gas Pool. The discovery well is Gifford, Mitchell & Wisenbaker White Eagle Well No. 1 located in Unit F of Section 22, Township 26 South, Range 36 East, NMPM. Said pool would comprise:

TOWNSHIP 26 SOUTH, RANGE 36 EAST, NMPM
Section 22: N/2

(d) CREATE a new pool in Chaves County, New Mexico, classified as a gas pool for Abo production and designated as the Penjack-Abo Gas Pool. The discovery well is McClellan Oil Corporation Penjack Well No. 1 located in Unit D of Section 6, Township 10 South, Range 26 East, NMPM. Said pool would comprise:

TOWNSHIP 9 SOUTH, RANGE 25 EAST, NMPM
Section 36: SE/4

TOWNSHIP 9 SOUTH, RANGE 26 EAST, NMPM
Section 31: SW/4

TOWNSHIP 10 SOUTH, RANGE 25 EAST, NMPM
Section 1: E/2 and NW/4
Section 2: NE/4

TOWNSHIP 10 SOUTH, RANGE 26 EAST, NMPM
Section 6: NW/4

(e) CREATE a new pool in Roosevelt County, New Mexico, classified as an oil pool for Pennsylvanian production and designated as the North Peterson-Pennsylvanian Pool. The discovery well is Enserch Exploration, Inc. Amoco State Well No. 1 located in Unit L of Section 16, Township 4 South, Range 33 East, NMPM. Said pool would comprise:

TOWNSHIP 4 SOUTH, RANGE 33 EAST, NMPM
Section 16: SW/4

(f) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Morrow production and designated as the Red Hills-Morrow Gas Pool. The discovery well is Amoco Production Company Andrikopoulos Federal Well No. 1 located in Unit L of Section 24, Township 25 South, Range 33 East, NMPM. Said pool would comprise:

TOWNSHIP 25 SOUTH, RANGE 33 EAST, NMPM
Section 24: W/2

(g) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Atoka production and designated as the Sand Point-Atoka Gas Pool. The discovery well is Perry R. Bass Big Eddy Unit Well No. 72 located in Unit R of Section 3, Township 21 South, Range 28 East, NMPM. Said pool would comprise:

TOWNSHIP 21 SOUTH, RANGE 28 EAST, NMPM
Section 3: S/2

(h) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Morrow production and designated as the Young-Morrow Gas Pool. The discovery well is Harvey E. Yates Company Young Deep Unit Well No. 1 located in Unit D of Section 10, Township 18 South, Range 32 East, NMPM. Said pool would comprise:

TOWNSHIP 18 SOUTH, RANGE 32 EAST, NMPM
Section 10: W/2

(i) EXTEND the Airstrip-Wolfcamp Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 34 EAST, NMPM
Section 26: SE/4

(j) EXTEND the Baldridge Canyon-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 24 SOUTH, RANGE 24 EAST, NMPM
Section 11: All
Section 12: W/2
Section 13: W/2

(k) EXTEND the Mid Bell Lake-Devonian Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 23 SOUTH, RANGE 34 EAST, NMPM
Section 18: N/2 and SW/4

(l) EXTEND the North Benson Queen-Grayburg Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 30 EAST, NMPM
Section 33: SW/4

(m) EXTEND the West Bitter Lake-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 10 SOUTH, RANGE 25 EAST, NMPM
Section 17: SE/4 NE/4

(n) EXTEND the Boyd-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 25 EAST, NMPM
Section 35: S/2

TOWNSHIP 19 SOUTH, RANGE 25 EAST, NMPM
Section 2: All

(o) EXTEND the Brunson-Fusselman Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
Section 9: NW/4

(p) EXTEND the Buffalo Valley-Pennsylvanian Gas Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 14 SOUTH, RANGE 28 EAST, NMPM
Section 31: All

(q) EXTEND the Cato-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 7 SOUTH, RANGE 31 EAST, NMPM
Section 31: SE/4

(r) EXTEND the Diamond Mound-Atoka Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 16 SOUTH, RANGE 28 EAST, NMPM
Section 6: Lots 3, 4, 5, 6, 11, 12, 13, and 14

(s) EXTEND the Diamond Mound-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 16 SOUTH, RANGE 28 EAST, NMPM
Section 5: Lots 1, 2, 7, 8, 9, 10, 15, and 16

(t) EXTEND the East Eagle Creek Atoka-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 25 EAST, NMPM
Section 22: All
Section 23: W/2

(u) EXTEND the Gem-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 33 EAST, NMPM
Section 32: N/2

(v) EXTEND the East Grama Ridge-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 34 EAST, NMPM
Section 36: S/2

(w) EXTEND the Indian Flats-Atoka Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 28 EAST, NMPM
Section 25: N/2
Section 26: E/2

(x) EXTEND the Indian Flats-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 28 EAST, NMPM
Section 23: E/2
Section 26: E/2

(y) EXTEND the Southwest Indian Flats-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 28 EAST, NMPM
Section 9: All
Section 10: W/2

(z) EXTEND the La Rica-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 34 EAST, NMPM
Section 2: All

(aa) EXTEND the vertical limits of the Nadine-Drinkard Pool in Lea County, New Mexico, to include the Abo formation and redesignate said pool as the Nadine Drinkard-Abo Pool.

(bb) EXTEND the Penasco Draw-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 24 EAST, NMPM
Section 1: N/2

(cc) EXTEND the South Peterson-Pennsylvanian Pool in Roosevelt County, New Mexico, to include therein:

TOWNSHIP 5 SOUTH, RANGE 33 EAST, NMPM
Section 30: SW/4
Section 31: NW/4 and N/2 SW/4

(dd) EXTEND the Race Track-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 10 SOUTH, RANGE 28 EAST, NMPM
Section 18: S/2 SE/4
Section 20: E/2 NW/4 and SW/4 NW/4

(ee) EXTEND the Railroad Mountain-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 28 EAST, NMPM
Section 2: W/2 SW/4
Section 3: E/2 SE/4 and SE/4 NE/4

(ff) EXTEND the Red Lake-Pennsylvanian Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 27 EAST, NMPM
Section 29: S/2

(gg) EXTEND the Richard Knob Atoka-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 24 EAST, NMPM
Section 13: All

(hh) EXTEND the Round Tank-Queen Associated Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 15 SOUTH, RANGE 29 EAST, NMPM
Section 19: SW/4 SE/4

(ii) EXTEND the Sand Point-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 28 EAST, NMPM
Section 2: Lots 11, 12, 13, 14, and SW/4

(jj) EXTEND the vertical limits of the Sioux Tansill-Yates Pool in Lea County, New Mexico, to include the Seven Rivers formation and redesignate pool as the Sioux Tansill-Yates-Seven Rivers Pool, and extend the horizontal limits of said pool to include therein:

TOWNSHIP 26 SOUTH, RANGE 36 EAST, NMPM
Section 16: SW/4

(kk) EXTEND the Tomahawk-San Andres Pool in Roosevelt County, New Mexico, to include therein:

TOWNSHIP 7 SOUTH, RANGE 32 EAST, NMPM
Section 19: SE/4

(ll) EXTEND the Tom-Tom San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 7 SOUTH, RANGE 31 EAST, NMPM
Section 25: NE/4

(mm) EXTEND the North Turkey Track-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 29 EAST, NMPM
Section 27: N/2
Section 28: N/2
Section 33: N/2
Section 34: N/2

(nn) EXTEND the Twin Lakes-San Andres Associated Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 28 EAST, NMPM
Section 24: SE/4 SW/4
Section 25: N/2 and N/2 SW/4

TOWNSHIP 8 SOUTH, RANGE 29 EAST, NMPM
Section 18: S/2 SW/4 and SW/4 SE/4
Section 19: NW/4 and N/2 SW/4
Section 31: SW/4

TOWNSHIP 9 SOUTH, RANGE 28 EAST, NMPM
Section 1: SE/4 NE/4, NE/4 SE/4 and S/2 S/2

STATE OF NEW MEXICO
ENERGY & MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN MATTER OF THE HEARING
CALLED BY THE
OIL CONSERVATION DIVSION
FOR THE PURPOSE
OF CONSIDERING:

APPLICATION OF
HARVEY E. YATES COMPANY
FOR DESIGNATION OF A
TIGHT FORMATION
LEA COUNTY, NEW MEXICO

CASE NO. 6984

ORDER NO. R-6175

ORDER OF THE DIVISION

BY THE DIVISION

This Cause came on for hearing at 9:00 a.m. on July 23, 1980, at Santa Fe, New Mexico, before Examiner Richard Stamets.

Now, on this _____ day of September, 1980, the Division Director, having considered the testimony, the record, and the recommendation of the Examiner, and being fully advised in the premises

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the Applicant, Harvey E. Yates Company requests that the Division in accordance with Section 107 of the Natural Gas Policy Act, and 18 C.F.R. §271.~~305~~ 705 of the interim regulations recommend to the Federal Energy Regulatory Commission that the ~~Austin~~ Mississippian formation underlying the following described lands situated in Lea County, New Mexico, hereinafter referred to as the Austin-Mississippian formation, be

designated as a tight formation in said Federal Energy Regulatory Commission's regulations:

Township 13 South, Range 35 East, N.M.P.M.
Township 13 South, Range 36 East, N.M.P.M.
Township 14 South, Range 35 East, N.M.P.M.
Township 14 South, Range 36 East, N.M.P.M.
Township 15 South, Range 35 East, N.M.P.M.
Township 15 South, Range 36 East, N.M.P.M.

Containing 138,240 acres mor or less.

(3) That the "Austin" Mississippian formation underlies all of the above described lands; ~~and~~ that the formation consists of a shallow water limestone; ~~with~~ that the top of such formation ~~being~~ is found at depths of from 13,200' to 13,300' ~~below the surface with the~~ within the area set out in Finding No. 2 above; and that the thickness of such formation ~~being~~ is from 200 to 300 feet within said area.

(4) That the type section for the "Austin" Mississippian formation for the proposed tight sand designation is found at a depth of from approximately 13,180 feet to 13,494 feet on the Gamma Ray-Neutron log of the Phillips Petroleum Company Austin Well No. 1 located in Unit M of Section 17, Township 14 South, Range 36 East, Lea County, New Mexico.

(5) That the following wells produce or have produced natural gas from the "Austin" Mississippian formation within the proposed area:

Harvey E. Yates Company Austin Monteith #1	1650 feet from South Line and 1980 feet from West Line of Section 8, Township 14 South, Range 36 East, N.M.P.M.
Southern Union Exploration Company State 17 #1	1980 feet from North Line and 1980 feet from West Line of Section 17, Township 14 South, Range 36 East, N.M.P.M.
Yates Petroleum Corporation Barbee LL #1	1980 feet from North Line and 1980 feet from East Line of Section 18, Township 14 South, Range 36 East, N.M.P.M.
Adobe Oil Corporation Hannah #1	1980 feet from North Line and 660 feet from East Line of Section 17, Township 14 South, Range 36 East, N.M.P.M.
Phillips Petroleum ~~Corporation~~ Company Austin #1	661 feet from South Line and 661 feet from West Line of Section 17, Township 14 South, Range 36 East, N.M.P.M.

Adobe Oil Corporation
State 16 #1

990 feet from South Line and 660 feet from West Line of Section 16, Township 14 South, Range 36 East, N.M.P.M.

Adobe Oil Corporation
State 16 #2

1980 feet from North Line and 1980 feet from West Line of Section 16, Township 14 South, Range 36 East, N.M.P.M.

(6) That the "Austin" Mississippian formation underlying the above described lands has been penetrated by a number of other wells, none of which produced natural gas in commercial quantities from the "Austin" Mississippian or any other formation.

(7) That the evidence presented in this case demonstrated that no well formerly or currently completed in the "Austin" Mississippian formation within the proposed area exhibited permeability, gas productivity, or crude oil productivity in excess of the following parameters:

(a) ~~The estimated~~ average in situ gas permeability throughout the pay section of ~~the Austin Mississippian formation is expected to be~~ 0.1 millidarcy ~~or less;~~ and

(b) ~~The~~ stabilized production rates, against atmospheric pressure, ~~of wells contemplated for production in the Austin Mississippian formation, without stimulation, is not expected to exceed production levels determined~~ by reference to ~~well depths~~, as found in the table set out in 18 C.F.R. §271.705(b)(1)(ii) of the interim regulations and

(c) ~~No well drilled into the formation is expected to produce~~ more than five barrels of crude oil per day.

(8) That based on analysis of available data from ~~the~~ existing wells within the proposed area and utilizing generally and customarily accepted petroleum engineering techniques and measurements:

(a) The estimated average in situ gas permeability throughout the pay section of the Austin Mississippian formation is expected to be 0.1 millidarcy or less; and

(b) The stabilized production rate, against atmospheric pressure, of wells contemplated for production in the Austin Mississippian formation, without stimulation, is not expected to exceed production levels determined by reference to well depth, as found in the table set out in 18 C.F.R. §271.705(b)(i)(ii) of the interim regulations; and

(c) No well drilled into the formation is expected to produce more than five barrels of crude oil per day.

(9) That within the proposed area there are two recognized aquifers being the Ogallala, a fresh water aquifer found at depths of from 60 feet to 300 feet, and the Santa Rosa, a ~~brackish~~ brackish water aquifer found at depths of from 1500 feet to 1700 feet.

That to the well commonly or currently completed in the proposed area exhibited permeability in excess of that set out in paragraph (8) above.

(10) ~~(8)~~ That existing State of New Mexico and Federal Regulations relating to casing and cementing of wells will assure that development of the Austin Mississippian formation will not adversely affect said water zones.

(11) That the Austin Mississippian formation, or any portion thereof, as described herein, is not currently being developed by infill drilling as defined in 18 CFR § 271.703 (b) (6) of the final regulations as promulgated by FERC Order No. 99.

(12) That the Austin Mississippian formation within the proposed area should be recommended to the Federal Energy Regulatory Commission for designation as a tight formation.

IT IS THEREFORE ORDERED:

(1) That it be and hereby is recommended to the Federal Energy Regulatory Commission pursuant to Section 107 of the Natural Gas Policy Act of 1978, and 18 C.F.R. §271.705 of the interim regulations and 18 CFR § 271.703 of the final regulations that the Austin Mississippian formation underlying the following described lands in Lea County, New Mexico be designated as a tight formation:

Township 13 South, Range 35 East, N.M.P.M.
Township 13 South, Range 36 East, N.M.P.M.
Township 14 South, Range 35 East, N.M.P.M.
Township 14 South, Range 36 East, N.M.P.M.
Township 15 South, Range 35 East, N.M.P.M.
Township 15 South, Range 36 East, N.M.P.M.

Containing 138,240 acres more or less.

(2) That jurisdiction of this cause is hereby retained for the entry of such further orders as the Division may deem necessary.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

October 7, 1980

Federal Energy Regulatory Comm.
Department of Energy
825 North Capitol Street, N.E.
Washington, D. C. 20426

Attention: Mr. Howard Kilchrist

Dear Mr. Kilchrist:

Enclosed is a tight formation recommendation for the Commission's consideration. Upon the advise of Vic Zabel, I am sending it to you for your handling. Let me know if additional information is required.

Very truly yours,

ERNEST L. PADILLA
General Counsel

ELP/dr

cc: Harvey E. Yates

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

NGPA SECTION 107 TIGHT FORMATION RECOMMENDATION	)	
STATE OF NEW MEXICO OIL CONSERVATION DIVISION OF THE ENERGY AND MINERALS DEPARTMENT	)	Docket No. _____

RECOMMENDATION FOR TIGHT FORMATION DESIGNATION UNDER SECTION 107 OF THE NGPA.

Harvey E. Yates Company, pursuant to Section 107 of the Natural Gas Policy Act, 18 CFR §271.705 of the interim FERC regulations, and the Special Rules and Procedures for Tight Formation Designations under Section 107 of the Natural Gas Policy Act of 1978 of the Oil Conservation Division, petitioned the Oil Conservation Division for tight formation designation of a portion of the Austin-Mississippian formation in Lea County, New Mexico.

After notice and hearing on the application of Harvey E. Yates Company, the Oil Conservation Division hereby recommends that that portion of the Austin-Mississippian formation which is described in Exhibit A (being Oil Conservation Division Order No. R-6475) attached hereto and incorporated by reference, be designated a tight formation. Additionally, the Oil Conservation Division, submits herewith Exhibits B and C, attached hereto and incorporated herein by reference, which are supporting data required under 18 CFR §271.703 (c)(3) of the final FERC regulations and United States Geological Survey ratification of this recommendation, respectively.

Respectfully submitted,

Ernest L. Padilla

ERNEST L. PADILLA
Attorney for the
Oil Conservation Division

VERIFICATION

STATE OF NEW MEXICO)
)ss.
COUNTY OF SANTA FE)

ERNEST L. PADILLA, being first duly sworn, on oath, states that he is an attorney for the Oil Conservation Division of the Energy and Minerals Department of the State of New Mexico; that he has executed the foregoing document with full power and authority to do so; and that the matters and facts set forth therein are true to the best of his information, knowledge and belief.

Ernest L. Padilla
ERNEST L. PADILLA

Subscribed and sworn to before me, this 6th day of October, 1980.

Diana Richardson
NOTARY PUBLIC

My Commission Expires:

October 28, 1981

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a copy of the foregoing Recommendation to Harvey E. Yates Company in accordance with the requirements of Section 1.17 of the Rules of Practice and Procedure.

Dated this 6th day of October, 1980.

Ernest L. Padilla
ERNEST L. PADILLA

United States Department of the Interior
GEOLOGICAL SURVEY
South Central Region
P. O. Box 26124
Albuquerque, New Mexico 87125

SEP 2 9 1980

Mr. Ernest L. Padilla
Oil Conservation Division
State of New Mexico
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Padilla:

The enclosed letter is our concurrence to the recommendation contained in NMOCD Order No. R-6475 for a tight formation under Section 107 of the Natural Gas Policy Act.

Request the enclosed letter be included with the recommendation submitted to the Federal Energy Regulatory Commission.

Sincerely yours,

Allen F. Buckingham
Supervisor, Determination Unit

Enclosure

United States Department of the Interior

GEOLOGICAL SURVEY
South Central Region
P. O. Box 26124
Albuquerque, New Mexico 87125

SEP 2 9 1980

Federal Energy Regulatory Commission
825 North Capitol Street, N. E.
Washington, D. C. 20426

Gentlemen:

This jurisdictional agency concurs in the recommendation of the State of New Mexico, Case No. 6984, Order No. R-6475, dated September 22, 1980, that the described lands in subject order in Lea County, New Mexico be designated as a tight formation.

Sincerely yours,

Jack Willock

Jack Willock
Acting Deputy Conservation
Manager, Oil and Gas

cc: NMOCD, State of New Mexico

Called in by Bob Strand on
April 28, 1980

Harvey E. Yates Co.

Designation of Austin-Mississippian formation underlying T13S-R35E, T13S-R36E, T14S-R35E, T14S-R36E, T15S-R35E, T15S-R36E containing 138,240 acres, more or less in Lea County as a tight formation pursuant to Section 107 of the NGPA and 18 CFR Section 271.701-705.

HEYCO

PETROLEUM PRODUCERS

HARVEY E. YATES COMPANY

P. O. BOX 1933 SUITE 300, SECURITY NATIONAL BANK BUILDING 505/623-6601
ROSWELL, NEW MEXICO 88201

June 17, 1980

Case 6984

Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. Joe Ramey

Re: Application for
Designation of Tight
Formation
Lea County, New Mexico

Dear Mr. Ramey:

As we discussed last week, I enclose for filing an original and two copies of our Application for Designation of the Austin-Mississippian formation under the lands described therein as a tight formation pursuant to Section 107 of the Natural Gas Policy Act of 1978.

Please set this matter for examiner hearing on the July 23, 1980 Docket. We will provide to your office and the U. S. Geological Survey a complete set of exhibits at least fifteen (15) days prior to the hearing. Thank you.

Sincerely yours,

Robert H. Strand
Attorney

RHS/cj
Enclosures

BEFORE THE OIL CONSERVATION DIVISION

ENERGY AND MINERALS DEPARTMENT

OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF :
HARVEY E. YATES COMPANY : Case No. 6984
FOR DESIGNATION OF A TIGHT FORMATION :
LEA COUNTY, NEW MEXICO :

APPLICATION

COMES NOW HARVEY E. YATES COMPANY by its attorney and respectfully states:

1. Applicant is the owner of an interest in the Austin Mississippian formation underlying a portion of the following described lands situated in Lea County, New Mexico:

Township 13 South, Range 35 East, N.M.P.M.
All

Township 13 South, Range 36 East, N.M.P.M.
All

Township 14 South, Range 35 East, N.M.P.M.
All

Township 14 South, Range 36 East, N.M.P.M.
All

Township 15 South, Range 35 East, N.M.P.M.
All

Township 15 South, Range 36 East, N.M.P.M.
All

Containing a total of 138,240 acres more or less.

2. The Austin Mississippian formation underlying the above described lands is expected to have an estimated average in situ gas permeability throughout the pay section of less than 0.1 millidarcy.

3. The average depth to the top of said formation underlying the above described lands is 13,200 feet, and the stabilized production rate, against atmospheric pressure of wells completed for production in said formation, without stimulation, is not expected to exceed 1,655 MCF of gas per day.

4. No well drilled into said formation is expected to produce more than five barrels of crude oil per day.

WHEREFORE, applicant prays:

A. That this application be set for hearing before an examiner, and that notice of said hearing be given as required by law.

B. That upon such hearing, the Division enter its order recommending to the Federal Energy Regulatory Commission that pursuant to 18 CFR, Section 271.701-705, the Austin Mississippian formation underlying the above described lands be designated a tight formation.

C. For such further relief as the Division deems just and proper.

DATED this 17th day of June, 1980.

HARVEY E. YATES COMPANY

By: Robert H. Strand

Robert H. Strand
Attorney for Applicant
P. O. Box 1933
Roswell, New Mexico 88201

BEFORE THE OIL CONSERVATION DIVISION

ENERGY AND MINERALS DEPARTMENT

OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF :
HARVEY E. YATES COMPANY : Case No. 6984
FOR DESIGNATION OF A TIGHT FORMATION :
LEA COUNTY, NEW MEXICO :

APPLICATION

COMES NOW HARVEY E. YATES COMPANY by its attorney and respectfully states:

1. Applicant is the owner of an interest in the Austin Mississippian formation underlying a portion of the following described lands situated in Lea County, New Mexico:

Township 13 South, Range 35 East, N.M.P.M.
All

Township 13 South, Range 36 East, N.M.P.M.
All

Township 14 South, Range 35 East, N.M.P.M.
All

Township 14 South, Range 36 East, N.M.P.M.
All

Township 15 South, Range 35 East, N.M.P.M.
All

Township 15 South, Range 36 East, N.M.P.M.
All

Containing a total of 138,240 acres more or less.

2. The Austin Mississippian formation underlying the above described lands is expected to have an estimated average in situ gas permeability throughout the pay section of less than 0.1 millidarcy.

3. The average depth to the top of said formation underlying the above described lands is 13,200 feet, and the stabilized production rate, against atmospheric pressure of wells completed for production in said formation, without stimulation, is not expected to exceed 1,655 MCF of gas per day.

4. No well drilled into said formation is expected to produce more than five barrels of crude oil per day.

WHEREFORE, applicant prays:

A. That this application be set for hearing before an examiner, and that notice of said hearing be given as required by law.

B. That upon such hearing, the Division enter its order recommending to the Federal Energy Regulatory Commission that pursuant to 18 CFR, Section 271.701-705, the Austin Mississippian formation underlying the above described lands be designated a tight formation.

C. For such further relief as the Division deems just and proper.

DATED this 12th day of June, 1980.

HARVEY E. YATES COMPANY

By: Robert H. Strand
Attorney for Applicant
P. O. Box 1933
Roswell, New Mexico 88201