

# Application

Case No.

6984

Transcripts

### Small Exhibits



### NEW MEXICO OIL CONSERVATION DIVISION EXAMINER HEARING JULY 23, 1980 DOCKET NO.

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PREPARED FOR: HARVEY E, YATES COMPANY SUITE 300 SECURITY NATIONAL BANK BUILDING ROSWELL, NEW MEXICO 88201

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### AUSTIN MISSISSIPPI (GAS) POOL

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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 beneat. Lanus 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 comented. 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 atypical of wells producing gas from a "Tight", low permeability reservoir. Specific reference is made to Adobe Oil and Gas Corporation's Hannah Ng. 12Well which domonstrated 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; how ver, the low permeability matrix is now the controlling factor of gas flow to the well bores. Page 1

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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.

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A recombination of the scharator fluids, condensate and gas, utilizing a computer simulation Pressure-Volume-Temperature (PVT) technique (Gerrott Computing System) indicates that above a reservoir pressure of 3792 psig all fluids exist in r 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 - MISSISE:PPI GAS RESERVOIR LEA COUNTY, NEW MEXICO SUMMARY OF RESERVOIR BUILDUP SURVEYS PRODUCTION TEST DATA, FORMATION RESERVOIR TUID CHARACTERISTICS, PERMEABILIZIES, RADIUS OF INVEC. JATION, DAVAGE RATIOS AND CALCULATED FLOW RATES TO ATMOSPHERE USING SURVEY TEST DATA AND RESULTS REJENCETING COnsultants

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Owner-Operator	Harvey E. Yates Company	Tates Petroleum Corporation	AGo	be Oil & Gas Corporation	•	An Average of
Lease Name Well Number	Austin Montfelh Mell No. 1	Barbee LL Well No. 1	State 18 Well No. 1	State 16 Well No. 2	Hannah Well No. 1	All hells at Time of This: Respective Pressure Buildup, Surrays
Location: Section, Township and Range	Sec. 8, T-14-8, R-16-B	Sec. 18, T-14-S, R-35-E	Soc. 16, T-14-S, R-35-E	8ec. 16, T-14-5, R-36-E	Sec. 17, T-14-8, R-36-E	
Productive Mississippi Pormation Interval Measured Depth - Peet	13,356' fc 13,611'	13,350' to 13,655'	13, 192" to 13, 496"	13,266' to 13,552'	13,720 to 13,490	
Tost Data		しん 一般 一般				( )
Dete of Now Tests and Reservoir Bulldup Survey Flowing Tubing Pressure - peig Flowing Bottom Hole Pressure (Per) -psig Choke Size - Inches Gas Gethering Line Operating Pressure - psig	4-*-1980 - 1400 2000	11-30-1979 879 1258 12/64"	5-11-1979 1100 854 18/64" 250	\$-20-1579 1100 1889 13/64" 672	2-26-1979 2290 2613 14/64" 720	1517 1638 596
Production Data	그는 지원 문제		المراجع المراجع (1996) المراجع المراجع (1997) المراجع (1997) المراجع (1997) المراجع (1997) (1997) المراجع (1997) المراجع (1997) المراجع (1997)	te an air - shaalan daraa ku san daraa ku sa ahaa ku sa Ahaa ahaa ahaa ahaa ahaa ku sa aha		
Gas Production on Test - MC7D Condensate Production - Sarrels Water Production - Barrels	1184 40	930 -	1193 29	725 (1997) 33	2000) 59	1207 49
Cumulative Ges Production at Test Date - MCF	51,581	2,790	13,505	5,800	8,150	16,361
Formation, Reservoir and Physical Characteristics Data			1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1			
Net Miselszippi Zone Thickness - Feet Perceity (Ø % of Hulk Volume Interstitul Water (8 <sub>20</sub> % of Pore space Reservoir Temperature % P/cR Specific Orawity of Gas (80) Air = 1.00 Gas Viscocity (2) at Average Reservoir Pressure During Test - Unificates	255 3.15 0 188°P/648°P 0.897	305 1.31 -60 192°P/652°R 0.67	304 3.02 60 230°P/590°R 0.723	180 1.800 40 2255F/685°R 6.643	279 2.66 40 20697/6669R 0.648	111 1.69 10 10(7)/447 R 0.71
Critical Pressure (Pe) - pres Critical Temperative (Te) - *R Gas Compressibility (Cg) - psi <sup>-1</sup>	0,0270 618 434 () 7,80 x 10 <sup>-4</sup> 3.1( x 10 <sup>-8</sup>	0,0235 670 575 5.458 x 10 <sup>-4</sup> 3.500 x 10 <sup>-6</sup>	0. P(6 883 374 8.14 x 10 <sup>-4</sup> 3.30 x 10 <sup>-6</sup>	0.025 670 372 2,69 x 10 <sup>-6</sup>	0.6245 674 378 2.758 x 10 <sup>-4</sup>	0.0240 576 338 3,36 x 10 <sup>-6</sup>
Water Compressibility (Cw) - pd <sup>-1</sup> Rock Compressibility (Cf) - pd <sup>-1</sup> Total Compress <sup>2</sup> tity (Ct) - pd <sup>-1</sup>	5.11 × 10 <sup>-6</sup> 5.58 × 10 <sup>-6</sup> 1.77 × 10 <sup>-4</sup>	3.800 x 10 10.550 x 10 <sup>-8</sup> 1.95 x 10 <sup>-4</sup>	3.30 ¥ 10 8.60 x 10 <sup>-6</sup> 4.9833 x 14 <sup>-6</sup>	3. 50 x 10 <sup>-6</sup> 8. 50 x 10 <sup>-6</sup> 1. 712 x 10 <sup>-6</sup>	3.39 x 10 <sup>-6</sup> 8.59 x 10 <sup>-6</sup> 1.753 x 10 <sup>-4</sup>	3.26 x 10 <sup>-8</sup> 3.25 x 52 <sup>-8</sup> 2.668 x 10 <sup>-6</sup>
Gas Devisition Factor (?) 6 Plowing Botton Hole Pressure Average Reservoir Pressure Boundary Reservoir Pressure	0.74 0.60 9.96	9.907 0.890 1.02	0.345 0.910 0.880	6. 906 6. 549 1. 05	9.870 0.919 0.475	9. 573 0. 565 9. 549
Ges Formation Volume Factor (Bg) - Cubic Feet/SCF Feil Bore Redius (rg ) - Pec:	4.12 x 10 <sup>-3</sup> 0.375	5.07 x 10 <sup>-3</sup> 9.375	1.445 x 19 <sup>-3</sup> 0.375	4.99 x 10-3	4.63 x 10""	5.295 x 10 <sup>-3</sup>
Squivalent Liquid Rate of Test Gar Production (QRBrD) - Bar	rels \$54	<b>4</b> 91	<b>1913</b>	613	1135	1139
Pseudo First Time at Test Date (Te) - Hours Shut in fime of Reserved Buildup Test ( at) - Hours	1063 152.6	11 117	24d 65	162 168		275 110
Stope of Buildup Curre (Horner Technique) a psi/cycle	845	489	776	683	1154	114
Reedervär Boundary Pressure from Buildup (re) - pelg Trenandsalblikty	5139	5282	1804	5316	4639	<b>6401</b>
(Kh/u) = 153.3 x 98820 = Md - Pt/C;	(63.93	175.64	4¢8.07	170	249.18	538.54
Productive Capacity (Xh/u)(u) = (kh) = Mi.Pt.	4.43	4.41	9,742	4.25	5.951	5.72
Permeability (kh/h) = X - Md.	0.01735	9.6313	0.012	0.01485	0.02206	0.0292
Radius of Investigation During Buildup Pressure Surveys						
ry = V ref There T is shut in time in minutes T = (\$\$)(60 minute Yan Porjan Equation Settemeted Demigo Barlo (EDB)	<b>135</b>	<b>111.5</b>				87.44
$EDR = \frac{P_0 - F_{eff}}{m(\log T + 3.45)}$	9.52	1.34	9,35	1.15	0.21	4,59
alonialad Plow to Atmospheric Pressure or Verloan Drainage Lett - BCFD Using Davy Fylial Flow Equation for Gas						S 24
qec = 0.763 kh (Pe <sup>1</sup> - P <sub>er</sub> <sup>2</sup> ) <sup>2</sup> pTT ln (re/re) r 0.00 scree r 0.100 acree r 0.200 acree r 0.200 acree r 0.200 acree r 0.200 acree r 0.200 acree	s \$40	11 11 61 13 13 13 13 13 13	1903 1933 1987 1987 194	C20 549 546 514 514	3045 2015 1000 1017	
There Pais Reserver pressure at drainage boundary Paris flowing pressure of well how						
Setting Pur = 6 represents maximum flow that formati deliver into well bars.	on estrix would					

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. د بر د AND STATES OF THE OFFICE OF THE OFFICE OF THE OFFICE OFFIC Π ESTIBIT I A YATES AUSTIN MONTEITH #1 BEC 8, THP 145, R 34E LEA COUNTY, NEH MEXICU PRESSURE BUILD-UP ANALYSIS 1 POINTS USED RADIUS FELT. FT SLOPE PRI/CYC 818HP P819 COMP EFF. (1605) H/D/PSI AVO. 1 2810 X 1- 2 16 1742 2 0. 01 0.17 154 3314. 8596 2-3 22 1097.9 0.01 0.25 141.2 3664 6643. 3.17 147 283.6 0.05 4012 4424 236 19-33 555. 2 0.03 4261. 4828 33-39 268 644. 9 0.02 0 37 5139 CORRECTED PRESSURE DT (HOURS) PRESSUR CONRECTED POINT CORRECTED PRESSURE (PBI) (T+DT)/DT 00 3200 3400 2790. 3314. 3544. 3705. 3741. 3768. 3788. 3804. 3819. 3831. 2843. 3892. 123456789 0. 50 1. 00 2. 00 3. 00 4. 00 5. 00 7. 00 8. 00 7. 00 14. 00 15. 00 7. 00 14. 00 15. 00 24. 00 25. 00 26. 00 102. 00 114. 00 114. 00 115. 00 115. 30 2153.111 1077.056 539.028 359.483 270.014 216.211 180.349 135.307 120.662 7.801 54.803 45.816 39.431 34.627 30.6781 54.803 45.816 39.431 34.627 30.6781 54.803 45.816 39.431 34.627 30.6781 54.803 45.816 23.418 23.418 21.693 20.215 18.334 17.304 15.945 18.334 17.304 15.945 18.546 13.810 12.956 13.850 10.439 9.947 9.277 18.686 0.174 8.056 2153. 109 1077. 055 539. 055 539. 055 270. 014 216. 211 180. 343 154. 722 135. 307 120. 562 178. 165 48. 803 45. 836 39. 431 34. 627 30. 890 27. 901 25. 456 23. 418 21. 693 20. 214 18. 945 14. 796 13. 810 12. 945 14. 796 13. 810 12. 956 10. 943 10. 439 9. 967 5. 277 8. 686 0. 174 8. 056 10 11 12 13 14 15 16 7 18 9 0 21 22 24 56 7 29 0 31 23 34 56 7 87 57113 3927, 39931, 39733, 3994, 4012, 6032, 4049, 4049, 4049, 4049, 4049, 4002, 4049, 4002, 4098, 4113, 4134, 4174, 4174, 4174, 4174, 4229, 4246, 4224, 4299, 4224, 4246, 4299, 4246, 4299, 4246, 4299, 4274, 4299, 4274, 4294, 4214, 4299, 4274, 4294, 4297, 4207, 420, <u>in zos</u>zi 104 CONRECTED TIME 10## .5 CORRECTED FOR AFTERFLOW ee. ECTED 0 1 EXHIBIT 1 A

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### PRESSURE BUILD-UP ANALYSIS

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EXHIBIT I B

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	E 16 42 P 148, R 34E , Hem Mexico		
Signation and a second s	PRESSURE BUILD-UP ANALYSIS	AVO. P. P810	
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4- 3 5- 6 6- 8 8-37	17.       3147.0       0.00       0.09       163:7       4058.         19.       2217.0       0.00       0.12       167.8       4330.         23.       1636.3       0.00       0.14       151.0       4612.         176.       602.6       0.01       0.20       85.9       5342.	9762. 8077. 7090. 5544. CORRECTED PRESSURE (PS1)	100 6000 6500 7000
POINT !	CORRECTED         DT         CORRECTED           PRESSURE         PRESSURE         (HOURS)         (T+DT)/DT         (T+DT)/DT           2178.         2175.         0.25         749.044         740.797           2178.         2175.         0.50         335.000         385.000           2443.         2493.         0.50         193.000         193.000           2947.         1.00         193.000         193.000         193.000           3511.         2.00         97.000         65.000         65.000	CORRECTED PRESSURE (PSI) 2000 2500 3000 3500 4000 4500 5000 55 	-11X
9 6 7 8 9 10 11 12 13	4038         4058         5.00         49.000         49.000           4330         4330.         5.00         39.400         37.400           4467         5.00         39.400         37.400           4467         5.00         33.000         33.000           4512         4512         6.00         33.000         33.000           4545         4655         7.00         28.429         28.429           4645         4705         8.00         25.000         25.000           4732         4732         9.00         22.333         22.333           4739         4759         10.00         20.200         20.200           4759         4759         15.00         13.600         13.900		
14 15 16 17 18 18 19 20 21	4933         20.00         10.800         80.80           4937         4937.25.60         8.680         8.660           987.4997.25.60         8.680         8.680           922.5052.30.00         7.400         7.400           5058.5058.35.60         5.800         5.800           5064.5064.40.00         5.800         5.800           5164.5164.60.00         4.840         4.840           5164.5164.5164.5166         70.00         3.743         3.743           5196.5176         70.00         3.400         3.400	10+* 2: C R R C C I C C I C	
22 23 24 25 25 25 26 27 28 27 28 30	3247         5249         90.00         3.133         3.133           3271         3271.100.00         2.720         2.920           3271.3271.3271.3271         3271.3271         2.745         2.745           3284.5264.5264         110.00         2.745         2.745           5298.5298.5298         120.00         2.600         2.600           3307.5307.130.00         2.477         2.477         3.371           3316.5314.140.00         2.371         2.371         3.371           3324.5324.130.00         2.280         2.280         2.280           3333.160.00         2.280         2.280         2.280	D T T H E [0## 1:	
31 32 34 35 36 36	5333         5333         162.00         2 183         2 173           5338         5538         163.00         2 171         2 171           5338         5538         165.00         2 171         2 171           5338         5338         165.00         2 164         2 164           5338         5339         165.00         2 164         2 164           5338         5339         165.00         2 157         2 157           5342         5342         166.00         2 157         2 150           5342         5342         168.00         2 143         2 143		
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			EXHIBIT 1 D
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## EXHIBIT 2 PRODUCTION STATISTICS AUSTIN MISSISSIPPIAN (GAS) FIELD LEA COUNTY, NEW MEXICO Ralph H. Viney & Associates, Inc. Engineering Consultants

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<u>Operator</u> <u>Lease</u>	) MEY	· <u>june</u>	July	August	<u>September</u>	October	November	<u>December</u>	Totals for Year 1979	Cumulative Production <u>12-31-79</u>	Jamary
Adobe Oil & Gas Hannah #1			14-9-9-9-9-9-9-9-9-9-9-9-9-9-9-9-9-9-9-9	n suite PCMU strategie at the ins Annual State Marine Sta							
Сав	27,625	15,853		13,838	12,678	10,108	8,482	14,560	119,221	119,221	11,478
Oll Water	486 240	i 303 i 160		208 160	162 192	195 160	83 121	196 200	1,908 1,378	1,908 1,378	126 190
State 16 #1											
Gas	22, 842	9,005	6,384	4,879	5,735	8, 272	5,976	4, 412	67,505	69,505	3,167
Oll Water	317 98	102	20 10^	75	125	175 126	66 70	13 68	591 764	<b>591</b>	162
State 16 #2			ي. اولاحمدوفت ( زران بر			0					
Gas Oll				متند عالي <u>کي</u> رو		19,550 581	15,275 364	8,977	43, 802 945	43, 802 945	3, 439
Water						170	205	235	610	610	291
Harvey E Yates Company Austin Monteith #1											
Gas Oil Water											

Yates Petroleuth 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		·····	(T-4-1-			An inclusion	1980			
ust	<u>September</u>	<u>October</u>	November	<u>Decemher</u>	Totals for Year 1979	Cumulative Production 12-31-79	January	February	March	<u>April</u>	May	
	بالاردان براه میزید از مردن توسط کنا کنترک با بازیند	and an an an an ann an an ann an ann an ann an a				a da anticipa en en el composicione en el composicione en el composicione en el composicione en el composicion A definica en el composicione en el	n an	e la constante da co Este a constante da c				e statuk: Nationalis
138 208 .€0	12,678 162 192	10,103 195 160	8,482 83 121	14,560 196 200	119,221 1,908 1,378	119,221 1,908 1,378	11,478 126 190	6,058 50 188	8,229 112 117			
<b>79</b> 75	5,735 125	8,272 175 126	5,976 66 70	4,412 13 68	67,505 591 764	69,505 591	3,167 162	2,716 120	3,314 51 161			
		19,550 581 170	15,275 364 205	8, 977 	43, 802 945 610	43,802 945 610	3, 439 291	6,660 142 188	6,110 94 280			
								871 18	41,082 1,417			
									24,763 744			
er v	1 1 1 1 1										EXHIBIT 2	

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		Pige 18
	EXHEIT 3 Gas Austin Mibbissippian	
	LEA COUNTY, NEW NEXICO Harvey e yateb company	
	RECONBINATION DF	
B	SEPARATOR FLUID SAMPLES	
	INPUT DATA: 8TAGE 1 STAGE 2	
(L) (D)	PREBSURE + (PBIO) 133.0 0. TEMPERATURE + (D28.F.) 80.0 80.0	
	GAS RATE, (MSCF/D) 1175.0	
	PRESSURE RABE = 14.696 PSIA, TEMPERATURE BASE = 60.0 DEG. F.	
	LIQUID AND GAS SAMPLE FROM STAGE 1 STAGE 1 GAS / STAGE 1 LIOV D RATID IS 29375 SCF/BDL OR 34.0 BBL/MMSCF	
	BASIS FOR RECONSINATIONI	
	(1) SEPARATOR BOR = INPUT GOR / SHRINHAGE = 29375 / 1.000 = 29375	
	(2) HOLEB OF OIL = DENSITY / H.W. = 242.2 / 10E.5 = 12.417 (3) HOLEB OF GAS = SEP. OOR / SCF PER HOLE = 29375 / 379.51 = 77.402	
	- 29373 / 379.51 - 77.402 (4) OIL FRACTION0303 J GAB FRACTION9697	
	SEPARATOR RECOMBINATION	
	PAGE 2	
8	CONPONENT SEPARATOR SEPARATOR BAS WELL STREAM NAME LIG, HOL KOL OPH HOL OPH	
Ø	HITROGEN 090 097 0. CARBON DIOXIDE 0. 1.04 0. 1.01 0. Hybrogen Sulfide 0. 0. 0. 0. 0. Methane 4.97 88.46 0. 85.93 0.	
	METHANE         4,97         68,46         0.         57,8         0.           ETHANE         2.05         5.68         0.         5.76         0.           PROPANE         2.44         2.05         .56         2.06         .57           IGO-BUTANE         1.23         .43         .14         .45         .15           H-BUTANE         2.53         .61         .19         .67         .21	
	ISO-PENTANE 2.81 .27 .10 .35 .13 N-PENTANE 2.49 .20 .07 .27 .10 HEXANE 008 .03 .08 .03 HEPTANE 0. 0. 0. 0. 0.	
	OCTANE         O.         O. <th< td=""><td></td></th<>	
	100.00 100.00 1.14 100.00 2.44	
	PROPERTIES OF THE HEAVY ENDS SPECIFIC GRAV. 1770 1645	
	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.	
	STAGE 1 GAS TO STAGE I GIL RATIO = 29964 8CF/BDL STAGE 1 GIL GRAVITY - 35.4 DEGREES API.	
	S THE MEAVY END IS HEPTANES	EXILBIT 3
	THE FLUID IS A GAS-CONDENSALE SYSTEM WITH DEV POINT - 3792 PSI	

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12							Page 1	8	··
	Description:	1	1. ·			Fo	r Program: FAST		
	Reservoir	- 101	MISSIBSIPS	Gas - Mont	En Flu	vid Anal	vsis by		
	Field State & County	102	Hustin Mis	si*fitei					
(F)	Other	104	L'HEVEN E	LATES COMEN	🖕 - Jimu	lation 1	echnique		
						Input Data For	m 4/27/71		
- 633 - 633	Reservoir and Units Data:		Reservoir Temperature.°F	Max. Reservoir Pressure PSIG	<sup>1</sup> Saturation Pre if Known, PSIG	s <sup>2</sup> Units (US=1, Canadian=2			
		201	207	5544	0				
6	Separator Conditions:	- 	Stage #14	Stage #2	Stage #3	Stage #4	Standard Cond <sup>5</sup>		이 같은 것이다. 같은 것이 같은 것
ES.	Pressure, PSIG	203	133	0	0	0	14.696		
6	Temperature, °F	204	80	80	<u> </u>	<u> </u>	60		
	Data For: <sup>6</sup>		N2	co2	H <sub>2</sub> S	c <sub>1</sub>	c <sub>2</sub>		
	Ga: Sample or Full Well Stream	301	0.90	1.04	0	88.46			
	Mol Percent	302	c3 2.05	i <sup>c</sup> 4 0.43	n <sup>c</sup> 4 0.61	1°5 0,27	n <sup>C</sup> 5 0, 20		
				<u>с</u> ,		<u> </u>	c <sub>L</sub>		
		303	0.08	<u> </u>	0	0	0.08		
			Molecular Wt. of $C_L$	Sp. Gravity of CL	Sample Source <sup>8</sup> Sep. Stage No.	Prod. Rate, MSCF/D			
		304	100.3	0.645	1	1175			
۷	Data For: Ligu: Sample	401	N <sub>2</sub>	со <sub>2</sub>	H <sub>2</sub> S O	c <sub>1</sub>	C2		
	(Omit )f Full Well Stream Data	101	с <sub>3</sub>		n <sup>C</sup> 4	<u>1, 11</u>	2.05 n <sup>C</sup> 5		
	Entered on Lines 301-304)	402	2.44	1.23	2.153	2.81	2.49		
		403	с <sub>б</sub>	C7 O	C8	C9	CL 81.48		
		405	Molecular Wt.	Sp. Gravity	Measurepent <sup>9</sup>	O Prod. Rate,	Separator <sup>10</sup>		
	f fer en fransk skriver i de stander en	404	of c <sub>l</sub> 122,71	of CL 0.77	Stage Xo.	B/D <b>4-0</b>	BCI/BEI <sup>9e</sup> <b>4.0</b>		
	ASTM Boiling			and a second					
	<u>Poin: Data:</u> Volume Distilled; \$	501	1 2 0 10	3 4 20 30	s 6 _4 <u>0 50</u>	7 8 60 70	9 10 <u>80 90</u>		
	Temperature, °F	502		· · · · · · · · · · · · · · · · · · ·		Sec. 1	364 454		
- <b>6</b> 7	Lab Hatching Data: <sup>7</sup> (Opt:onal)								
	Pressures 1-10	601	·	· · · · · · · · · · · · · · · · · · ·	·	ر <u>مینانی</u> ( <del>در این</del> انی)	and a start of the second s Second second		
ு	Prossures 11-20	602		<del></del>	••••••••••••••••••••••••••••••••••••••				
	(Duscending Order) V/V <sub>R</sub> *s 1-10	701							
	V/V <sub>R</sub> 's 11-20	702					······································		
	Notes: (1) should be (2) Enter zer	at least	1000 PSI above	expected satural	ion pressure.				
—	<ul><li>(3) Used only</li><li>(4) The first</li></ul>	in calcu stage is	lation of GPM. the high pressu	are stage; the la	ist stage is the	stocktank. Ente	r zero		
	for separ (5) Enter are	ators not	used. • base, PSIA/ATH		onditions temper				2000 1997 1997 1997
	(7) Beisure t (8) Separater	o include Stage wh	data from both	above and below were taken for c	the bubble point	ivais. Second	t da serie de la constante de Esta de la constante de la const		
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<b>9</b>	separator	where th	ie liquid volume	was measured.		RETT COMPUTING			
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<u>阅</u>									
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14		аланы аларыны а Аларыны аларыны а Аларыны аларыны	S. JTHWI	ESTERN I	LABORA's OR	1125		I 45v - v	
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	l a la companya da la La companya da la comp		FRACT	IONAL ANA	LYSIS REPORT			- 283 	
	i .		<b>2</b>			DATE RECEIVED	6-30-80		
	SAMPLE MARTIO		ntieth #1 Sep	xarator Gas		FILE NO.	C-1950-C		
		<u>133 psi @</u>					44311		
	SAMPLE FROM	Harvey E.	Yates				6=26=80		
3		<u>6-30-80</u>				SECURED BY	Tefteller	· · · · · · · · · · · · · · · · · · ·	
	COMPONENT	MOL. %	G. P. M.						
	hitrogen Gibon Dioxide	0.90			an an Araban An Araban An Araban				
	Metione	88.46	1.568			CONDENSATE VALUES,	, G.P.M.		
	· ropane	2.05	0.563		Propon Butane		1977 - 19		
	Pentóne	0.61	0.192			IEATING VALVE, B.T.U. P	Per Cu. Ft.•		$\sim$ $\sim$ $\sim$ $\sim$ $\sim$
	«Pentana exones	0.20	0.072		Calculated wat	a an		1110 1091	
	veptanes & Heavier	0.08 *None Det.	0.037		Hydrogen Sulfie	HUR CONTENT, Grains Pe ide	er 100 Cu. Ft.•		Antonia de la constante de la c
X	-Tydrogen Sulfide Flium Alfogen				Mercoptans Calculated from	SPECIFIC GRAVIT	<b>···</b>	0.645	
	arbon Monoxide					m % Composition		<b>V.V.</b>	
	r o tals	100.00	2.704	in en ser	•14,696 lbs./sq. in., 60*	n ∎a la serie de la serie La serie de la s La serie de la s			
		une + GPM 1.							
	*Deter	ermined on labo	wratory samp]	le.					
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<b>6</b> 1	lcc Te	arvey E. Yates efteller							i) ij
	lœ R.	. Viney		41					
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			3. 	S. JTHW 1703 v	ESTERN West Industrial MIDLAND, TE (915) 68			
			n in the second seco Second second	FRACI	n na se	ALYSIS REPORT		
						DATE RECEIVED 6-30-80		
		SAMPLE MANY	Austin Mon			FILE NO <u>C-1950</u>	<u>G</u>	
		SAMPLE FROM		Liquid, 133	psi <u>0 80° 1</u>			
		DATE OF RUN	7-1-80			DATE SECURED 6-26-80 SECURED BY		
		COMPONENT	iAOL. %	G. P. M.	LIQUID VOL. %	SECURED BY TEL CELLIE	ει, inc.	
		Oxygen Nitrogen						
		Carbon Diovide Methane	4.97	در مربقه برنیز ویواقه این مربع این	1.82			
1		ropane -Bulane	2.05 2.44 1.23		1.12 1.45	CONDENSATE VALUES, G.P.M.		
	প্র	N-Bulane Pentane	2.53 2.81	e e a secondaria de la composición de l Composición de la composición de la comp	0.87 1.72 2.22	- Butano - Gosoline		li instanti Cra
		Pentane Paxanes plus Preptanes & Heavier	2.49 81.48		1.95 88,95	HEATING VALVE, B.T.U. Per Cu. Ft.* Calculated from % Composition Calculated water saturated		
		"Planes & Heavier				SULPHUR CONTENT, Grains Per 100 Cu. 1 Hydrogen Sulfide	<b>A.</b> •	
	<u> </u>	Hium Sdrogen				Mercaptuns SPECIFIC GRAVITY+	•	
		arbon Monoxide				Calculated from % Composition		
		OTALS	ar wight of h		100.00	*14,496 lbs /sq. in., 60* F		
			c Gravity of h			22.71		
				STARD PIG		0.770		
	]			a da anti-arresta da anti- la da anti-arresta da anti- la da anti-arresta da anti- la da anti-arresta da anti-				
	; :c	HIS: 300 Harvey	E. Yates					2 2
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					SOUT	HWESTERN LABORATORIES		
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	ΓΩ	SOUTHWE	STERN LABORA	TORIES		
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		ANC	TESTING ENGINEERS	5		
		Mi 21 an 2	7	a 1050 m	с. с.	
	J	Midland T	Cexas 7-2-80	File No. <u>C-1950-</u> GD		
1	Report of tests on	Fluid				
	Τσ	Harvey E. Yates		Date Rec'd.6-30-	ÖÖ	
	1	harvey E. Tates		Date Rec. d. 0-30-	00	
	Received from			1. 1. 1. 1		
	Identification Marks	Austin Montieth No. 133 psi @ 80° F	o. 1, Separator Liqui Flashed to Atmos.	d, 6-26-80,		
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ß			LLATION, ASTM D-8			
		Percent Dist	illed Observ	ved Temperature° F		
2		I.B.P 5		- 108 - 160		
		10	· · · · · · · · · · · · · · · · · · ·	176		
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	Percer Percer Gravit Color- Bar. Press 3∞ Harvey Yates 1∞ Tefteller 1∞ R. Viney	50 60 70 80 90 95 95 95 1t Loss 1t Loss 2y - 687 mm Hg	1.5 2.5 57.1 • A.P.I. I.t. Straw	260 288 322 364 454 534 454 (End Point) @ 60° F		
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	SOUTHWESTEI	RN LABORATORIES		
	FORT WORTH - DALLAS - HOUSIC	NALYTICAL CHEMISTS	n de la construcción de la constru La construcción de la construcción d Nacional de la construcción de la c	
		7-2-80 File No	<u>C-1950-</u> G	
	Midland Texas			
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Received from	Marks Austin Montieth No. 1,	Separator Liquid		
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	TOTAL VOL.	GAS VOL. Cu. Ft. 0 t	RESIDUE VOL. ml	
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1cc Te Jcc R.	rvey E. Yates fteller Viney	SOUTHWESTERN	Darton	
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	SOUTHWESTERN LAB		Page 23
	CONSULTING, ANALYTICAL AND TESTING ENGIN	CHEMISTS	
	Midland Texas 7-2-80		
Report of tes	is on Water	File No. C-1950-W	
То	Harvey E. Yates		
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Identification	Marks Austin Montieth #1, Separator Water, 6-26-80, Sampled by Toftall	an a	
	6-26-80, Sampled by Tefteller		
	Calcium	<u>mg/1.</u>	
	Magnesium	400	
	Sodium (Calc.)	73	
	Iron	4686	
	Carbonate	High, Greater than 5	
	Bicarbonate	None	
	Sulfate	<b></b> 362	
9 	Chloride	<b>186</b>	
	Total ne	7801	
	Total Dissolved Solids (Calc.)	13327	
	Total Hardness (as CaCO3)	1299	
	Resistivity0.390 @ 87° F.		, M7., A.
	р <del>н</del> 6.22		
300 Harvey E.			
ICC R. Viney	SOUTHWESTE	RN LABORA FORMES	
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apply only in the sempler	exclusive use of the clients to whom they are addressed. The use of our name feated and are not necessarily indicative of the quolifice of identical or simila	I must receive our prior written approval	
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	A CARE AND A	에는 100 March 12 August 2018년 8월 2017년 11월	

<u>Field</u>	County and State			Date of Completion or	Total Depth and	Ca	Casing Record	
Operator	Leass Name and Well Number	Legal Description	Blevation	Recompletion	Plug Back	Size	Depth	
Austin Field	Lea County, New Mexico	(a) A start of the second sec second second sec						
Adobe Oil & Gas Corp.	Hannah #1	Parcel H, Section 17, T-14-S, R-36-R	3954' GR	3-26-79	13,832' 13,520'	13-3/8" 8-5/8"	371' 4,640'	
						5-1/2"	13,831	
	State 16 #1	Parcel M, Section 16, T-14-S, R-36-E	3944' GR	4-29-78	13,770' 13,687'	13-5/6" 9-5/18" 5-1/2"	308' 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 <sup>n</sup> 9-5/8 <sup>n</sup> 7 <sup>n</sup>	392' 4,650' 13,425'	
Harvey E. Yates Company	Austin-Monteith #1	Parcek K, Section 8, T-14-S, R-36-E	3986' 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" 8-5/2" 4-1/2"	387' 4,659' 13,838'	
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### EXHIBIT 4 WELL DATA MISSISSIPPI GAS POOL LEA COUNTY, NEW MEXICO Ralph H. Viney & Associates, Inc. Engineering Consultants

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	sing Reco			2) 	M-71 Attanciation	Choke Size	Tesi Interval	Gas MCFD	Condensate BOPD	Gas-Oll Ratio	Heter Supp
Size	<u>Depth</u>	Cement	Producing Zone	Perforated Interval	Well Stimulation	0120	Inter ver				
								A1A		A1046	
10 3/8"	0741 011	450 Sx	a den 1995 de censo a ser en entre en entre Autor de la 1970 de la defenda en entre en entre en		Aciaizea w/4000	8/04 10/04		610 1490		01000 ULAVA	
8-5/8*	4,640'	1880 Sx	Mississippian	13, 397'-13, 460'	Gals 20% Acia	12/64" 16/64"	60 Min 60 Min	1480 2685			
5-1/2"	13,831'	1' 1300 Sx				18/64"	60 Min	3347			
		ې د روم د د کې کور د است مخه کې کور				10/03	CAOF	7176			<b>Ata</b> ti'
13-3/8"	3681	450 Sx	Mississippian	13, 199'-13, 261'	Acidized w/4000	7/64"	60 Min	710		: <u>n</u> - 5	
9-5/18"	4,661'	1600 Sx			Gals 15% Acid	8/64"	60 Min	890	에 가지 않은 것을 가지 않는다. 이 가지 않는 것은 것을 가지 않는다.		
5-1/2"	13,770'	1600 3x				9/64 <sup>H</sup>	60 Min	990			
						10/64"	69 Min CAOF	1200 2740		77778	SEMTHP
13-3/8"	389'	425 Sx	Mississippian	13,288'-13,373'	Acidized w/400	16/64"		1150		있는 이번 특별 가지 실려 가지 않는 것이 같이 있다.	
8-5/8" 5-1/2"	4,C75' 13,875'	2200 Sx 1750 Ex			Gals Acid	14/64" 8/64"	19 Hrs 13 Hrs	767 1125	30 34		
ə=1/4"	10,010	TLAN YY			an dia kaominina dia 4777. Aritr'i Angelandia	V/ V7		2.244 			
13-3/8"	392'	375 Sx	Mississippian	13, 194'-13, 208'			CAOF	4925	152		
9-5/8"	4,650'	710 Sx									ALC: NO
7	13,425'	590 Sx	(a) <sup>2</sup> / <sub>2</sub> = 0.5 (a) <sup>2</sup>				an a				
13-3/8"	388'	400 Sx	Mississippian	13, 360'-13, 391'	Natural	32/64"	24 Hrs	<b>321</b> 1	8		
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	an an sa	24908	
8-5/8"	4,650'	2350 Sx	24 이 이 분석한 관람은 및 정말 24 일반으로 이다. 이 이 것 같은 것이 있는 것 같은 것은 것이다.			가지 않는 것을 가지 않는 것 같이 가지 않는 것이 있다.					
4-1/2"	13,838'	1150 Sx									

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			P	lowing Pressure		Gravity		이 같은 것 같은
Condensate BOPD	Gas-Oil Ratio	Water BWPD	Tubing Pressure	Bottom Hole Pressure	Casing Pressure	Gas Air = 1	Condensate API	Remarks
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	31262		2375	de († 1917) - Nederlânsk Streen. 1917 - Antonio Britanija,		0.68	128 (1997) - State Constant, and a state of the state of	Flowed 2700 MCFGPD for 4 Lours on 19/64" oh w/tubing p
			2330 2225		• • • • • • • • • • •	-		
		- SIWHP	1980 2915				tra de Estados de Servicio de Servicio Estados de Servicio de Servi	
		in de la comp Gali de la comp Traga <del>E</del> compañía	2490			-		DST (Miss) 13,186', op 2 hrs, GTS = 103 MCFGPD 16/64"
	- -		2405 2315		een on de <b>L</b> ieste een Gebouwe Gebouwe			ch, rec 613' GCM (sampler rec 7.32 CFG @ 1200#) ISIP 38
			2215			-		493#/hr 4 hrs, HP 6275-6275#; after perf flo @ 1800 MCFG 45 min; flo @ 500 MCFGPD + 11 BC/10 hrs 10/64" ch, fl @
	77773	SIWHP		SIBHP	4157	•	54.7	2215#
			2200 1100			- /* -	in a start and a start and The start and a	DST (Miss) 13,270-13,360', op 2 hre 20 min w/strong blow
34			1800		-	-		thru 1/2" ch, TP 343# stab 6 1670 MCFGPD of FF, rec 24 5823#, FP 553-774# 4 hr FSIP 5578#, HP 6427-6427#, BTH
162							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 3
			500					DST (Miss <sup>9</sup> 13,231-400' op 3 hrs 33 min, rec 518' cond + 20 FP 2571-1324# 4 hr FSIP 5739#, HP 6558-6493#, BHT 196 <sup>9</sup>
	26800		178		400 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 100 - 10			No DST was run on Mississippian formation
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Gravity Condensate 1 API

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Remarks

Page 24

EXHIBIT

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 22/04" ch + 16 BC/4 hrs 45 min; flo @ 500 MCFGPD + 11 BC/10 hrs 10/64" ch, fl @ 1200 MCFGPD 10/64" ch FT 2215#

DST (Miss) 13,270-13,360', op 2 hrs 20 min w/strong blow GTS/71 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°

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

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<u>新闻的</u>的时候。 STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT 1 S.C. OIL CONSERVATION DIVISION STATE LAND OFFICE BLDG. 2 SANTA FE, NEW MEXICO 23 July 1980 3 EXAMINER HEARING 4 5 6 IN THE MATTER OF: Application of Harvey E. Yates Company [ 7 for designation of a tight formation CASE 6984 8 Lea County, New Mexico. 9 BOYD, C.S.R. 1 Box 1/3-E Vew Marico 87501 10 BEFORE: Richard L. Stamets 11 12 TRANSCRIPT OF HEARING 13 SAL 14 APPEARANCES 15 Ernest L. Padilla, Esq. 16 For the Oil Conservation Legal Counsel to the Division State Land Office Bldg. Division: 17 Santa Fe, New Mexico 87501 78 18 19 Robert Strand, Esq. For the Applicant: Roswell, New Mexico 20 21 22 23 24 25


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SALLY W. BOYD, C.S.R. Rt. I. Box 193-B Santa Fe, New Mexico 87301 Phone (503) 455-7409

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ANDREW LA	YTTU	
	Direct Examination by Mr. Strand	5
	Cross Examination by Mr. Stamets	11
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	Redirect Examination by Mr. Strand	14
	Cross Examination by Mr. Fadilla	1.5
	Recross Examination by Mr. Stamets	16
	Questions by Mr. Chavez	17
	Recross Examination by Mr. Stamets	19
	Questions by Mr. Buckingham	19

# RALPH VINEYDirect Examination by Mr. Strand20Direct Examination by Mr. Strand39Questions by Mr. Chavez39Questions by Mr. Buckingham41Cross Examination by Mr. Stamets42

MARSHER MARSHER STREET



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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.

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SALLY W. BOYN, C.S

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

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

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

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Section 107 of the Natural Gas Policy Act, and 18 CFR Section 2 271.701-705.

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

# ANDREW LATTU

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

# DIRECT EXAMINATION

BY MR. STRAND:

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SALLY W. BOYD, C.S.

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

Andrew Lattu.

What is your address and your occupation?
 A. I live in Midland, Texas. I'r a geologist
 for Harvey E. Yates Company.

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

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.

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

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SALLY W. BOYD, C.S.R

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.

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

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Exhibit Two is a stratigraphic cross

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section.

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SALLY W. BOYD,

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.

Pag

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

It shows the development in this Austin Mississippian zone, which is the top zone on the cross section Tt 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.

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

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SALLY W. BOYD,

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?

Yes, I dc.

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

Yes, they have,

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?

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

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

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Mar Martin and the specific constant was a

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

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SALLY W. BOYD, C.S.

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

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

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 formalion may be actually deeper than that.

Mr. Lattu, build 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,

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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.

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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?

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?

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.

Page

# CROSS EXAMINATION

BY MR. STAMETS:

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SALLY W. BOYD,

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 pro duction is concerned. If I had to pick a type well, I think
 that one.

G 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.

Yes.

g 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.

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?

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Yes, there are.

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A. How many of thore 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?

Yes, I have.

Contraction and a low marker appears

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?

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No, not as to the section as it exists.
 Q. You would anticipate finding esrentially
 the same type of formation wherever you drilled in this area?
 N. 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.

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But the interval itself, the lithology

is consistent throughout?

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# REDIRECT EXAMINATION

BY MR. STRAND:

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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 cor-

Yes, it does.

Yes.

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

Q Mr. Lattu, could you describe the fresh

water aquifers that underlies 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.

Ω 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.

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MR. STAMETS: Any other questions of this

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witness? He may be ---

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MR. PADILLA: I have a couple. MR. STAMETS: Excuse me, I'm sorry.

# CROSS EXAMINATION

BY MR. PADILIA:

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?

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

Q Do you know whether they were ever perforatel 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 --

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

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The wells that are not on the cross section A, do not produce from it ---3 Q. Right. --- if that's what you're asking, yes. 5 They just ponetrated the Austin Mississ-6 ippian except for the one well. That ---That are not on the cross section. The wells that are not on the cross section did penetrate the zone. Is that what you're asking? But only one was perforated in the Austin Mississippian Oh, one did attempt completion but it did not make it. Q.

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

> Yes, I believe they are. MR. PADILLA: Thave nothing further.

RECROSS EXAMINATION

BY MR. STAMETS:

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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?

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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
 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?

Yes, they do.

Okay .

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

MR. CHAVEZ: Yes.

QUESTIONS BY MR. CHAVEZ:

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

Yes, he did.

Okay, where was that located again, in ---In Section 8.

-- 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.

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

But where ---

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

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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.

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.

Okay, that's all I have.

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# RECROSS EXAMINATION

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BY MR. STAMETS:

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On the subject of logs, do available logs give you any indication of the porosity in the Austin zone? 0 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 reservoir. MR. STAMETS: Any other questions of Mr.

Would you identify yourself for the record Lattu?

please?

QUESTIONS BY MR. BUCKINGHAM: 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 conden-

sate and gas? 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

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engineering testimony.

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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, tc-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?

Yes, sir.

Yes, sir.

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

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erus.

MR. STAMETS: This is the page that I have

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.

HR. 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-IF, which should be inserted in the book of exhibits, which also relates to this additional well.

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

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1 straightened out. This is Exhibit No. 1-F? 2 A. Three-1F, right. Exhibit Three-1F, right 3 MR. STAMETS: And this will be another addendum? 6 A. Yes, sir. MR. STRAND: Yes. 7 MR. STAMETS: Okay. And that will go in 8 where, at page 22 in the original exhibit, Exhibit Three? MR. STRAND: It should be right after page SALLY W. BOYD, C.S.R 10 8, 11 MR. STAMETS: Right after page eight? 12 MR. STRAND: We can designate it as page 13 8A, if you wish. 14 MR. STAIETS; Okay, and then that other 15 addendum, what page would that be? 16 MR. VINEY: It will still remain the same 17 page number, page 3. 18 MR. STRAND: Yes. 19 MR. STAMETS: We seem to be one short on 20 Exhibit Three-1F. 21 MR. VINEY: I've got one here. 22 MR. STAMETS: Okay, thank you. 23 ۵ Mr. Viney, referring to Exhibit Three-1, 24 which is the summary of the basic data, would you please de-25 scribe each well that you've listed on this Exhibit Three-1 and the second s

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 reguirement.

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 of 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 buildur is to obtain a substantial buildup period pressure relationship, analyze that in the conventional Horner formulas

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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: Weil, let's take one well and run through it and give us the significant issues --

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.

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

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

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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?

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.

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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.

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-

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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

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To your knowledge is the 4-point test not necessarily dependable. that you utilized to calculate the permeability the best evidence we have available for permeability calculations for

Yes, sir, it is the only evidence, plus that well? 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 in-

MR. STAMETS: Let me ask you a guestion 14 stances optimistic. 15

relative to data as shown on page 6 and 7.

MR. STAMETS: On the millidarcies figure, Yes, sir. 17 as we move vertically from top to bottom in the pressure 18 19

build-up analysis

MR. STAMETS: -- I think in each of those Yes, sir. 21 cases we move up a millidarcy figure of 1.47 and then that A. 22 What's the significance of 23 drops off eventually to a .03. 24 and a stranger of the second stranger of the second stranger of the second stranger of the second stranger of t 25

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Well, what happens in there is that in ħ 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 exhibitpresentation in this exhibit.

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

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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?

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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 forma tion that -- that this permeability would be reasonably stand ard throughout?

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

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

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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.

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We also calculated, and did not present this, wellhead conditions, and we found in case of the Marvey 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 commont 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.

 Had that well been treated?
 Megative, 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

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

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.

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Now you will note in this exhibit, Mr.

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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

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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 --Ā. 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.

Thank you.

MR. STAMETS: That's clarified.

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?

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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.

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

No, sir.

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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.

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

Yes, sir.

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?

Yes, sir.

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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.

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SALLY W. BOYD, C.S.R.

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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.

S 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. 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 anain the reservoir, due to the retrograde, because of the anain the reservoir fluids. Approximate maximum saturation lysis of the reservoir fluids. Approximate maximum saturation would be about 4 percent, 3 to 4 percent of liquids pore wolume, I mean of pore volume. What would you estimate to be the reservoir

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

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pressure at this time? A. Reservoir pressure appears at this time, if we base it on the analysis of all the wells, approximately if we base it on the analysis of all the wells, approximately 4500 pounds. I think the summary that we used on Exhibit 4500 pounds. I think the summary that average, I think we used Three-1, and we'd have to use that average, I think we used 4481, so approximately 4500 pounds would be the pressure at 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 been done of the fluids from the reservoir, would it be your been done of the fluids drilled into the Austin Mississippian opinion that any wells drilled into the Austin Mississippian of formation would be expected to produce more than,5 barrels of formation would be expected to produce more than, 5 barrels of

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 reserSo 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.

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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 gee 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?

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.
 But in your professional opinion, you

would classify it as condensate as opposed to crude oil?

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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.

3R

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.

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.

Yes, sir.

0. 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.

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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?

Yes, sir.

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

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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. CHAVE? :

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SALLY W. BOYD, C.S.R.

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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

# Yes, sir.

### CROSS EXAMINATION

BY MP. STAMETS:

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SALLY W. BOYD, C.S.F

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.

# 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. 0 Okay. Now you've referred to the Horner

#### formula.

A.

Stewart R

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

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it substantially treated with acid? The operator, I guess, elected to do it, Mr. Chavez. Most people want to stimulate wells to get maxi-

mum producability. 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

No. -- for example, the Hannah Well by this **A.** Q.

Of course, in the Hannah Well, acid treatment? No, sir. 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.

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SALLY W. BOYD, C.S.R. Rt. 1 Box 193-B Sunta Fe, New Merico 87501 Phone (305) 455-7409

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41 damage ratio, would you say that there was a little minor 1 bit of skin damage, then? 2 Well, any time you have an excess of one, A. 3 there is some s. in damage, but in either case the wells per-4 formed so poorly that even if you removed the damage, you 5 wouldn't improve the producability more than 10 or 15 percent. 6 MR. STAMETS: Mr. Buckingham? 7 MR. BUCKINGHAM. Yes. 8 9 QUESTIONS BY MR. BUCKINGHAM: 10 Mr. Viney, on your Exhibit Three-2, just SALLY W. BOYD, C.S. Rt. 1 Box 199-B 0. 11 a point of clarification. 12 Yes, sir. 13 Every time you use the word "oil" you 14 mean condensate. 15 Yes. Unfortunately, the records are re-16 A. ported right from the Commission as oil. 17 Okay, because I'm sure that question will 18 Q. come up when FERC looks at it. 19 Right. 20 So I was trying to clarify it for USGS 21 22 purposes. Right, we may change that, if you don't 23 mind, when we go to FERC. 24 Thank you. 25

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SALLY W. BOYD, C.S.R.

(505) 455-740

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.

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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.

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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.

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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.

> 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 --

Yes, sir.

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--- 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.

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

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

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SALLY W. BOYD, C.S.R.

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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.

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

Sugar and sugar Share for all to be and a stand and a stand and a stand and the second and the second and the s

2:51 you'd ever see any possibility of damage. Are there any other questions 1 MR STAMETS : 2 He may be excused. Does anyone have any other questions relaof Mr. Vincy? 3 tive to this matter or anything they wish to add? 4 The case will be taken under advisement. б 6 7 (Hearing concluded.) 8 S 10 SALLY W. BOYD, C.S.R. Rt. I Box 199-B Santa Fe, New Merico 87501 Phone (505) 455-7409 11 12 13 14 1 15 16 17 18 19 20 21 22

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(505) 455-7405

I, SALLY W. BOYD, C.S.R., DO HEREPY 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.

Snelly W. Boyd C.S.E.

Examiner

I do hereby certify that the foregoing is a complete record of the proceedings in the Ekaminer hearing of Case No.\_\_\_\_\_\_ heard by me on\_\_\_\_\_\_\_19\_\_\_\_

Oil Conservation Division

1 Page 1 STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT 2 OIL CONSERVATION DIVISION STATE LAND OFFICE BLDG. SANTA FE, NEW MEXICO 3 23 July 1980 4 EXAMINER HEARING 5 6 IN THE MATTER OF: 7 Application of Harvey E. Yates Company ) for designation of a tight formation, ) CASE 8 Lea County, New Mexico. - J 6984 9 SALLY W. BOYD, C.S.R. Rt. I Box 193-B 10 BEFORE: Richard L. Stamets New Mexico 87: (505) 455-7409 11  $\langle \cdot \cdot \rangle$ 12 TRANSCRIPT OF HEARING 13 14 APPEARANCES 15 16 For the Oil Conservation Ernest L. Padilla, Esq. 17 Division: Legal Counsel to the Division State Land Office Bldg. 18 Santa Fe, New Mexico 87501 19 20 Robert Strand, Esq. For the Applicant: Roswell, New Mexico 21 22 23 24 25

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# RALPH VINEY

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SALLY W. BOYD, C.S.R. Rt.1 Box 19-B

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Cross Examination by Mr. Stamets	42

EXHIBITS Applicant Exhibit One, Map Applicant Exhibit Two, Cross Section Applicant Exhibit Three, Booklet Applicant Exhibit Three-1, Summary Exhibit Three-1A through 1F Exhibit Three-2, Summary Exhibit Three-2A through 2F SALLY W. BOYD, C.S.R. Rt. 1 Box 193-B Sutta, Fc. New Metics 87501 Phone (805) 455-7405 Exhibit Three-3A through 3G Exhibit Three-4, Document 

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Page MR. STAMETS: We will call next Case 6984. 1 MR. PADILLA: Application of Harvey E. Yates Company for designation of tight formation, Lea County, 2 3. New Mexico. MR. STAMETS; Call for appearances in 4 5 this case. 6 MR. STRAND: Mr. Examiner, I'm Robert H. Strand, Attorney, from Roswell, representing the applicant, 7 8 E Yvey E. Yates Company. 9 We will have two witnesses, Mr. Andrew ci in SALLY W. BOYD, C.S.R. 10 Lattu and Mr. Ralph Viney. 11 MR. STAMETS: I'd like to have both stand 193-B Box 12 and be sworn at this time, please. 13 14 (Witnesses sworn.) 15 16 MR. STRAND: Mr. Examiner, for the record, Harvey E. Yates Company as applicant in this case is requesting 17 the Division to recommend to the Federal Energy Regulatory 18 19 Commission that the Austin-Mississippian formation underlying 20 Township 13 South, Range 35 East, Township 13 South, Range 36 21 East, Township 14 South, Range 35 East, Township 14 South, 22 Range 36 East, Township 15 South, Range 35 East, and Township 23 15 South, Range 36 East, six townships all in Lea County, 24 New Mexico, be designated as a tight formation, pursuant to 25  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?

Pade

A. Yes, I am, and I have prepared two exhi-

bits. MR. STRAND: Mr. Examiner, it might be holpful 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 A. Exhibit One is an Isopach map of the Austin-Mississippian zone in Lea County, New Mexice. The centour 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?

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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.

far as coverage of formations?

Exhibit Two is a stratigraphic cross

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section.

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SALLY W. BOYD,

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

13 this 6-township area.

The Austin Mississippian zone, as indicated on this cross section, consists of a shallow water limestone. *coated* It shows very, very quiet waters, a lot of <del>seded</del> grains and *cherts oolites* <del>liker</del>. It's a fairly consistent interval with some <del>churdiness</del> <del>liker</del>. It's a fairly consistent interval with some <del>churdiness</del> 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

and an internet all grants being a state of the second

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

zone, really.

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SALLY W. BOYD, C.S.F

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

Page

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?

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?

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

Principality and

It's fairly easily correlated and mapable,

and consists of a shallow water shelf type lime. right through here. What is the average thickness of the pay

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From the Isopach map here in the area of Q. current development, it's approximately 200 to 300 feet thick. section? The thickest portion being approximately 4 5 6

It gets -- there are a few wells here that are a little over 300. There's one well that's about 7 300 feet? 8

Mr. Lattu, on the average, what is the 360 feet, and 310, 304, 270. depth from the surface to the top of the Austin Mississippian

Based on the control now it's 13,200 to formation that you've described? Most of the wells drilled here are drilled on structural features, so in the areas where we have no struc-14 tural points the top of this formation may be actually deeper 15 13,300 feet. 16 17

Mr. Lattu, could you point out on your cross section and on the map, also, the wells which have ac-18 than that. tually produced natural gas from the Austin Mississippian? 19 Okay, this would be in this interval right 20 in here in Township 14, 36, of the Austin Mississippian fields, 21 22 as designated, and it consists of wells on the cross section, 23 24

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 Mississ-

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SALLY W. BOYD, C.S.R

ippian zone.

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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.

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?

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?

Yes, it is.

and the second second

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:

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SALLY W. BOYD, C.S.F

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.

## Yes.

A.

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.

# 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?

Martin Carlo and the Carlo and t

Yes, there are.

How many of those would you say there are? There are not too many. I can count them 0. A. there are two wells in 13, 36, and there -off the map or ---I don't believe there are any wells there I've left off.

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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 pene-

trate the entire section.

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SALLY W. BOYD, C.S.R.

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. Have you examined the logs of these wells,

or a number of these wells? 21

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

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cross section?

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SALLY W. BOYD, C.S.R.

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:

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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.

Page \_\_\_\_\_14\_\_\_\_

A But the interval itself, the lithology is consistent throughout?

REDIRECT EXAMINATION

Yes.

BY MR. STRAND:

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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?

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.

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MR. STAMETS: Any other questions of this

witness? He may be --

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SALLY W. BOYD, C.S.R.

Rt. I Box J Fc, New Mu 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.
 0. So all of those wells, while they pene-

trated 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 --

Well, what I'm saying is that -

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

Q. Right,

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A -- if that's what you're asking, yes.
 Q They just penetrated the Austin Mississ ippian except for the one well.

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?

Yes, I believe they are.

MR. PADILLA: I have nothing further.

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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?

1 No, not if the operator ran a prudent A. operation, which he had his casing properly cemented and in 2 place. Then there'd be no risk to any of the shallow aquifers 3 And you feel that the rules and regulations a and policies of the Oil Conservation Division do provide for such a proper casing and cementing process?

Page

Yes, they do,

Okay.

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

MR. CHAVEZ: Yes.

QUESTIONS BY MR. CHAVEZ:

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Y W. BOYD, C.S.

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

Yes, he did,

Okay, where was that located again, in --In Section 8,

-- relation to the producers?

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

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

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.

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

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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 drill.stem 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.

Okay, that's all I have,

#### RECROSS EXAMINATION

BY MR. STAMETS:

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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 No.
 drill stem test it was obviously new reservoir.

11 MR. STAMETS: Any other questions of Mr. 12 Lattu?

Would you identify yourself for the record

QUESTIONS BY MR. BUCKINGHAM:

Q. Allen F. Buckingham, the U.S. Geological Survey, and my question to Nr. 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

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engineering testimony.

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SALLY W. BOYD, C.S.R Rt. 1 Box 193-B 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:

#### DIPECT 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?

Yes, sir.

Q Have you testified before the Division

in the past?

Yes, sir.

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

Yes, sir.

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SALLY W. BOYD, C.S.F

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-- 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.

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.

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MR. STRAND!" And I would also state for

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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.

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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 pro-

> MR. STRAND: All right. MR. STAMETS: That is corrected Exhibit

> > 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-IF, 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? 2 Three-1F, right. Exhibit Three-1F, right 3 MR. STAMETS: And this will be another 4 addendum? 5 À. Yes, sir. 6 MR. STRAND: Yes. 7 MR. STAMETS: Okay, And that will go in where, at page 22 in the original exhibit, Exhibit Three? 8 9 MR. STRAND: It should be right after page 10 8. 11, MR. STAMETS: Right after page eight? 13 MR. STRAND: We can designate it as page 13 8A, if you wish. 14 MR. STAMETS: Okay, and then that other 15 addendum, what page would that be? 16 MR. VINEY: It will still remain the same 17 page number, page 3. 18 MR, STRAND: Yes. 19 MR. STAMETS: We seem to be one short on 20 Exhibit Three-1F. 21 MR. VINEY: I've got one here, 22 MR, STAMETS: Okay, thank you. 23 0 Mr. Viney, referring to Exhibit Three-1, 24 which is the summary of the basic data, would you please de-26 scribe each well that you've listed on this Exhibit Three-1

SALLY W. BOYD, C.S.R

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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.

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SALLY W. BOYD, C.S.R

Phone (505) 455-740

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

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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 --

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,

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

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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 gatting stabilized recervoir 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

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pressure, what does that signify?

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.

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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-

and the second second
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.

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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.

Yes, sir.

Yes, sir,

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

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?

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SALLY W. BOYD.

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 exhibitpresentation 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 buildup 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

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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 01 than 21 millidarcies?

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SALLY W. BOYD, C.S.

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 forma tion that -- that this permeability would be reasonably stand ard 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

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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.

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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, yould 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 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 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 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.

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SALLY W. BOYD, C.S.R.

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.

References and and Republic respective to

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.

### 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.

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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.

Thank you,

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MR. STAMETS: That's clarified,

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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?

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. I note that this does not include the 3 Q.

Southern Union Exploration well. 5

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To your knowledge are there any production No, sir. A. . 6 Q. 7

figures available on that yet? The well did not We liave some. yes, sir. 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. And, Mr. Viney, do your Exhibits Three-2A through Three-2F demonstrate the production rates of these

wells in graphic form?

Yes, sir. 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?

yes, sir. 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.

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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 1; 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.

Pag

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.

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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.

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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?

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. 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, 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 using the data 3B through 3G, and 3B through 3G is support data from the laboratory, showing how all the fluid was anadata 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 pro-

gram. 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 Ex-

hibit Three-4.

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A. Yes, sir.
 Does this set out casing programs used
 Q. Does this set out casing programs used
 for the wells that have been drilled?
 for the wells that have been drilled?
 A. This sets out the casing that was reported
 A. This sets out the casing that was the recommendation

set supposedly, and we'd have to assume that it was the recommended program by the State office.

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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?

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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?

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

Yes, sir.

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:

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fillion the mathematic measures.

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

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it substantially treated with acid?

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

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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 -

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.

And those two that showed some -- a

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			Page 41
			l you say that there was a little minor
	2	bit of skin damage,	then?
	3	<b>A.</b>	Well, any time you have an excess of one,
	4	there is some skin	damage, but in either case the wells per-
	5	' formed so poorly th	at even if you removed the damage, you
	6	wouldn't improve th	e producability more than 10 (r 15 percent.
	7		MR. STAMETS: Mr. Buckingham?
	8		MR. BUCKINGHAM, Yes.
	9		
S. S. B.	10	QUESTIONS BY MR. BU	CKINGHAM:
BOYD, C.S Box 199-B ew Menico 87501 505) 455-7409	11	<b>Q</b>	Mr. Viney, on your Exhibit Three-2, just
<b>W. B(</b> Rt. 1 Boo Re. New)	12	a point of clarific	ation.
SALLY W. BOYD Rt. 1 Box 192-1 Santa Fe, New Meetic Phone (505) 455-7	13	A	Yes, sir.
Ø	14	۶ <b>، ۶</b>	Every time you use the word "oil" you
	15	mean condensate,	
	16	A.	Yes. Unfortunately, the records are re-
	17	ported right from the	he Commission as oil.
	18	<b>Q</b> "	Okay, because I'm sure that question will
	19	come up when FERC 10	poks at it.
	20	А.	Right.
	21	<b>Q</b>	So I was trying to clarify it for USGS
	22	purposes.	
	23		Right, we may change that, if you don't
	24	mind, when we go to	FERC.
	25	Q	Thank you.

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and the main compares with our spectral devices we want to be a first to prevent the first of the spectra of ma

#### CROSS EXAMINATION

Yes, sir.

BY MR. STAMETS:

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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.

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.

#### Yes, sir,

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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 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.
I think, considering that this is the very

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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.

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SALLY W. BOYD, C.S.R.

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.

> 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-

in a standard a super

W. BOYD, C.S.R tt. 1 Box 193-B c. New Mexico 87501 ac (505) 455-7409 2

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

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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.

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

Hopefully, yes, sir.

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

Sec. you'd ever see any possibility of damage. MR, STAMETS: Are there any other questions He may be excused. of Mr. Viney? Does anyone have any other questions rela-tive to this matter or anything they wish to add? The case will be taken under advisement. **?** (Hearing concluded.) SALLY W. BOYD, C.S.R Rr. 1 Box 193-B ÷. alaran na manakan ing karangan ang karangalan ing karangan karangan karangan karangan karangan karangan karang I

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SALLY W. BOYD, C.S.R.

R1. 1 Box 193-B Santa Fe, New Micrico \$7501 Phone (505) 455-7409

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.

Society W. Boyle C.S.R.

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I do hereby cerilfy that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. Examiner heard by pie on Oll Conservation Division

#### STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT DIL 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:

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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 Les County, New Mexico, hereinafter referred to as the Austin-Miscissippian formation, be designated as a tight formation in said Federal Energy Regulatory Commission's regulations:

5	lown	shi	p 13	South	, Range	35 Ea	st, NMPM
				South		36 Ea	
						35 Ea:	st, NMPM
				South			st, NMPM
					, Range		
				South			st, NMPM

-2-Case No. 6984 Order No. R-6475

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containing 138,240 acras, 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 23,200 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, Les 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. Yatas Company Austin Montelth 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

Adobe Oil Corporation Hannah No. 1

Phillips Petroleum Company Austin No. 1 1980 feet from Noith line and 1980 feet from East line of Section 18, Township 14 South, Range 36 East, NMPH

1980 feet from North line and 660 feet from East line of Section 17, Township 14 South, Range 36 East, NMPM 661 feet from South line and 661 feet from West line of Section 17, Township 14 South, Range 36 East, NMPM -3-Case No. 6984 Order No. R-6475

Adobe 011 Corporation State 16 No. 1

990 feet from South line and 660 feet from West line of Section 16, Toxnehip 14 South, Range 36 East, NMPM

Adobe 011 Corporation State 16 No. 2

1980 fost from North line and 1980 feet from West line of Section 16, Township 14 South, Range 36 East, NMPM

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(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 quanti-ties 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
- 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 regu-(b) lations; and
- (c) production of more than five barrels of crude oil per day,

(D) 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 eaction of the Austin-Mississippian formation is expected to be 0.1 millidarcy or less; and
- (b) The stabilized production rate, against stacspheric pressure, of wells contemplated for production in the Austin-Missisippian formation,

-4-Case No. 6984 Order No. R-6475

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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 Ogalisis, a frash 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 comenting 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+Niesissippian 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 Les County, New Mexico, be designated as a tight formation:

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ା	Fowr	shi	p 15	South,	Range	36 Ea	st, NMPM

-5-Case No. 6984 Order No. R-6475

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.

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

JOE D. RAMEY Director

STATE OF NEW HEXICO QIL CONSERVATION DIVISION ma

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#### 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

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#### ORDER OF THE DIVISION

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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

-3-Case No. 6984 Order No. R-6475

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 Sestion 16, Township 14 South, Range 36 East, NMPM

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(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 <u>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-Missisippian formation,

-5-Case No. 6984 Order No. R-6475

THE REAL PROPERTY OF THE PARTY OF THE PARTY

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

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SEAL

fd/

EXHIBIT 1 F SOUTHERN UNION STATE 17 SEC. 17, TWP 148, R 36E LEA COUNTY, NEW MEXICO

## PRESSURE DRAWDOWN ANALYSIS

POINTS USED	BLOPE PSI/CYCL	RADIUS REACHED FT	PORE VOLUME MB	HYDROCAR VOLUME	K (MDB)	COMPL. EFF. %
UNSTEAD	Y-STATE ANA	LYSIS:				
1- 2	251. 0	37.	5. 675	4. 197	0. 05	221.6
SEMI-STI	EADY STATE	ANALYSIS:				
2- 4-	103.0		6. 417	4. 654		
POINT	HOURS	RATE	PRESSURE.	DP/GN	PLOT	

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POINT HOURS RATE	PRESSURE	DP/GN	PLUI
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

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		C	CMPLETION	OR RECOMPL	PRESSURE TE	ST AND LOG			8. Identification Number
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	، د به ساعب الما المانية م		التبعد متحصصت وأحمروا			a Banta faile B			Retest
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	- للله النبية فركو مورجه					Yes	] No		
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un Io.	Size C	hoke Size Or	Hr. Coeff. Sta if or Choke Ch	uic Pm or Di oke Press h		Factor Fil	Gravity Factor Fg	Compross Fictor	Volume MCF/DAY
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Husky

Husky Oil Company

NOVO 71980 SION

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

October 31, 1980

Russell M. Davidson Vice President

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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 Regica. 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 Marter State Oil & Gas> Conservation Commission HEYCO

Man 2 and A

PETROLEUM PRODUCERS

HARVEY E. YATES COMPANY

401 NORTH COLORADO . SUITE 202 . MIDLAND, TEXAB 79701 . (915) 883-8444 P. O. BOX 1933 + SUITE 300, SECURITY NATIONAL BANK BUILDING + ROSWELL, N. M. 85201 + (505) 823-6801

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

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

ell C

SCEIVED AUGO 3 1980 OIL CONSERVATION DIVISION

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ACL': amp

Enclosure

Andrew C. Lattu

EXHIBIT 1 F SOUTHERN UNION STATE 17 SEC. 17, TWP 145, R 36E LEA COUNTY, NEW MEXICO

ALCONSIDE STRATES

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### Addendum 3-1F

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# PRESSURE DRAWDOWN ANALYSIS

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STATISTICS IN CONTRACT

EXHIBIT 1 F SOUTHERN UNION STATE 17 SEC. 17, TWP 148, R 36E LEA COUNTY, NEW MEXICO

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# PRESSURE DRAWDOWN ANALYSIS

POINTB USED	SLOPE PSI/CYCL	RADIUS REACHED FT	PORE VOLUME MB	HYDROCAR VOLUME	K (MD8)	COMPL. EFF.
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E. C.

## United States Department of the Interior

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



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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

BRUCE KING

BOVE LARRY KEHOE

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT OIL CONSERVATION DIVISION

September 24, 1980

POST OFFICE BOX 2008 STATE LAND OFFICE BUILDING SANTA FE, NEW MEXICO 87501 (505) 827-2434

CASE NO. Re: 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

-6984

Dear Sir:

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

Pours very truly, JOE D. RAMEY Director

JDR/fd

Copy of order also sent to:

Hobbs OCD Artesia OCD Aztec OCD

Other

1.11

**HEYCO** 

#### **PETROLEUM PRODUCERS**

P. O. BOX 1933

#### SUITE 300, SECURITY NATIONAL BANK BUILDING 505/623-6601

HARVEY E. YATES COMPANY

ROSWELL, NEW MEXICO 88201

igennesser na heitig an

July 7, 1980

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

Charles and the second s

Attention: Mr. Richard Stamets

Case No. 6984 Rei 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

RECEIVED JUL 8 1980

Oll Conservation

Attorney

RHS/1h NGPA #3-1

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

ECEIVED OCT 14 1980 OIL CONS RVATION DIVISION SANTA FE



Malakis Contrast and some of the

PETROLEUM PRODUCERS

P. O. BOX 1933

SUITE 300, SECURITY NATIONAL BANK BUILDING

505/623 660 1 ROSWELL, NEW MEXICO 88201

3

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

HARVEY E. YATES COMPANY

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

RECEIVED JUL 3 1980

Un Conservation

RHS/1h NGPA #3-1

cc:

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

#### 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:

CASE NO. 6984

ORDER NO.

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

#### 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.F.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

BANG RECEIPTING

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 for

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.

Alobe 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 fe

661 feet from South Line and 661 feet from West Line of Section 17, Township 14 South, Range 36 East, N.M.P.M.

P

Adobe Oil Corporation State 16 #1

an san

Adobe Oil Corporation State 16 #2

990 feet from South Line and 660 feet from West Line of Section 16, Township 14 South, Range 36 East, N.M.P.M.

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:

- The estimated average in situ gas permeability throughout the pay section of the Austin Mississppian 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

Section Contraction

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- (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

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\*28d treat

Joe D. Ramey Director NEW MEXICO OTL CONSERVATION DIVISION EXAMINER MARING JULY 23, 1980 DOCKET NO. A CONTRACTOR OF THE REAL

PREPARED FOR: HARVEY E. VATES COMPANY SUITE 300 SECURITY NATIONAL BANK BUILDING ROSWELL, NEW MEXICO 88201

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	EXHIBIT	<b>1</b>	C	Pressure Buildup Analysis State 16 No. 1	6	•••
	EXHIBIT	1	D	Pressure Buildup Analysis State 16 No. 2	7	4 4 4 4 4
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## 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" purcertain lands in Lea County, New Mexico, as a "right formation" pur-suant 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".

1993 ( N. A.

The producing Mississippi zone is a dense limestone, dolomite, with some possible conglomerates, and quartzites. The matrix is characterized as possible congromerates, and quartities. 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

Operators in the Austin Mississippi (Gas) Pool have conducted reservoir depth of 13,300 feet. 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 compieted 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

Exhibit No., 2 is a summary of gas production by operator and wells of the Austin Mississioni (Gas) Pool Individual graphic presentation of the pro-Exmon No. 4 is a summary of gas production by operator and wents 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 atypical of wells producing gas from a "Tight" low permeability reservoir. Specific reference is made to Adobe "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. meril

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Service.

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
PRO	DUCTION TEST DAYA, FORMATION RESERVOIR FI-UID
CHARAG	CTBRISTICS, PERMEABILITIES, RADIUS OF INVESTIGATION,
DAMAG	RATIOS AND CALCULATED PLOW RATES TO ATMOSPHERE
	USING SURVEY TEST DATA AND RESULTS
	Italph H. Viney & Associates, Inc.
	<ul> <li>Engineering Consultants</li> </ul>

Sec. 20 19 19 19

Page 3

Owner-Operator Has Lease Name Well Number	Austin Montleth Mell No. 1	Yates Petroleum Corporation Barboe LL Well No. 1	Ado State 16 Mell No. 1	be Oil & Gas Corporation State 16 Well No. 2	Hannah Well No. 1	An Average of All Wells at Time of Their Respective Pressure Buildup Survey
	c. 8, T-14-5, R-36-E	Sec. 18, T-14-8, R-36-E	Sec. 16, T-14-8, R-36-E	Sec. 16, T-14-S, R-38-E	Sec. 17, T-14-5, R-36-B	
Productive Mississiopi Formation Interval Measured Depth - Feet	13,356' to 13,611'	13, 350' to 11,655'	13, 197' to 13, 49."	13, 265' to 13, 552'	13,120 to 13,490	
Test Data						
Date of Flow Tests and Reservoir Buildup Survey Flowing Tubing Pressure - paig Flowing Botion Hole Pressure (Parf) -paig Choke Sias - Inches	4-7-1980 ↓400 ±000 ↓5/64"	1258 12/64"	5-11-1979 1100 854 18/64*	9-20-1579 1100 1889 13/64"	3-26-1979 2290 2613 14/84*	1217 1638
Gas Gathering Line Operating Pressure - paig Production Data	649	NR	250	672	810	596
Get Production on Test - MCTD	1164	930	1132	- <b>125</b> - 476	2080	1107
Condenaste Production - Barrels Water Production - Barrels	40 		29	33	59	40 -
Cumulative Gas Production at Test Date - MCP	51,561	2,100	13,505	5,800	8,150	16,361
Formation, Reservoir and Physical Characteristics Data		a de la companya de l			had Adapt parts	an a
Net Mirclastopi Zone Thickness - Feet Porosity (0) 1 of Bulk Volume	255 2,15	905 1.81	201 - 1923 - 1923 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 3013 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 903 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1 903 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1 903 - 19355 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1935 - 1	In 1997 III III III AN	210	203
niermund Water (Swight & of Pore Space Reservoir Temperatur ?7/*2	40 185°7/645°R	192°F/652°R	3.02 (0 21027 (2007)	1.800 60	2.66 49 56557 (8457)	2.69 40 547°P/867*R
Specific Gravity of $C_{1,2}$ (SG) Air = 1.00	0,897	0.61	230°F/696°R 0.723	215°F/665°R 0.643	1077/66678 0.680	30/-2/601-H 0.71
Gas Viscosity (#.) at Average Reserver Pressure During Test - Clatipolase Critical Pressure (Pc) - pais	9.0270 678	0.0735	810.6	0.025	8.0245	0.0240
Critical Temperature (Tc) - °R	444	670 375	688 374	670 372	874 373	676 348
Gas Compressibility (Cg) - pat <sup>-1</sup> Water Compressibility (Cm) - pat <sup>-1</sup>	2.80 x 10 <sup>-4</sup> 3.10 x 10 <sup>-5</sup>	3.058 x 10 <sup>-4</sup> 3.300 x 10 <sup>-6</sup>	5.14 x 10 <sup>-4</sup> 3.30 x 10 <sup>-6</sup>	7.69 x 10 <sup>-6</sup> 3.30 x 10 <sup>-6</sup>	2.758 x 10 <sup>-6</sup> 3.30 x 10 <sup>-6</sup>	3.34 x 10 <sup>-4</sup> 5.36 x 10 <sup>-6</sup>
Rock Compressibility (Cf) - pel-1	8.50 x 10 <sup>-6</sup>	10.500 x 10-8	8.60 x 10 <sup>-6</sup>	8.50 x 10-6	8.50 x 10-6	1 8,50 x 10 <sup>-6</sup>
Total Compressibility (Ct) - pst-1	1.77 x 10 <sup>-4</sup>	1.95 x 10 <sup>-4</sup>	4.5832 x 10-4	1.711 x 10-4	1.753 x 10 <sup>-6</sup>	1.046 x 10 <sup>-4</sup>
Gas Deviation Factor (2) Flowing Botton Hole Pressure Average Reservoir Pressure Boundary Reservoir Pressure	0.74 0.80	0.900 0.890	6.945 0.910	0.906 0.940	0. \$70 0. \$10	0. \$70 3. \$65
Gas Formation Volume Factor (Bg) - Cubic Feet/SCF	0.96 4.12 x 10 <sup>-3</sup>	1.02 5.02 x 10 <sup>-3</sup>	9.880 1.445 x 10 <sup>-8</sup>	1.05 4.90 x 10 <sup>-3</sup>	\$.175 4.68 x 10 <sup>-3</sup>	8.940 5.395 x 10 <sup>-3</sup>
Well Bore Radius (rur ) - Feet	0.375	0.375	0.375			
Equivalent Liquid Ests of Test Gar Production (GBBPD) - Barrels	254	831	2913	<b>632</b>	1733	1138
Pseudo Flow Time at Test Date (Te) - Hours Shut in Time of Reservoir Buildup Test (At) - Hours	1063 152.5	72 137	216 85 -	192 168	94 87	575 120
Slope of Buildup Curve (Horner Technique) a pel/cycle	845	(89	776	603	1156	174
Reservoir Boundary Pressure from Buildup (Pe) - psig	5139	5282	1804	5544	4639	4451
Fransules Wilty						
(Kh/u) = 147.1 x QRBPD = Md - Ft/Cps	163.93	7.3.64	603.17	176	343.16	338.51
Productive Capadiy (Xb/u) = (kb) = Md, Fi,						
'ermsebility (kh/h) = K - Md.	<b>4.4</b> 3.	6. (7	\$.742	4.23	5.957	5.11
Rectine of Investigation During Bulldup Pressure Surveys	0.01735	0.0212	0.032	0.01486	0.02206	0.0202
$T_{2} = \sqrt{\frac{kT}{176900}} - Foot$ Where T is shot in time in minutes T = (4.7/(60 minutes)) Yes Poster Equation	115	116.5	60	1	<b>4</b>	<b>#1.44</b>
latimated Danage Ratio (102)						
$EDR = \frac{T_0 - P_0T}{\omega(\log T + 1.65)}$	0.52	1.54	0.15	1.13	0.09	9.64
alculated Flow to Atnoppherio Pressure or Various Dreinage Esofi - NCTD	en en ser en selfer en Ginterreter					
Using Darcy Radial Flow Equation for Gas					<b>0</b>	
gao = <u>6.703 kb (Pe<sup>4</sup> - P<sub>mi</sub>r<sup>2</sup>) n</u> ri j.73 lb (re77e) r 3 80 scree r 6 109 scree r 6 109 scree	1373 1017 914 640 911	015 712 612 658 658	1303 833 796 778	839 569 546 546 536	3043 2075 1009 1317	1405 944 934 934 934
7 0 640 acres Where Pa is Reservoir pressure at drainage boundary Pu is finding pressure at well have		••••••••••••••••••••••••••••••••••••••	144	510 - 1997 -	1999	

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1.	FIELD NANE					LEASE NAME	,			9. Wels Number
	NEW M	EXICO	مۇ بىرسەرد، مىسمەر ب		.	STATE 17	<b>,</b> <b>.</b>			1
3. 1	OPERATOR									10. County
4.	ADDRESS		·	· ·		· · ····	· · · · · · · · · · · · ·	<u> </u>		LEA
5. 1		ection, Block,	, and Surrey) 45, R 36E		55.	Distance and Di	ection from nee	west town in thi	s county.	Initial Potential
s. 1	f Operator has	changed with	in last 60 days -	2. If Workov	er or Re	class, give forme		servole)& Gas		
	IVe former Op	erator.				& RESERVOIR	OIL LE	ID or OIL - O EASE # Ges-G	YELL	Recloss
13.	Pipe Line Con	mection								14. Completion or Recompletion Dat
		Operators No.	ified and Date of 1	Vallianian	Any Co	adensate on hend	Lat time of Wor	kover 114.	Type of Blee	tric or other Log Run.
••••		tiparaiora iroj	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		or Read	empletion?	Yes	1 No		
	Section	1		(	JAS ME	ASUREMENT DA	والمحاط سيبيه مستحديها وسأتن	<u>,</u>	·····	
	Date of Test 4-11		ce X Por children Children	(Check One) Litive	Ori	lfice Vent	Pitot Tube	Critical- Prover	flow []	Gasproduced during to 283. MC
tun No.			Hr. Coeff. Stat If or Choke Cho	Lic P or the Press	םווו. אש	Flow Temp.	Temp. Factor	Gravity Factor Fg	Compress Factor Fau	Volume NCF/DAY
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Dockets No. 24-80 and 25-80 are tentatively set for August 6 and 20, 1980. Applications for hearing must

DOCKET: COMMISSION HEARING - MONDAY - JULY 21, 1980

OIL CONSERVATION COMMISSION - 9 A.H. - HORGAN HALL STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

CASE 6967:

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Application of Amoco Production Company for a carbon dioxide gas unit agreement, Union, Harding, and 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 for Bravo Dome lands aituate 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; Township 20 and 21 North, 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 specifi-cally 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.

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Docket No. 23-80

DOCKET: EXAMINER HEARING - WEDNESDAY - JULY 23, 1980

9 A.H. - 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 Examinor: CASE 6968: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Bloom In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Bloom-field Oil and Cas Company and all other interested parties to appear and show cause why the Sheetz Bloom-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 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 Five 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 pluceing program. 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 Union 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. 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 senser and show cause the the Finch Wall No CASE 6971: In the matter of the nearing called by the ULL Conservation Division on its own motion to primit Act Development Company and all other interested parties to appear and show cause why the Finch Kell No. 1 located in Unit O of Section 15, Township 29 North, Range 11 Vest, San Juan County, should not be nineed and abandoned in accordance with a Division-approved plucoing program. plugged and abandoned in accordance with a Division-approved plugging program. In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Coal Greek 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 he pluesed and ebandoned in accordance with a Division-sphroved pluesing program. CASE 6972: CASE 6973: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit all In the matter of the nearing called by the Gil 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 a Division-approved plugging program.

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, Pederal, and fee lands in Township 3 South, Ranges 27 and 28 East, CASE 6974:

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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. Application of R. N. Hillin for an NGPA determination, Eddy County, New Mexico. Application of K. N. Hillin for an NGFA decermination, Edgy 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 Sec-Application of Benson Mineral Group, Inc. for salt water disposal, Sandoval County, New Mexico. Applicant, in the above-styled cause, seeks outhority 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 CASE 6977: Application of Benson Mineral Group, Inc. for salt water disposal, Sandoval County, New Mexico. CASE 6978: 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. 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-Pederal Well'No. 1 in CASE 6979: Unit G of Section 30, Township 7 South, Range 32 East, Tomahawk-San Andres Pool. (Continued from June 25, 1980, Examiner Hearing) CASE 6940: 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 operatine costs and charges for supervision. designation of applicost thereof as well as actual operating costs and charges for supervision, designation of the cant 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 CASE 6980: Application of Bass Enterprises Production Company for a dual completion, Eddy County, New Mexico. Application of nass interprises froquetion 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 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. (Continued from July 9, 1980, Examiner Hearing) CASE 6950: 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, 1. E/2 of said Section 4 to be dedicated to the well. 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 6981:

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Docket No. 23-80

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Docket No. 23-80

<u>CASE 6982</u>: 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 Hississippian 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. Ya es Company for amendment of Order No. R-6303, Lea County, New Nexico. 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 Marvey 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 urithodox 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)

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Application of Consolidated Oil & Cas, 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, NHPM Section 34: W/2

(c) EXTEND the Aztec-Pictured Cliffs Pool in San Juan County, New Mexico, to include therein:

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TOWNSHIP 29 NORTH, RANGE 10 WEST, NNPM Section 1: SW/4

TOWNSHIP 30 NORTH, RANGE 10 WEST, NMPM Section 35: S/2 Page 4 of 9 Examiner Hearing - Wednesday - July 23, 1980

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(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, NMPH NE. Section 8: 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, RANCE 2 WEST, NMPH Section 5: All All: All (Partial Section) Section 6: 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, RANCE 8 WEST, NMPM Section 4: SW/4

TOWNSHIP 30 NORTH, RANGE 9 WEST, NMPM Section 4: SW/4 Section 4:

TOWNSHIP 30 NORTH, RANGE 10 WEST, NMPM Section 22: SW/4

TOWNSHIP 32 NORTH, RANGE 12 WEST, NMPM Section 36: S/2

(1) EXTEND the South Blanco-Pictured Cliffs Pool in Rio Arriba, Sandoval, and San Juan Counties, Hew 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, NHPM 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 JP

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#### Docket No. 23-80

(1) EXTEND the Fulcher Kutz-Picturea Cliffs Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 28 NORTH, RANGE 11 HEST, NMPM Section 23: SW/4

(m) EXTEND the South Gallegos-Fruitland Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 26	NORTH,	RANCE	12	WEST,	NMPH
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, RANCE 4 HEST, 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, NHPM 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

Section 7: SE/4 TOWNSHIP 25 NORTH, RANGE 4 WEST, NMPM Section 26: W/2 Section 35: NW/4

TOWNSHIP 24 NORTH, RANGE 4 WEST, NMPM

(r) EXTEND the South Los Pinos Fruitland-Pictured Cliffe 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:

Sere and s

TOWNSHIP 30 NORTH, RANCE 17 WEST, NMPM Section 4: SE/4 NW/4 and SW/4 NE/4

Docket No. 23-80

-11

Examiner Hearing - Wednesday - July 23, 1980 (v) EXTEND the Star-Messverde Oil Pool in McKinley County, New Mexico, to include therein: TOKNSHIP 19 NORTH, RANGE 6 WEST, NMPH 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 produc-tion and designated as the Forty Niner Ridge-Bone Spring Pool. The discovery well is Cetty Oil Company Forty Niner Ridge Unit Well No. 2 located in Unit G of Section 21, Township 23 South, Range 30 Fast, NNPH. Said pool would comprise. CASE 6986: 30 East, NPM. Said pool would comprise: TOWNSHIP 23 SOUTH, RANGE 30 EAST, MPM (b) CREATE a new pool in Lea County, New Mexico, classified as an oil pool for Hississippian pro-duction and designated as the Gladiola-Hississippian 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, RANCE 38 EAST, MPH (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, NHPH. Said roal would comprise: Said pool would comprise: TOWNSHIP 26 SOUTH, RANGE 36 FAST, 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 McGlellan 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 comprise: TOWNSHIP 9 SOUTH, RANGE 26 EASI, NMPM Section 31: SW/4 TOWNSHIP 10 SOUTH, RANGE 25 EAST, NMPM Section 1: E/2 and NW/4 NE/4 Section 2: TOWNSHIP 10 SOUTH, RANGE 26 EAST, NMPM (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 Fast NVPM Said pool would comnete: 33 East, NHPM. Said pool would comprise: TOWNSHIP 4 SOUTH, RANCE 33 EAST, NMPM Section 16: SW/4 (f) CREATE a new pool in Les 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

Page 7 of 9 Examiner Hearing ~ Wednesday - July 23, 1980

Docket No. 23-80

35

(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, NHPM. Said pool would comprise:

> TOWNSHIP 21 SOUTH, RANGE 28 EAST, NMPM Section 3: 5/2

(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, NHPM Section 10: W/2

(i) EXTEND the Airstrip-Wolfcamp Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANCE 34 EAST, NMPM Section 26: SE/4

(j) EXTEND the Baldridge Canyon-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

UWNSHIP 24 SOUTH	, RANGE 24 EAST, MADY
ection 11: All	
Section 12: W/2	المي المراجع التي المراجع من المراجع المراجع الم
ection 13: W/2	an a

(k) EXTEND the Mid Bell Lake-Devonian Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 23 SOUTH, RANGE 34 EAST, NMPH Section 18: N/2 and SW/4

(1) EXTEND the North Benson Queen-Grayburg Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 30 EAST, NAPM 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, RANCE 37 EAST, NMPM Section 9: NW/4

(p) EXTEND the Buffalo Valley-Pennsylvanian Gas Pool in Chaves County, New Mexico, to include therein:

and a second and a second and a second a second a second second second second second second second second second

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, RANCE 31 EAST, NMPM Section 31: SE/4 Page 8 of 9 Examiner Hearing - Wednesday - July 23, 1980

#### Docket No. 23-80

(r) EXTEND the Diamond Hound-Atoka Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 16				
Section 6:	Lots 1 13, an	5, (	6, 11,	12,

(s) EXTEND the Diamond Hound-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 16 SOUTH, RANCE 28 EAST, NMPH 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, NHPH Section 22: All Section 23: W/2

(u) EXTEND the Gem-Morrow Gas Pool in Les County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 33 EAST, NMPH 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, NAPH 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, RANCE 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

(2) 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

(sa) 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, NHPM 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

Page 9 of 9 Examiner Hearing - Wednesday - July 23, 1980

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#### Docket No. 23-80

(dd) EXTEND the Race Track-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 10 SOUTH, RANGE 28 EAST, NMPH 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, MPM 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

EXTEND the Round Tank-Queen Associated Pool in Chaves County, New Mexico, to include therein:

### TOWNSHIP 15 SOUTH, RANCE 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, RANCE 28 EAST, NMPM Section 2: Lots 11, 12, 13, 14, and SH/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

(11) EXTEND the Tom-Tom San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 7 SOUTH, RANCE 31 EAST, NMPM Section 25: NE/4

(am) EXTEND the North Turkey Track-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

NMPM

TOWNSHIP 18 SOUTH,	RANCE	29	EAST,
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, RANCE 29 EAST, NMPM Section 18: S/2 SW/4 and SW/4 SE/4 Section 19: NW/4 and N/2 SW/4 Section 51: 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 he interim regulations Natural Gas Policy Act, and 18 C.F.R. \$271. 205 recommend to the Federal Energy Regulatory Commission that the **Austime** Mississippian formation underlying the following alter referred to a 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. That the Austin Mississippian formation underlies all of (3) the above described lands; the consists of a shallow Vhat 8 water limestone; within the top of such formation being depths of from found at A13,200! to 13,300! below the area set out in finding Non above; when and that the is from firm 200 thickness of such formation 300 feet within ŧ, said area, 4 That the following wells produce or have produced natural (5) gas from the Austin Mississippian formation within the 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 Fetroleum 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 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.

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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

Rustin Mis

Nie Nie

T'a

1980 feet from North Line and 1980 feet from West Line of Section 16, Township 14 South, Range 36 East, N.M.P.M.

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(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.

The cridence presented in This (7) another that no well formert Care completed 020000 wi permen bilit inty ord due reters para second average in situ gas permeability (a) ok throughout the pay section of the Mistinglississe

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 of the inform regulations 18 C.F.R. \$271.705(b)(i)(ii)/n and

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

state back alors to reall dow for the state of the

day.

at based on analysis of available data from existing withing the proposed and wells / and utilizing generally and customarily accepted petroleum engineering techniques and measurements: The estimated average in situ gas permeability (a) throughout the pay section of the Austin Mississ+ppian formation is expected to be 0.1 millidarcy or less; and The stabilized production rate, against atmos-(b) pheric 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 3 The interim regulations 18 C.F.R. \$271.705(b)(i)(ii) and No well drilled into the formation is expected to (c) produce more than five barrels of crude oil per day. (?) That within the proposed are there are Two recognized aquifers being the Ogollala, a bush we tar aquifer found at sepths of from 60 feet to 300 feet, and the Santa Rose, a tophe brackish waiter apuiter found at dipths of drom 1000 feet to 1200 feet.

(10) (13) 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.

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IT IS THEREFORE ORDERED:

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(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. \$271.7054 Augulations and 182 FR & 271.703 and 18 C.F.R. \$271.7054 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.

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STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT OIL CONSERVATION DIVISION

POST OFFICE BOX 2088 STATE LAND OFFICE BUILDING BANTA FE, NEW MEXICO 8750; (505) 827-2434

October 7, 1980

BRUCE KING GOVERNOR LARRY KEHOE SECRETARY

> Federal Energy Regulatory Comm. Department of Energy 825 North Capitol Street, N.E. Washington, D. C. 20426

Attention: Mr. Howard Kilchrist

Dear Mr. Kilchriet: Enclosed is a tight formation recommendation for Enclosed is a tight formation upon the advise of the Commission's consideration. Upon the advise of Vic Zabel, I am sending it to you for your handling. 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

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STATE OF NEW MEXICO OIL CONSERVATION DIVISION OF THE FNERGY 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, silla

ERNEST L. PADILLA Attorney for the Oil Conservation Division

#### VERIFICATION

)88.

STATE OF NEW MEXICO

Martin Martineses.

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.

adilla

Subscribed and sworn to before me, this <u>loth</u> day of October, 1980.

Beaua 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.

AND A CONTRACT OF A CAR STREET





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 recommenda-tion submitted to the Federal Energy Regulatory Commission.

Sincerely yours,

st. Allen F. Buckingham

Supervisor, Determination Unit

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Enclosure



# United States Department of the Interior %

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



DIVISION

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,

Jul 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 Narvey E. yates Co. Designation of austin - Mississippian formation underlying T135-R35E, T135-R36E, T145-R35E, T145-R36E, T155-R35E, T155-R36E containing 138,240 acres, more or less in headounly as a tight formation pursuant to Section 107 of the NGPA and 18 CFR Section 271.701-705.

HEYCO

PETROLEUM PRODUCERS

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HARVEY E. YATES COMPANY

and the state of the

P. O. 80X 1933

SUITE 300, SECURITY NATIONAL BANK BUILDING 505/623-6601 ROSWELL, NEW MEXICO 88201

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

Attention: Mr. Joe Ramey

June 17, 1980 JUN I 9 1981 OIL CONSTRUCTION DIVISION Case 6984

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

Robert H. Strand Attorney

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RHS/cj Enclosures IN THE MATTER OF THE APPLICATION OF HARVEY E. YATES COMPANY FOR DESIGNATION OF A TIGHT FORMATION LEA COUNTY, NEW MEXICO

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#### APPLICATION

COMES NOW HARVEY E. YATES COMPANY by its attorney and respectfully states:

Case Noto

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

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.

By:

DATED this 17th day of June

1980.

HARVEY E. YATES COMPANY

en

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 FOR DESIGNATION OF A TIGHT FORMATION LEA COUNTY, NEW MEXICO

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ATT

#### APPLICATION

Case No.

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.

Township 15 South, Range 36 East, N.M.P.M.

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 <u>in</u> <u>situ</u> gas permeability throughout the pay section of less than 0.1 millidarcy.

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Section Street Street

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.

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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

That upon such hearing, the Division enter its order recommending to the Federal Energy Regulatory Commission that law. pursuant to 18 CFR, Section 271,701-705, the Austin Mississippian formation underlying the above described lands be designated a

C. For such further relicf as the Division deems just tight formation.

, 1980. 0 DATED this 17th day of Jone and proper. HARVEY E. YATES COMPANY

BY: Strand Attorney for Applicant P. O. Box 1933 88201 Roswell, New Mexico