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FISHHOOK GAS POOL, PIKE AND ADAMS COUNTIES, ILLINOIS

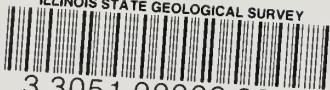
Wayne F. Meents

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FISHHOOK GAS POOL

Pike and Adams Counties, Illinois

Wayne F. Meents

ABSTRACT

The Fishhook gas pool, discovered in 1955, is located near the western border of Illinois and about 70 miles northwest of the state's main oil-producing region. About 57 gas wells in an area of 5,500 acres had initial open-flow capacities ranging from a few thousand to nearly $4\frac{1}{2}$ million cubic feet per day (average 624,000 cu. ft. per day) from Silurian Limestone. Average depth to the top of the gas pay is 487 feet. The wells are shut in for lack of a market. The area has possibilities for the underground storage of natural gas.

INTRODUCTION

The Fishhook Gas pool is located mainly in Pike County but extends into Adams County (Ts. 3 and 4 S., Rs. 4 and 5 W.) and is about 11 miles north and slightly west of Pittsfield, county seat of Pike County. It is about 20 miles from the Mississippi River, which is the western Illinois boundary, and is about 70 miles northwest of the boundary of the principal oil and gas producing part of Illinois (fig. 1). Thirty-three counties in the major oil field area have produced about 99.7 percent of the state's total oil production; the remaining 0.3 percent of the oil was produced in the Colmar-Plymouth field, some 40 miles north of Fishhook.

The industrial gas market areas of Springfield, Illinois, and St. Louis, Missouri, are about 70 miles to the east and 70-85 miles to the southeast, respectively, from the Fishhook Gas pool.

The Fishhook Gas pool is in a part of Illinois where the principal producing formations of the state are thin or absent. The producing formation, Silurian Limestone, is the same as that of the old Pittsfield Gas pool, discovered in 1886 and now abandoned. Both pools are located on anticlinal structures of similar size and shape, and both were discovered, so far as we know, by random drilling.

The geology of the area has been described in the following Illinois State Geological Survey publications:

"Parts of Pike and Adams Counties," by Horace N. Coryel, Bulletin 40, p. 69-95, 1919.

"Structural Reconnaissance of the Mississippi Valley area from Old Monroe, Missouri, to Navoo, Illinois," by Frank Krey, Bulletin 45, 1924 (out of print).

DEVELOPMENT

The discovery well, the No. 1 Layne in the NE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 30, T. 3 S., R. 4 W., was drilled by W. Vette in March 1955, and had an open-flow

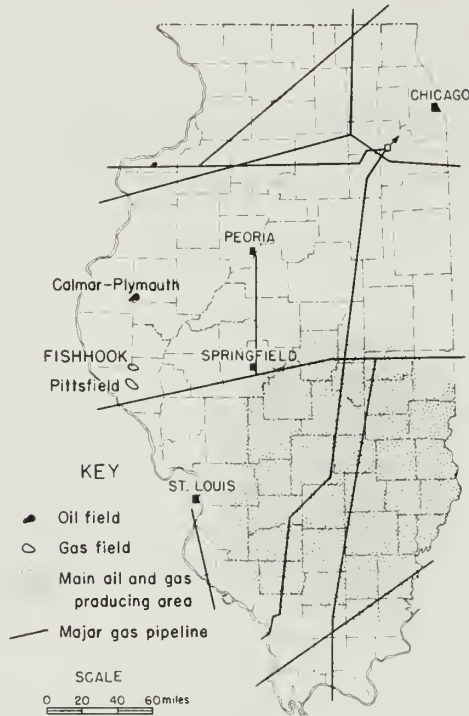


Fig. 1. - Index map showing location of the Fishhook Gas pool with respect to nearby oil and gas pools, the main oil-producing area, and major gas pipelines.

gauge of 1,140,000 cubic feet of gas per day. The well was completed in the Silurian System at a depth of 460 feet. Since then 57 gas wells have been completed. The gas producing area is oval-shaped, $5\frac{1}{2}$ miles long and $2\frac{1}{2}$ miles wide, and includes about 5,500 acres.

Open-flow capacities range from a few thousand cubic feet per day up to 4,494,000 cubic feet per day. The average open-flow gauge is 624,000 cubic feet per day. In several of the wells the gas stratum was penetrated for only a few inches, thus lowering the open-flow average. The present shut-in pressure throughout the pool is 114 pounds per square inch; the original pressure was 116 to 118 pounds per square inch. The average depth to the top of the gas pay is 487 feet. Gas gravities measured .55 and .57, air being 1.00, indicating a very dry gas, which is also verified by Orsat gas analyses (table 1). The wells are shut in because of lack of a market.

GAS TESTING PROCEDURE

The open-flow gas measurements listed in table 3 were taken by the author through 2-inch connections at the well heads. The procedure was to install a 2-inch by 2-foot flow nipple into the available 2-inch gate valve which was standard equipment on all of the wells. The open flow was measured by a Pitot-tube if the capacity ranged from 900,000 cubic feet per day to 3,000,000 cubic

Table 1. - Analyses of Gas from Two Wells in Fishhook Gas Pool

W. Vette #1 Layne		S & S Oil Co. #1 Conkright	
NE SE SE, 30-3S-4W, Pike County		SE NW NE, 4-4S-4W, Pike County	
Absorption Method (Orsat)		Absorption Method (Orsat)	
	Per-		Per-
	cent		cent
CO ₂	0.12	CO ₂	None
Illuminants	0.12	Illuminants	0.06
O ₂	0.06	O ₂	0.10
CO	0.12	CO	0.87
H ₂	None	H ₂	0.37
Methane	92.57	Methane	96.42
Ethane	None	Ethane	None
N ₂	<u>7.01</u>	N ₂	<u>2.18</u>
Total	100.00	Total	100.00
Specific Gravity	BTU/cu. ft.	Specific Gravity	BTU/cu. ft.
Calculated = 0.58	Gross = 939	Calculated = 0.56	Gross = 981
Measured = 0.57	Net = 846	Measured = 0.55	Net = 883

feet per day. Open flows below 900,000 cubic feet per day generally were measured by the orifice well tester and those above 3,000,000 by the side static pressure method four diameters from the outlet of the flow nipple. Gas gravities were measured and gas samples were analyzed by the State Geological Survey. Shutin pressures were measured by a standard Bourdon pressure gauge on the earlier wells and by a dead weight tester on most of the later wells. Isochronal back pressure tests have not been made to date.

CORE ANALYSES

Core analyses listed in table 2 were made by James A. Lewis Engineering, Inc., of Evansville, Indiana. These analyses were on cores taken from pre-determined wells throughout the field. The Silurian gas rock was cored and analyzed in five wells and in addition to the Silurian the entire St. Peter Sandstone was cored and analyzed in one well.

The average permeability of the gas rock through the better pay is 54 millidarcys and the average porosity is 20 percent. The average horizontal permeability of the St. Peter Sandstone is 682 millidarcys and the average vertical permeability is 512 millidarcys with an average porosity figure of 18.8 percent. According to these core analyses data, the St. Peter Sandstone appears to be an excellent gas storage horizon, if other factors are favorable.

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Table 2. - Core Analyses (Partial) from Four Wells

Depth in feet	Horizontal permea- bility, md.	Porosity per cent	Vertical permea- bility, md.	Depth in feet	Horizontal permea- bility, md.	Porosity per cent	Vertical permea- bility, md.
Western Oil and Gas Co. #1 Barker NE NE SE 36-3S-5W, Adams Co. Silurian System				#1 Cooley - Continued			
				498.3	26.0	16.8	0.0
495.0	0.00	4.2		498.8	0.7		
496.0	2.68	12.5		499.3	12.0	14.1	
497.0	19.20	14.9		499.8	101.0		0.5
498.0	10.73	16.1		500.3	4.4	12.7	
499.0	74.60	21.3		500.8	0.0		1.1
500.0	35.35	18.4		501.3	25.0	17.5	
501.0	28.96	14.3		501.8	125.0		24.0
502.0	3.43	13.7		502.3	98.0	13.9	
503.0	36.98	21.7		502.8	4.8		0.7
504.0	3.22	16.0		503.3	28.0	14.4	
505.0	22.40	26.1		503.8	15.0		3.5
506.0	38.33	24.2		504.3	37.0	19.1	
507.0	46.69	21.5		504.8	49.0		2.9
508.0	8.04	20.2		505.3	65.0	15.7	
509.0	16.10	20.6		505.8	61.0		5.8
510.0	0.00	-		506.3	4.6	16.5	
Western Oil and Gas Co. #1 A. Waters NE SE SE 25-3S-5W, Adams Co. Silurian System				506.8	42.0		0.6
484.5	0.7	11.8		507.3	35.0	23.3	
485.5	37.0	18.6		507.8	5.1		0.0
486.5	28.0	18.2		508.3	10.0	20.7	
487.5	45.0	25.5		508.8	137.0		15.0
488.5	30.0	21.8		509.3	3.7	18.6	
489.5	43.0	19.1		509.8	147.0		0.6
490.5	91.0	21.5		510.3	3.1	16.2	
491.5	308.0	24.2		Western Oil and Gas Co. #70 C. Gray NW NW SW 33-3S-4W, Pike Co. Silurian System			
492.5	508.0	29.0		533.5	0.0	15.2	
493.5	216.0	20.5		534.5	7.2	18.5	
494.5	281.0	28.8		535.5	10.0	21.3	
495.5	27.0	21.0		536.5	4.8	15.4	
496.5	31.0	27.4		537.5	157.0	22.2	
497.5	77.0	22.7		538.5	17.0	19.7	
498.5	6.2	24.2		539.5	15.0	19.9	
499.5	64.0	21.8		540.5	0.0	-	
500.5	1.3	19.6		541.5	99.0	21.3	
501.5	17.0	14.5		542.5	123.0	23.1	
Western Oil and Gas Co. #1 Cooley SE SE NW 28-3S-4W, Pike Co. Silurian System				543.5	1.5	16.3	
497.3	0.0	-		544.5	23.0	20.4	
497.8	0.0	7.7		545.5	30.0	23.5	
				546.5	1.0	25.2	
				547.5	4.6	21.9	
				548.5	8.1	12.9	
				549.5	0.0	-	

FISHHOOK GAS POOL

Table 2. - Continued

Depth in feet	Horizontal permea- bility, md.	Porosity per cent	Vertical permea- bility, md.	Depth in feet	Horizontal permea- bility, md.	Porosity per cent	Vertical permea- bility, md.
Pike County Gas Assoc. #2 Conkright NW SE NE 4-4S-4W, Pike Co. Silurian System				St. Peter Formation - Continued			
				1057.5	1375.0	20.8	
				1058.5	2220.0	20.6	174.0
510.5	0.0	7.1		1059.5	112.0	15.4	431.0
511.5	0.0	2.1					
513.5	0.0	2.4		1061.5	568.0	20.8	
514.5	0.0	4.2		1065.5	1030.0	21.1	
515.5	0.0	5.3		1069.5	392.0	18.0	
				1071.5	99.0	18.7	1090.0
516.5	0.0	6.5		1075.5	858.0	19.5	
517.5	0.0	2.7					
518.5	5.4	5.5	0.0	1077.5	1310.0	20.3	815.0
519.5	0.0	13.3	0.0	1079.5	1144.0	22.2	
520.5	0.0	12.8	0.0	1082.5	1410.0	22.2	2220.0
				1084.5	830.0	20.8	
521.5	8.2	17.8	1.0	1088.5	1200.0	22.7	
522.5	39.0	18.3	0.0				
523.5	12.0	18.1	0.0	1092.5	1732.0	22.9	
524.5	38.0	24.6	4.8	1096.5	2100.0	27.8	
525.5	68.0	21.7	46.0	1098.5	2070.0	21.5	1050.0
				1102.5	258.0	18.2	
526.5	0.4	15.9	0.0	1106.5	810.0	21.9	115.0
527.5	140.0	20.0	71.0				
528.5	10.0	22.4	10.0	1108.5	208.0	15.9	
529.5	370.0	23.6	3.7	1112.5	420.0	15.1	
530.5	211.0	22.2	10.0	1116.5	945.0	17.5	
				1120.5	278.0	18.1	
531.5	17.0	23.0	4.5	1124.5	356.0	20.7	
532.5	27.0	22.4	15.0				
533.5	0.0	19.6	0.0	1128.5	7.3	12.9	
534.5	4.8	21.5	1.7	1132.5	188.0	16.8	
535.5	10.0	16.5	0.0	1136.5	840.0	21.4	
				1140.5	440.0	20.4	
536.5	166.0	20.5	28.0	1145.5	298.0	18.3	
537.2	208.0	18.5	33.0				
537.8	0.0	-	-	1149.5	208.0	18.6	
				1153.5	47.0	14.4	
				1154.5	2350.0	20.9	240.0
				1158.5	137.0	17.0	
				1165.5	570.0	10.1	
				1167.5	288.0	20.0	
1012.5	2148.0	19.2		1170.5	276.0	18.8	21.0
1016.5	170.0	14.8		1178.5	101.0	18.6	29.0
1020.5	970.0	19.9		1180.5	151.0	16.7	
1024.5	2430.0	18.2		1182.5	3.5	11.2	15.0
1028.5	202.0	16.5					
				1184.5	152.0	17.2	
1032.5	194.0	20.4		1185.5	66.0	15.1	
1036.5	482.0	22.0		1190.5	260.0	18.7	398.0
1039.5	139.0	17.0	403.0	1192.5	3.7	13.3	
1040.5	645.0	20.2		1196.5	275.0	17.5	
1043.5	26.0	14.9		1200.5	150.0	20.5	
				1204.5	262.0	22.2	
1044.5	183.0	17.9	190.0	1208.0	121.0	16.1	17.9
1045.5	40.0	16.6	64.0				
1046.5	695.0	22.4					
1050.5	1170.0	21.7					
1054.5	3190.0	22.8					

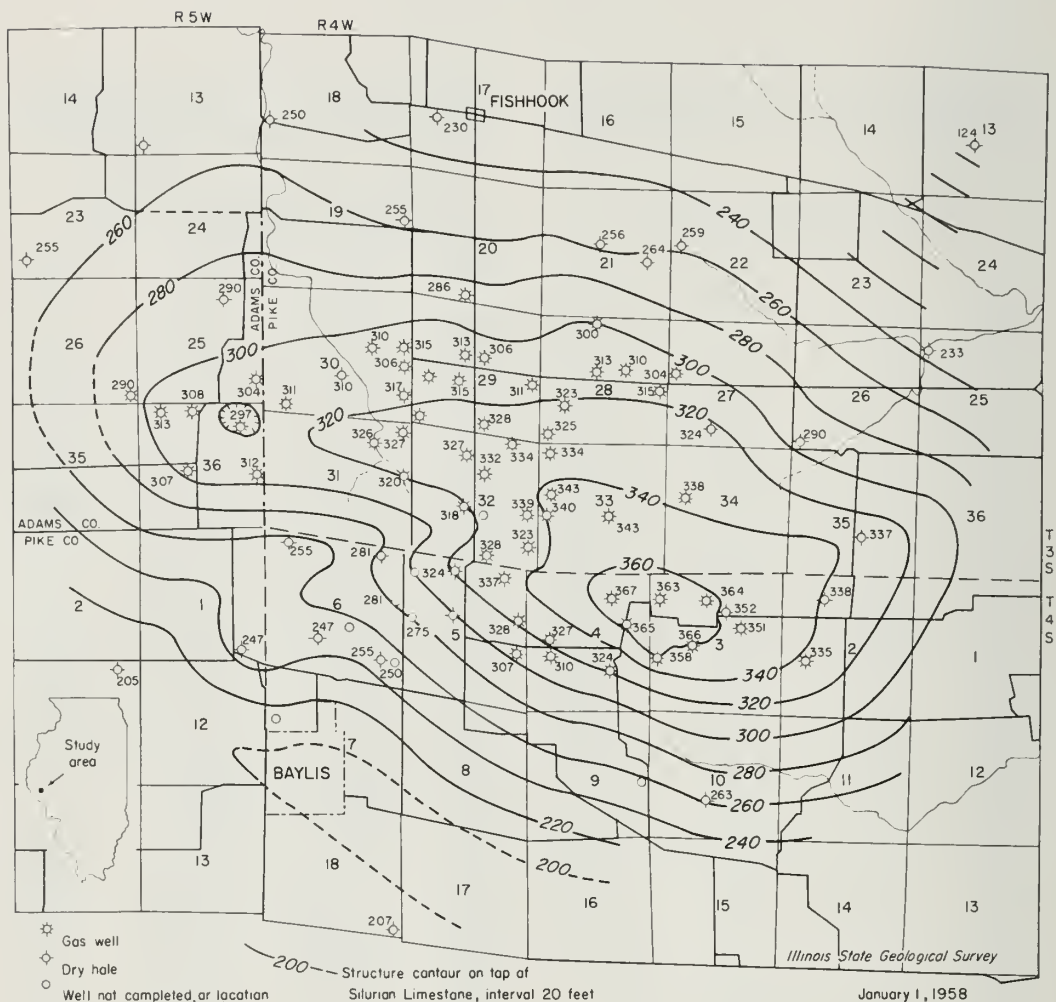


Fig. 2. - Fishhook Gas pool showing structure contours on top of the Silurian Limestone.

STRUCTURE

The Fishhook gas structure is an elongate oval anticline that trends slightly south of east and north of west and has a closure of about 100 feet on top of the Silurian Limestone (fig. 2). The structure is about 8 or more miles long and about 5 miles wide. Its position is indicated by topography and drainage. Several stream courses radiate from it, as shown on the map.

The structure of the top of the Silurian Limestone is nearly parallel to the structure of the base of the Osage Limestone about 180 feet higher in the stratigraphic column.

STRATIGRAPHY

Thin glacial drift (0 to 50 feet) overlies the bedrock in most of the area. Pennsylvanian rocks are present on the flanks of the structure but are absent over its top where Mississippian strata are the uppermost bedrock.

The Mississippian limestones and dolomites range in thickness from 160 to 250 feet, according to drillers' logs, and the underlying Kinderhook shales average 180 feet thick. The Devonian rocks are absent on the upper portion of the Fishhook structure, but there are indications of Devonian type beds in nearby wells.

The Silurian strata in the area correlate with the Sexton Creek and Edgewood Formations of the southern Calhoun County area and are 32 to 46 feet thick. The Sexton Creek Formation is the caprock limestone and the Edgewood Formation below it is the gas horizon which consists of approximately 15 feet of porous dolomite. Noix Oolite, as described below, has been cored in several of the wells.

Western Oil and Gas Co. #1 Russel Walters
SE SW NE, 30-3S-4W, Pike County

Top of core taken at depth of 458.0 feet

	Thickness feet	Depth feet
Silurian System		
Sexton Creek Formation		
Limestone, very light tan-gray, slightly finely crystalline, very slightly chalky, many wavy thin green shale partings, faintly fossiliferous throughout (very fine fossil fragments).	1.0	459.0
Edgewood Formation		
Dolomite, slightly calcareous, light tan-gray, sucrosic, pin-head vugs throughout, a few larger vugs, vugs are crinoid ring and other fossil fragment cavities, a few vertical fractures, very good porosity in areas and fair to good porosity throughout.	14.5	473.5
Limestone, oolitic (Noix Oolite), dense, white to light gray, some iron stain, medium to large oolites with scattered fossil fragments.	0.5	474.0
Ordovician System		
Maquoketa Formation		
Shale, greenish-gray slightly tan, brittle, glauconitic specks and slightly sandy at top.	3.0	477.0

The Maquoketa Formation is 175 feet thick in the center of the Fishhook area. Formations below the Maquoketa are described in the following description of the core from a well drilled directly on top of the structure:

Pike County Gas Association #2 Conkright
NW SE NE, 4-4S-4W, Pike County

Top of core taken at depth of 712.0 feet

	Thickness feet	Depth feet
Ordovician System		
Kimmswick "Trenton" Formation		
Limestone, white to very light tan-gray, mostly chalky, finely fossiliferous, black-brown stylolitic shale partings throughout, white weathered chert nodules at 781 feet.	88.0	800.0
Limestone, white to very light tan-gray, mostly chalky, many bryozoans, brachiopods, and a few corals, faintly crinoidal, few black-brown shale partings from 836 feet to bottom and more fine-grained.	70.0	870.0
Decorah Formation		
Limestone, cinnamon colored, fine, dark purple shale partings, stylolitic areas; with green, weak, very silty, shale streaks 891 to 895 feet, thin crystalline fossiliferous streaks at 877, 887, 895, and 899 feet.	33.0	903.0
Plattin Formation		
Limestone, tan, fine, slightly chalky.	10.0	913.0
Limestone, light tan-gray upper part to tan-gray lower part, very slightly chalky to 926 feet and very fine to sublithographic below, fucoidal type throughout, black shale partings scattered.	43.0	956.0
Sandstone, medium to coarse, rounded, compact, grading to sandy dolomite, light gray to gray, shaly streaks.	4.0	960.0
Limestone, greenish-gray, very large oolites, shaly.	2.0	962.0
Limestone, tan-gray, finely crystalline, very finely fossiliferous, with 1/2 inch to 1 inch greenish shale streaks.	8.0	970.0
Joachim Formation		
Dolomite, tan to brown, fine, slightly vuggy 985 to 990 feet, green shale streaks at 995 feet, black carbonaceous shale partings throughout, vertical fracture from 997 through 1003 feet, sandy bottom foot.	40.0	1010.0
St. Peter Formation		
Sandstone, dolomitic, medium to coarse, rounded, slightly porous, slightly friable.	7.0	1017.0

FISHHOOK GAS POOL

9

St. Peter Formation - Continued

	Thickness feet	Depth feet
Sandstone, white to light gray, fine to medium to coarse (mostly medium-coarse), porous, permeable, friable.	40.0	1057.0
Sandstone, same, white with gray mottling.	6.0	1063.0
Sandstone, same as 1017 to 1057 feet.	27.0	1090.0
Sandstone, gray, mostly medium-coarse, friable, permeable and porous.	27.0	1117.0
Sandstone, same, gray speckled.	46.0	1163.0
Sandstone, white, some light gray, fairly porous and permeable, few compact streaks, fine to coarse, bottom 14 feet mostly fine to medium and compact.	45.0	1208.0

Cotter Formation

Shale, green, weak, slickensides; with nodules of white to very light gray, finely crystalline, dolomite.	0.5	1208.5
Shale, green, tough, laminated, dipping 20° to 30°; with streaks of very light gray finely crystalline dolomite up to 3 inches thick.	3.5	1212.0

Table 3. - Results of Tests on Wells in the

Operator Farm and well	Approx. location	Elev. ft. ¹	Sil. top	Gas depth	Total depth	Casing ²	Shut-in ³ pressure PSI
A. Beach Gray #1	SE SE SW 20-3S-4W	786 S	490			4" at	110 G
Western Oil and Gas G. Burke #1	SW SW NW 27-3S-4W	750 S	446	474- 487	489	5½" at 455	100 G
Western Oil and Gas Cooley #1	SE SE NW 28-3S-4W	785 S	472	497- 511	514	5½" at 480	114 G
Western Oil and Gas Cooley #2	NE NE NW 28-3S-4W	778 S	478	505- 510	510	5" at 435	114½ D
W. Vette L. Martin #1	SW SW SW 28-3S-4W	828 S	503	524- 530	530	5½" at 500	117½ G
P. Walden and H. Lipe W. T. Martin #1	SE NW SW 28-3S-4W	828 S	505	541- 546	546	5" at 514	115+ D
Western Oil and Gas Metz #1	NE NE SE 28-3S-4W	766 S	451	482- 436	486	4" at 473	115½ D
C. Faulkner Whitaker #1	SW NE 28-3S-4W	770 T	460	460- 465	465	6" at 250	
W. Walden Fox #1	SW SW NE 29-3S-4W	811 S	505	534- 544	550	4" at 600	115 G
Ray Starr L. Martin #2	SW SW SE 29-3S-4W	821 S	493	518- 528	528	5" at 495	86 G
P. Walden and H. Lipe W. T. Martin #1	SE SE NW 29-3S-4W	815 S	502	533- 537	537	5" at 510	115½ G
Western Oil and Gas Martin #36-F	NE NE SE 29-3S-4W	815 T	504	531- 537	537	4" at 504	114½ D
A. Beach Miller #1	SW SW SW 29-3S-4W	716 S		425-	425	6½" at	
Ray Starr F. Miller #1	C NE SW 29-3S-4W	767 T	452	476-	477	4" at 455	113 G
Ray Starr F. Miller #2	C NW SW 29-3S-4W		439	457-	458	4" at 442	115+ D
W. Vette Layne #1	NE SE SE 30-3S-4W	752 S	435	460-	460	4" at 460	119 G
Western Oil and Gas F. Miller #1	SE SE NE 30-3S-4W	760 S	445	472- 485	485	4" at 452	115 G
Western Oil and Gas Moran #1	SE SW SW 30-3S-4W	702 S	391	405- 419	419	5½" at 400	117 G
Western Oil and Gas W. Smith #2	NE NE SE 30-3S-4W	779 S	473	486- 495	495	4" at 475	115- D

(See footnotes at end of table.)

FISHHOOK GAS POOL

Fishhook Gas Pool, Adams and Pike Counties

Open-flow volume MCF per day ⁴				Build-up pressure ⁵ PSIG								Date tested
5 min.	10 min.	15 min.	longer	$\frac{1}{2}$ min.	1 min.	2 min.	3 min.	4 min.	5 min.	10 min.	longer	
	45				17		36		52			12-55
	14								14			5-56
	62						23				112+ 21 min.	5-56
740	740			80	103	107	107+	108	109-			7-56
186	191	201	232 40 min.	40	68	103						3-56
218	218	218			33	60	82	98	110			10-56
260	260	256	253 25 min.	26	52	90	106	110	111	113-	113+ 15 min.	10-56
3386	3140	2975			64	75	79	83	85	92	96 15 min.	8-55
1488	1488			94	104	110					115 12 min.	8-55
211	218	218			33	47	55	58	60	72	72 15 min.	10-56
	682	682	682 20 min.	54	88	114+	115+					10-56
174	174	175		22	40	71	93	107	113			4-57
4494	4494											6-55
		11							14			10-56
174	174			28		67	95	110	115			12-56
	1140	1140				119						4-55
40	40				14	25	36	46	55	94	118- 17 min.	7-56
206	206	206			50	79	98	109	114			3-56
707	708	709		80	111	114+						5-57

(See footnotes at end of table.)

Table 3. -

Operator Farm and well	Approx. location	Elev. ft. ¹	Sil. top	Gas depth	Total depth	Casing ²	Shut-in pressure ³ PSI
Western Oil and Gas R. Waters #1	SE SW NE 30-3S-4W	752 S	442	459- 473	477	5½" at 456	116 D
W. Vette E. Mowen #1	NE NE NE 31-3S-4W	710 S	383	407-	407	5" at 382	118 G
Ray Starr E. Mowen #2	SE NW NE 31-3S-4W	700 T	374	390-	392	4" at 375	114 D
Ray Starr E. Mowen #3	NE SE NE 31-3S-4W	700 T	380	399-	400	4" at 382	115 D
Ray Starr L. Martin #3	NW NE NE 32-3S-4W	844 S	510	536- 540	540	4" at 512	115 D
Ray Starr W. T. Martin #1	NE NE SE 32-3S-4W	842 S	503	526- 533	540	5½" at 503	117 G
Ray Starr W. T. Martin #2	SW SW SE 32-3S-4W	773 S	445	471-	471	4" at 445	116 D
Ray Starr W. T. Martin #3	NW SW NE 32-3S-4W	812 S	480	495- 500	500	4" at 480	116 G
Ray Starr R. Still #3	NE SE SE 32-3S-4W	802 S	479	502-	503	4½" at 480	108 G
Western Oil and Gas Walmsley #1	SE NE NW 32-3S-4W	782 S	455	478- 485	485	4" at 465	
Western Oil and Gas C. Gray #3D	NW NW SE 33-3S-4W	798 S	455	489- 498	498	4" at 498 ^B	115- D
Western Oil and Gas C. Gray #70	NW NW SW 33-3S-4W	849 T	509	535- 548	551	4" at 512	114 D
Ray Starr L. Martin #1A	NW NW NW 33-3S-4W	830 S	496	526-	526	5½" at 499	115½ D
Ray Starr L. Martin #3A	C SW NW 33-3S-4W	831 S	488	514-	514	5½" at 490	113 D
Nonneman Lahmmon #1	C SW NW 34-3S-4W	747 S	409	439- 451	451	5½" at 440	115+ D
Western Oil and Gas A. Waters #1	NE SE SE 25-3S-5W	774 S	470	484- 501	503	5½" at 480	113 G
Western Oil and Gas Barker #1	NE NE SE 36-3S-5W	790 S	478	493- 509	511	5½" at 486	109 G
H. Lipe C. Gray #1	NE NE SW 36-3S-5W	809 S	502	522- 528	531	5½" at 510 ^C	114 D
W. Walden Kennedy #1	SW NE NE 36-3S-5W	729 S	432	438-	458	3½" at	114 G
Western Oil and Gas O. Mowen #1	NE NE NW 36-3S-5W	809 S	501	515- 525	525	4" at 512	115 D

(See footnotes at end of table.)

FISHHOOK GAS POOL

Continued

Open-flow volume MCF per day ⁴				Build-up pressure ⁵ PSIG								Date tested
5 min.	10 min.	15 min.	longer	$\frac{1}{2}$ min.	1 min.	2 min.	3 min.	4 min.	5 min.	10 min.	longer	
78	78			9	15	27	38	49	59	90		3-56
	880			70	114							1-56
64	64				23	40	57	73	86			12-56
31	31				7	17	25	34	42	78		12-56
102	106	107	108 20 min.		23	44	62	77	90	113		10-56
4380	3870	3700	3380 35 min.	F	40	69	90	104+	112 ^F			5-56
1669	1586	1586		90	103	115						9-56
160	160				30	64	88	104	112			10-56
665	670	670		50	92	114						12-56
			1580 80 min.	91	108	109		109+				2-57
1047	1047	1047		74	83	89	91	93-	94	97	99 15 min.	2-57
89	95	100	111 40 min.	13	26	49	68	84	97	114		7-57
204	211	211			33	62	85	102	111			10-56
18	21	21							15	30	58 20 min.	10-56
431	431	431		35	60	95	107	111+	113-			10-56
269	274	279	279 20 min.									5-56
3090	2840	2600	2150 60 min.	52	60	69			79			3-56
	1020	1020		95 ^L	103	107	110-	110	110+	112		12-57
		857 ^E	537 25 min.	97	107	108+					110 14 min.	11-55
		505	300 45 min.		20		37		50			9-56

Table 3. -

Operator Farm and well	Approx. location	Elev. ft. ¹	Sil. top	Gas depth	Total depth	Casing ²	Shut-in pressure ³ PSI
H. Lipe Redman #1	NE NW NW 36-3S-5W	794 S	481	494- 500	500	4" at 489	114+ D
S & S Oil Hillman #1	NE NW SW 2-4S-4W	785 S	450	476-	489 ⁶	4" at 452	
S & S Oil C. Gray #1	SW SE NW 3-4S-4W	834 S	468	490- 496	496	4" at 471	115 D
S & S Oil J. Grimes #1	NW NW SW 3-4S-4W	838 S	480	507- 521	521	4" at	114½ D
S & S Oil Ingersoll #1	SW NW NW 3-4S-4W	837 T	474	495- 509	509	5½" at 477	115+ D
S & S Oil Moore #1	SE NE NW 3-4S-4W	764 T	400	427- 434	434	5" at 408	115 D
S & S Oil A. Phillips #1	NE SW NE 3-4S-4W	798 S	447	493-	540	4" at 447	114 G
S & S Oil Konkright #1	SE NW NE 4-4S-4W	857 S	490	511- 516	516	5½" at 490	115½ D
Western Oil and Gas Konkright #2	NW SE NE 4-4S-4W	856 S	491	518- 537	537	4" at 499	114 D
Western Oil and Gas C. Gray #1	SE SW NW 4-4S-4W	817 S	490	500- 514	514	4" at 514 ^B	115 D
Western Oil and Gas M. Gray #1	NE NW SW 4-4S-4W	797 S	487	510- 518	518	4" at	87 G
S & S Oil Stickman #1	SE NW SE 4-4S-4W	834 S	510	510- 543	543	5½" at 514	115 D
Ray Starr Engleman #1	NE NE NW 5-4S-4W	811 S	487	519- 526	526	4" at 490	113½ D
Western Oil and Gas Richards #1	NE NE SE 5-4S-4W	807 S	500	520- 524	524	4" at 500	112 G
Ray Starr R. Still #1	NE SE NE 5-4S-4W	800 S	472	480-	480	5" at 472	106 G
Ray Starr R. Still #2	NW NE NE 5-4S-4W	774 S	437	465-	465	4" at 440	111 G

1. Explanation:

S = Surveyed.
T = Topographical map.

2. Explanation:

B = Slotted pipe from thru gas zone.
C = 2 inch tubing.

3. Explanation:

G = Pressure gauge.
D = Dead weight tester.

4. Steady flow on last test,
no decline.

F = 254 MCF before 500 gallons
of acid, build-up pressure
taken before acid.

L = 2 inch tubing.

E = 18 min. test, good spray of
water with gas.

J = Acidized, 19,300 CF before
acid.

K = 500 gallons of acid.

FISHHOOK GAS POOL

Continued

Open-flow volume MCF per day ⁴				Build-up pressure ⁵ PSIG								Date tested
5 min.	10 min.	15 min.	longer	$\frac{1}{2}$ min.	1 min.	2 min.	3 min.	4 min.	5 min.	10 min.	longer	
439	431	428	422 30 min.	46	78	103	106	107	108-	109-	110-	7-57
		73				35	48	59	70			12-56
565	565	560	516 45 min.	71	105	115 ^A						11-56
390	403	410	414+ 25 min.	48	80	111	115					7-57
472	480	488	500 40 min.	40	67	100	113					8-56
777	777	777		61	96	115						10-56
755	690	648	500 60 min. ^J	50	64	71	75	78	80	88	92 15 min.	4-57
740	740	740		60	96	118						7-56
77	73	73	73 20 min.	11	20	38	53	65	78	110+	115 15 min.	7-57
415	415	415		40	74	110	115					10-56
46					12	22	32	41	49	76		12-56
395	391	391		24	44	76	94	103	106+	112		8-56
709	702	692	673 35 min. ^K	64	88	100+	107	108	109	112		5-56
15	15					7	11-	14	18-		70 25 min.	4-57
	212				12	22	32	40	48	81	101- 15 min.	9-56
	15								20	37	67 20 min.	10-56

5. Last figure shows duration of test.

F = 254 MCF before 500 gallons of acid, build-up pressure taken before acid.

A = 115 PSIG in $\frac{1}{2}$ min.

6. To drill deeper.

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CIRCULAR 250

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