

# OILFIELD RESEARCH LABORATORIES

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April 14, 1980

Hazlett Oil Company  
P.O. Box 707  
Chanute, Kansas 66720

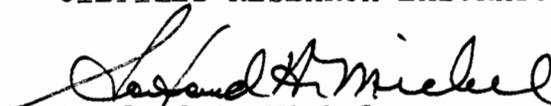
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary cores taken from the Rubow Lease, Well No. 2, Wilson County, Kansas, and submitted to our laboratory on March 13, 1980.

Your business is greatly appreciated.

Very truly yours,

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Sanford A. Michel

SAM/tem

5 c to Chanute, Kansas

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## GENERAL INFORMATION & SUMMARY

Company Hazlett Oil Company Lease Rubow Well No. 2

Location -

Section 14 Twp. 27S Rge. 16E County Wilson State Kansas

Elevation, Feet - - - - -

Name of Sand - - - - -	Squirrel	Bartlesville
Top of Core - - - - -	871.0	1008.0
Bottom of Core - - - - -	887.1	1030.6
Top of Sand - - - - -	874.0	1018.7
Bottom of Sand - - - - -	887.1	1030.6
Total Feet of Permeable Sand - - - - -	4.4	9.7
Total Feet of Floodable Sand - - - - -	0.0	5.4

Distribution of Permeable Sand:  
Permeability Range  
Millidarcys

Feet

Cum. Ft.

SQUIRREL SAND

0 - 10	1.1	1.1
10 - 20	1.1	2.2
20 - 30	1.7	3.9
40 - 50	0.5	4.4

BARTLESVILLE SAND

0 - 10	2.9	2.9
10 - 20	5.6	8.5
20 - 30	1.2	9.7

Average Permeability Millidarcys - - - - -	21.5	13.1
Average Percent Porosity - - - - -	14.1	16.5
Average Percent Oil Saturation - - - - -	13.2	36.5
Average Percent Water Saturation - - - - -	68.7	36.2
Average Oil Content, Bbls./A. Ft. - - - - -	140.	468.
Total Oil Content, Bbls./Acre - - - - -	783.	5,334.
Average Percent Oil Recovery by Laboratory Flooding Tests - - - - -	0.0	6.8
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - -	0.0	91.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - -	0.0	489.
Total Calculated Oil Recovery, Bbls./Acre - - - - -	0.0	See "Calculated Recovery" Section.

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The core was sampled and the samples sealed in plastic bags by a representative of the client. Fresh water mud was used as a drilling fluid. The core was reported to be from a virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
	<u>SQUIRREL SAND</u>
871.0 - 874.0	Gray sandy shale.
874.0 - 875.2	Gray calcareous shaly sandstone.
875.2 - 881.7	Gray laminated sandstone and shale.
881.7 - 882.4	Gray sandstone.
882.4 - 884.5	Gray sandy shale.
884.5 - 887.1	Gray sandstone.
	<u>BARTLESVILLE SAND</u>
1008.0 - 1015.6	Gray sandy shale.
1015.6 - 1015.8	Coal.
1015.8 - 1018.7	Gray sandy shale.
1018.7 - 1019.8	Brown sandstone.
1019.8 - 1020.3	Gray sandy shale.
1020.3 - 1021.4	Brown sandstone.
1021.4 - 1021.9	Brown shaly sandstone.
1021.9 - 1023.9	Brown sandstone.
1023.9 - 1024.6	Brown shaly sandstone.

<u>Depth Interval, Feet</u>	<u>Description</u>
1024.6 - 1027.2	Brown sandstone.
1027.2 - 1028.9	Brown shaly sandstone.
1028.9 - 1030.6	Gray shaly sandstone.

LABORATORY FLOODING TESTSBARTLESVILLE SAND

The sand in this core responded to laboratory flooding tests, as a total recovery of 279 barrels of oil per acre was obtained from 5.4 feet of sand. The weighted average percent oil saturation was reduced from 42.0 to 35.2, or represents an average recovery of 6.8 percent. The weighted average effective permeability of the samples is 0.14 millidarcys, while the average initial fluid production pressure is 50.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 11 samples tested, 5 produced water and oil, and 1 sample produced water only. This indicates that approximately 45 percent of the sand represented by these samples is floodable pay sand.

CALCULATED RECOVERY

It would appear from a study of the core data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 1,260 barrels of oil per acre. This is an average recovery of 234 barrels per acre foot from 5.4 feet of floodable sand analyzed in this core.

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These recovery values were calculated using the following data and assumptions:

Original formation volume factor, estimated	1.07
Reservoir water saturation, percent, estimated	25.0
Average porosity, percent	17.3
Oil saturation after flooding, percent	35.2
Performance factor, percent, estimated	50.0
Net floodable sand, feet	5.4

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Hazlett Oil Company Lease Rubow Well No. 2

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation		Oil Content Bbls. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water			Ft.	Cum. Ft.		
					<u>SQUIRREL SAND</u>					
1	874.5	3.7	15	70	43	Imp.	1.2	1.2	52	0.00
2	882.3	18.9	13	68	191	22.	0.7	1.9	134	15.40
3	883.5	16.5	15	68	192	19.	1.1	3.0	211	20.90
4	884.7	20.1	10	74	156	44.	0.5	3.5	78	22.00
5	885.5	16.5	13	63	166	28.	1.0	4.5	166	28.00
6	886.5	15.1	11	71	129	7.5	1.1	5.6	142	8.25
					<u>BARTLESVILLE SAND</u>					
1	1019.5	17.3	41	33	550	18.	1.1	1.1	605	19.80
2	1020.5	18.2	32	33	452	17.	1.1	2.2	497	18.70
3	1021.5	15.0	29	46	338	3.6	0.5	2.7	169	1.80
4	1022.5	17.3	44	29	591	18.	1.1	3.8	650	19.80
5	1023.5	17.1	44	35	584	11.	0.9	4.7	526	9.90
6	1024.5	16.3	38	48	481	3.3	0.7	5.4	337	2.31
7	1025.5	16.0	34	36	422	17.	1.4	6.9	591	23.80
8	1026.5	17.1	49	27	650	24.	1.2	8.1	780	28.80
9	1027.5	13.9	44	36	475	0.60	0.8	8.8	380	0.48
10	1028.5	16.2	23	35	289	1.5	0.9	9.7	260	1.35
11	1029.5	15.7	26	45	317	Imp.	1.7	11.4	539	0.00

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**SUMMARY OF PERMEABILITY & SATURATION TESTS**

TABLE III

Company		Lease		Well No.			
Hazlett Oil Company		Rubow		2			
Depth Interval, Feet	Feet of Core Analyzed	Average Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Permeability Capacity Ft. x Md.	Total Oil Content Bbls./Acre
<u>SQUIRREL SAND</u>							
874.0 - 887.1	4.4		13.2	68.7	140	94.55	783
<u>BARTLESVILLE SAND</u>							
1018.7 - 1030.6	9.7	16.5	36.5	36.2	468	126.74	5,334
<u>SQUIRREL SAND</u>							
874.0 - 887.1	5.6	14.1	13.2	68.7	140		783
<u>BARTLESVILLE SAND</u>							
1018.7 - 1030.6	11.4	16.5	36.5	36.2	468		5,334



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## SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Lease	Rubow	Well No.
Hazlett Oil Company			2
Depth Interval, Feet	<u>BARTLESVILLE SAND</u> 1018.7 - 1030.6		
Feet of Core Analyzed	5.4		
Average Percent Porosity	17.3		
Average Percent Original Oil Saturation	42.0		
Average Percent Oil Recovery	6.8		
Average Percent Residual Oil Saturation	35.2		
Average Percent Residual Water Saturation	51.6		
Average Percent Total Residual Fluid Saturation	86.8		
Average Original Oil Content, Bbls./A. Ft.	563.		
Average Oil Recovery, Bbls./A. Ft.	91.		
Average Residual Oil Content, Bbls./A. Ft.	472.		
Total Original Oil Content, Bbls./Acre	3,036.		
Total Oil Recovery, Bbls./Acre	489.		
Total Residual Oil Content, Bbls./Acre	2,547.		
Average Effective Permeability, Millidarcys	0.14		
Average Initial Fluid Production Pressure, p.s.i.	50.		

NOTE: Only those samples which recovered oil were used in calculating the above averages.