WILLIAM FARISH, III

CORE ANALYSIS REPORT

FOLGER LEASE WELL NO. 2-A

WILSON COUNTY, KANSAS

1

OILFIELD RESEARCH LABORATORIES

536 N. HIGHLAND
CHANUTE, KANSAS

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Chanute, Kansas

January 19, 1965

William Farish, III
c/o Underwood Neuhouse
Houston Club Building
Houston 2, Texas

Dear Sir:

Enclosed herewith is the report of the analysis of the Rotary core taken from the Folger Lease, Well No. 2-A, Wilson County, Kansas, and submitted to our laboratory on January 15, 1965.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman

Benjamin R. Pearman

BRP:rf

1 c. - Jim Guinotte

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company William Farish, III Lease Folger Well No. 2-A

Location 165' NSL & 165' WEL, NW

Section 36 Twp. 28S Rge. 16E County Wilson State Kansas

Name of Sand	Squirrel
Top of Core	664.5
Bottom of Core	688.0
Top of Sand	673.0
Bottom of Sand	684.0
Total Feet of Permeable Sand	9.6
Total Feet of Floodable Sand	3.5

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 10	2.0	2.0
10 - 20	2.0	4.0
20 - 50	4.7	8.7
50 & above	0.9	9.6

Average Permeability Millidarcys	25.2
Average Percent Porosity	17.3
Average Percent Oil Saturation	52.9
Average Percent Water Saturation	23.8
Average Oil Content, Bbls./A. Ft.	706.
Total Oil Content, Bbls./Acre	7,787.
Average Percent Oil Recovery by Laboratory Flooding Tests	6.2
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	92.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	323.
Total Calculated Oil Recovery, Bbls./Acre	1,080.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

Fresh water mud was used as the circulating fluid while taking this core. The core was sampled and the samples sealed in plastic bags by a representative of Oilfield Research Laboratories. The well was drilled in non-virgin territory.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
664.5 - 668.4	Sandy shale.
668.4 - 671.7	Broken shaly sandstone.
671.7 - 673.0	Gray sandy limestone.
673.0 - 675.5	Brown, slightly shaly sandstone.
675.5 - 677.6	Dark, carbonaceous, laminated, shaly sandstone.
677.6 - 684.0	Laminated sandstone and shale.
684.0 - 688.0	Sandy shale.

Coring was started at a depth of 664.5 feet in sandy shale and completed at 688.0 feet also in sandy shale. For the most part, the pay is made up of brown, slightly shaly sandstone.

PERMEABILITY

For the sake of distribution, the core was divided into two sections. The weighted average permeability of the upper and lower sections is 38.9 and 12.6 millidarcys respectively; the overall average being 25.2 (See Table III). By observing the data given on the coregraph, it is noticeable that the sand has a fairly regular permeability profile. The permeability of the sand varies from impermeable to a maximum of 54. millidarcys.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a good weighted average percent oil sat-

uration, namely, 52.9. The weighted average percent oil saturation of the upper and lower sections is 54.6 and 51.8 respectively. The weighted average percent water saturation of the upper and lower sections is 17.7 and 28.2 respectively; the overall average being 23.8 (See Table III). This gives an overall weighted average total fluid saturation of 76.7 percent. This low total fluid saturation indicates considerable fluid was lost during coring most of which was probably oil.

The weighted average oil content of the upper and lower sections is 785 and 652 barrels per acre foot respectively; the overall average being 706. The total oil content, as shown by this core, is 7,787 barrels per acre (See Table III).

LABORATORY FLOODING TESTS

The upper portion of the sand in this core responded to laboratory flooding tests, as a total recovery of 323 barrels of oil per acre was obtained from 3.5 feet of sand. The weighted average percent oil saturation was reduced from 49.6 to 43.4, or represents an average recovery of 6.2 percent. The weighted average effective permeability of the samples is 1.57 millidarcys, while the average initial fluid production pressure is 30.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 11 samples tested, 4 produced water and oil. This indicates that approximately 36 percent of the sand represented by these samples if floodable pay sand. The tests also show that the sand has a wide variation in effective permeability to water.

CONCLUSION

The results of the laboratory tests indicate that an efficient waterflood in the vicinity of this well should recover approximately 1,080

barrels of oil per acre or an average of 234 barrels per acre foot from 4.6 feet of floodable pay sand analyzed in this core. These recovery values were calculated using the following data and assumptions:

Original formation volume factor	1.05
Present formation volume factor	1.02
Reservoir water saturation, percent	15.0
Primary recovery, estimated, percent	8.0
Present oil saturation, percent	74.5
Average porosity, percent	19.8
Oil saturation after flooding, percent	43.4
Performance factor, percent	50.0
Net floodable pay sand, feet	4.6

This core shows a pay sand section having a good oil saturation, a moderate water saturation and a wide variation in effective permeability to water.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company William Farish, III Lease Folger Well No. 2-A

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	Total			Ft.	Cum. Ft.		
1	673.1	21.4	46	16	62	764	37.	0.6	0.6	458	22.20
2	674.1	22.0	49	20	69	836	33.	1.0	1.6	836	33.00
3	675.1	18.0	55	18	73	767	54.	0.9	2.5	690	48.60
4	676.1	16.1	71	15	86	885	48.	1.1	3.6	974	52.80
5	677.1	17.9	47	19	66	652	23.	1.0	4.6	652	23.00
6	678.2	17.7	49	20	69	673	19.	1.0	5.6	673	19.00
7	679.2	18.7	58	16	74	840	21.	1.0	6.6	840	21.00
8	680.1	15.9	60	20	80	739	14.	1.0	7.6	739	14.00
9	681.1	14.1	44	41	85	481	8.1	1.0	8.6	481	8.10
10	682.1	15.0	46	37	83	535	0.95	1.0	9.6	535	0.95
11	683.1	15.8	53	33	86	649	Imp.	1.4	11.0	909	0.00
								Total		7,787	

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company William Farish, III Lease Folger Well No. 2-A

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
673.0 - 677.6	4.6	38.9	179.60
677.6 - 684.0	5.0	12.6	63.05
673.0 - 684.0	9.6	25.2	242.65

Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
673.0 - 677.6	4.6	18.9	54.6	17.7	785	3,610
677.6 - 684.0	6.4	16.2	51.8	28.2	652	4,177
673.0 - 684.0	11.0	17.3	52.9	23.8	706	7,787

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company William Farish, III Lease Folger Well No. 2-A

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation			Volume of Water Recovered cc*	Effective Permeability Millidarcys**	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
1	673.1	21.0	46	749	5	81	41	46	668	19	0.400	40
2	674.1	21.7	49	824	3	50	46	47	774	55	1.00	20
3	675.1	18.5	55	789	13	186	42	33	603	26	0.600	40
4	676.1	16.2	70	880	0	0	70	17	880	0	Imp.	-
5	677.1	18.4	47	671	4	57	43	46	614	190	3.70	20
6	678.2	17.6	50	682	0	0	50	22	682	0	Imp.	-
7	679.2	18.7	58	841	0	0	58	18	841	0	Imp.	-
8	680.1	15.6	59	712	0	0	59	22	712	0	Imp.	-
9	681.1	14.4	45	502	0	0	45	41	502	0	Imp.	-
10	682.1	15.1	46	539	0	0	46	37	539	0	Imp.	-
11	683.1	15.7	53	644	0	0	53	35	644	0	Imp.	-

Notes: cc—cubic centimeter.

*—Volume of water recovered at the time of maximum oil recovery.

**—Determined by passing water through sample which still contains residual oil.

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company William Farish, III Lease Folger Well No. 2-A

Depth Interval, Feet	673.0 - 677.6
Feet of Core Analyzed	3.5
Average Percent Porosity	19.8
Average Percent Original Oil Saturation	49.6
Average Percent Oil Recovery	6.2
Average Percent Residual Oil Saturation	43.4
Average Percent Residual Water Saturation	43.0
Average Percent Total Residual Fluid Saturation	86.4
Average Original Oil Content, Bbls./A. Ft.	758.
Average Oil Recovery, Bbls./A. Ft.	92.
Average Residual Oil Content, Bbls./A. Ft.	666.
Total Original Oil Content, Bbls./Acre	2,655.
Total Oil Recovery, Bbls./Acre	323.
Total Residual Oil Content, Bbls./Acre	2,332.
Average Effective Permeability, Millidarcys	1.57
Average Initial Fluid Production Pressure, p.s.i.	30.0

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