

OILFIELD RESEARCH LABORATORIES

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Kanaco Oil
P.O. Box 71
LeRoy, Kansas 66857

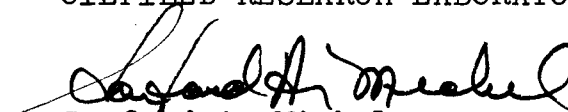
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Freeman Lease, Well No. 2, Coffey County, Kansas, and submitted to our laboratory on December 29, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Sanford A. Michel

SAM/tem
5 c to LeRoy, Kansas

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GENERAL INFORMATION & SUMMARY

Company Kanaco Oil Lease Freeman Well No. 2

Location SW NE SW $\frac{1}{4}$

Section 35 Twp. 22S Rge. 16E County Coffey State Kansas

Elevation, Feet - - - - -

Name of Sand - - - - -

Lower Squirrel

Top of Core - - - - -

961.0

Bottom of Core - - - - -

981.0

Top of Sand - - - - -

961.5

Bottom of Sand - - - - -

967.0

Total Feet of Permeable Sand - - - - -

5.5

Total Feet of Floodable Sand - - - - -

3.3

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

0 - 10

2.3

2.3

10 - 20

1.7

4.0

20 - 30

0.8

4.8

60 - 70

0.7

5.5

Average Permeability Millidarcys - - - - -

20.6

Average Percent Porosity - - - - -

17.5

Average Percent Oil Saturation - - - - -

52.6

Average Percent Water Saturation - - - - -

22.9

Average Oil Content, Bbls./A. Ft. - - - - -

707.

Total Oil Content, Bbls./Acre - - - - -

3,889.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - -

8.6

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - -

117.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - -

386.

Total Calculated Oil Recovery, Bbls./Acre - - - - -

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 non-virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
961.0 - 961.5	Hard gray fossiliferous calcareous sandy shale.
961.5 - 962.2	Brown and gray laminated sandstone and shale.
962.2 - 963.4	Brown slightly shaly sandstone.
963.4 - 964.1	Brown sandstone.
964.1 - 965.2	Brown and gray laminated sandstone and shale.
965.2 - 967.0	Brown sandstone.
967.0 - 970.0	Gray sandy shale.
970.0 - 981.0	Gray shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 386 barrels of oil per acre was obtained from 3.3 feet of sand. The weighted average percent oil saturation was reduced from 52.9 to 44.3, or represents an average recovery of 8.6 percent. The weighted average effective permeability of the samples is 0.45 millidarcys, while the average initial fluid production pressure is 38.3 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 6 samples tested, 3 produced water and oil, and 3

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samples produced water only. This indicates that approximately 50 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 790 barrels of oil per acre. This is an average recovery of 239 barrels per acre foot from 3.3 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.07
Reservoir water saturation, percent, estimated	15.0
Average porosity, percent	17.5
Oil saturation after flooding, percent	44.3
Performance factor, percent, estimated	50.0
Net floodable sand, feet	3.3

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Kanaco Oil Lease Freeman 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	Total			Ft.	Cum. Ft.		
1	961.9	16.8	52	21	73	678	11.	0.7	0.7	475	7.70
2	962.8	16.3	59	27	86	746	10.	1.2	1.9	895	12.00
3	963.7	18.1	44	29	73	618	66.	0.7	2.6	433	46.20
4	964.3	18.7	49	21	70	711	9.4	1.1	3.7	782	10.34
5	965.4	15.6	59	18	77	714	26.	0.8	4.5	571	20.80
6	966.5	18.9	50	21	71	733	16.	1.0	5.5	733	16.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Lease		Freeman	Well No.	2
Kanaco Oil					
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
961.5 - 967.0	5.5	20.6	113.04		
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Total Oil Content Bbls./Acre
961.5 - 967.0	5.5	17.5	52.6	22.9	707
					3,889

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company		Kanaco Oil		Lease		Freeman		Well No.		2	
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			
1	961.9	17.0	52	686	0	0	52	41	20	0.45	45
2	962.8	16.8	59	769	16	209	43	46	49	0.60	25
3	963.7	18.2	44	621	0	0	44	48	4	0.15	50
4	964.3	18.5	49	704	3	43	46	48	13	0.30	45
5	965.4	16.0	59	732	0	0	59	39	10	0.30	50
6	966.5	18.8	50	729	6	88	44	50	27	0.45	45

Notes: cc—cubic centimeter.

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

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

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Kanaco Oil	Lease	Freeman	Well No.	2
Depth Interval, Feet	961.5 - 967.0				
Feet of Core Analyzed	3.3				
Average Percent Porosity	18.0				
Average Percent Original Oil Saturation	52.9				
Average Percent Oil Recovery	8.6				
Average Percent Residual Oil Saturation	44.3				
Average Percent Residual Water Saturation	49.7				
Average Percent Total Residual Fluid Saturation	94.0				
Average Original Oil Content, Bbls./A. Ft.	735.				
Average Oil Recovery, Bbls./A. Ft.	117.				
Average Residual Oil Content, Bbls./A. Ft.	618.				
Total Original Oil Content, Bbls./Acre	2,426.				
Total Oil Recovery, Bbls./Acre	386.				
Total Residual Oil Content, Bbls./Acre	2,040				
Average Effective Permeability, Millidarcys	0.45				
Average Initial Fluid Production Pressure, p.s.i.	38.3				

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