

OILFIELD RESEARCH LABORATORIES

- REGISTERED ENGINEERS -

700 NORTH MISSION
OKMULGEE, OKLAHOMA
PHONE: 4444

Chanute, Kansas

536 N. HIGHLAND
CHANUTE, KANSAS
PHONE: HE 1-2650

July 31, 1961

Schermerhorn Oil Corporation
P.O. Box 287
Tulsa, Oklahoma

Gentlemen:

Enclosed herewith is the report of the analysis of the Rotary core taken from the Friedline "B" Lease, Well No. K-29, Wilson County, Kansas, and submitted to our laboratory on July 24, 1961.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Carl L. Pate

CLP:rf

1 c. Earlton, Kansas

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GENERAL INFORMATION & SUMMARY

Company Schermerhorn Oil Corp. Lease Friedline "B" Well No. K-29

Location 330' East of West line and 1320' North of South line, NE $\frac{1}{4}$

Section 17 Twp. 28S Rge. 17E County Wilson State Kansas

Name of Sand - - - - -	Bartlesville
Top of Core - - - - -	977.0
Bottom of Core - - - - -	997.0
Top of Sand - - - - -	977.5
Bottom of Sand - - - - -	982.2
Total Feet of Permeable Sand - - - - -	6.7
Total Feet of Floodable Sand - - - - -	4.7

Distribution of Permeable Sand:
Permeability Range
Millidarcys

	Feet	Cum. Ft.
0 - 40	3.1	3.1
40 - 65	2.0	5.1
65 & above	1.6	6.7

Average Permeability Millidarcys - - - - -	53.4
Average Percent Porosity - - - - -	18.7
Average Percent Oil Saturation - - - - -	44.0
Average Percent Water Saturation - - - - -	40.2
Average Oil Content, Bbls./A. Ft. - - - - -	645.
Total Oil Content, Bbls./Acre - - - - -	4,322.
Average Percent Oil Recovery by Laboratory Flooding Tests - - - - -	18.8
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - -	296.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - -	1,389.
Total Calculated Oil Recovery, Bbls./Acre - - - - -	1,278.
Packer Setting, Feet - - - - -	
Viscosity, Centipoises @ - - - - -	
A. P. I. Gravity, degrees @ 60 °F - - - - -	
Elevation, Feet - - - - -	

Water was used as a circulating fluid in the coring of the sand in this well. This well was drilled in a semi-virgin area.

This core was sampled and sealed in tin cans by a representative of Oilfield Research Laboratories.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval,</u> <u>Feet</u>	<u>Description</u>
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977.0 - 977.5	- Laminated sandstone and shale.
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977.5 - 982.2	- Brown fine grained sandstone.
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982.2 - 990.0	- Laminated sandstone and shale.
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990.0 - 996.0	- Brown to dark laminated shaley sandstone.
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996.0 - 996.8	- Shale.
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996.8 - 997.5	- Dark sandy conglomerate.
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Coring was started at a depth of 977.0 feet in laminated sandstone and shale and completed at 997.5 feet in dark sandy conglomerate. This core shows a total of 10.7 feet of sandstone. For the most part, the pay is made up of brown fine grained sandstone.

All depth measurements are taken from ground level.

PERMEABILITY

For the sake of distribution, the core was divided into two sections. The weighted average permeability of the upper and lower sections is 72.4 and 8.5 millidarcys respectively; the overall average being 53.4 (See Table III). By observing the data given on the coregraph, it is noticeable that the sand has a very irregular permeability profile. The permeability of the sand varies from 1.1 to a maximum of 149. millidarcys.

PERCENT SATURATION & OIL CONTENT

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

saturation, namely, 44.0. The weighted average percent oil saturation of the upper and lower sections is 47.0 and 37.0 respectively. The weighted average percent water saturation of the upper and lower sections is 34.7 and 53.5 respectively; the overall average being 40.2 (See Table III). This gives an overall weighted average total fluid saturation of 84.2 percent.

It is apparent that the pay sand section (upper) extends from a depth of 977.5 to 982.2 feet.

The weighted average oil content of the upper and lower sections is 712 and 487 barrels per acre foot respectively; the overall average being 645. The total oil content, as shown by this core, is 4,322 barrels per acre of which 3,348 barrels are in the pay sand section (See Table III).

LABORATORY FLOODING TESTS

The pay sand in this core responded very well to laboratory flooding tests, as a total recovery of 1,389 barrels of oil per acre was obtained from 4.7 feet of sand. The weighted average percent oil saturation was reduced from 47.0 to 28.2, or represents an average recovery of 18.8 percent. The weighted average effective permeability of the samples is 5.25 millidarcys, while the average initial fluid production pressure is 21.4 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 7 samples tested, 5 produced water and oil. This indicates that approximately 71 percent of the sand represented by these samples is floodable pay sand. The tests also show that the sand has a comparatively uniform effective permeability.

CONCLUSION

From a study of the above data, we believe that an efficient water-flood, within the vicinity of this well, will recover approximately

1,278 barrels of oil per acre or an average of 272 barrels per acre foot from the 4.7 feet of floodable pay sand analyzed. In calculating this oil recovery value, the following data and assumptions were employed:

Original formation volume factor	1.07
Present formation volume factor	1.03
Irreducible water saturation, percent	32.0
Primary oil recovery, percent	4.0
Present oil saturation, percent	61.4
Oil saturation after flooding, percent	28.0
Percent porosity	19.7
Performance factor	0.55

This core shows a thin pay sand section (977.5 to 992.2 feet) having a good oil saturation, a fairly low water saturation and a good permeability.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Schermerhorn

Lease Freidline "B"

Well No. K-29

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	978.1	18.7	38	38	76	552	33.	1.1	1.1	607	36.30
2	979.1	17.1	40	36	76	531	149.	1.0	2.1	531	149.00
3	980.1	21.3	61	27	88	1008	60.	1.0	3.1	1008	60.00
4	981.1	21.3	42	38	80	694	55.	1.0	4.1	694	55.00
5	982.1	18.2	60	32	92	847	67.	0.6	4.7	508	40.20
6	991.5	17.6	30	58	88	410	1.1	1.0	5.7	410	1.10
7	993.7	16.5	44	49	93	564	16.	1.0	6.7	564	16.00
								Total		4,322	

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III - B

Company	Lease	Well No.			
Schermerhorn Oil Corp.	Freidline "B"	K-29			
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
977.5 - 982.2	4.7	72.4	340.50		
991.0 - 994.0	2.0	8.5	17.10		
977.5 - 994.0	6.7	53.4	357.60		
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
977.5 - 982.2	4.7	19.4	47.0	712	3,348
991.0 - 994.0	2.0	17.0	37.0	487	974
977.5 - 994.0	6.7	18.7	44.0	645	4,322

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation			Volume of Water Recovered cc ^a	Effective Permeability Millidarcys ^b	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
1	978.1	19.2	38	566	6	89	32	67	477	101	2.77	35
2	979.1	17.1	40	531	10	133	30	63	398	284	7.10	20
3	980.1	21.8	61	1032	35	592	26	65	440	242	6.86	10
4	981.1	21.3	42	694	18	298	24	69	396	173	4.75	20
5	982.1	18.6	60	865	31	447	29	62	418	222	4.84	20
6	991.5	18.0	28	391	0	0	28	62	391	0	Imp.	-
7	993.7	16.7	40	519	0	0	40	55	519	0	Imp.	-

Schermerhorn Oil Corp. Lease Freidline "B" Well No. K-29

Notes: cc—cubic centimeter.

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

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

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Schermmerhorn Oil Corp.	Lease	Freidline "B"	Well No.	K-29
Depth Interval, Feet	977.5 - 982.2				
Feet of Core Analyzed	4.7				
Average Percent Porosity	19.7				
Average Percent Original Oil Saturation	47.0				
Average Percent Oil Recovery	18.8				
Average Percent Residual Oil Saturation	28.2				
Average Percent Residual Water Saturation	65.5				
Average Percent Total Residual Fluid Saturation	93.7				
Average Original Oil Content, Bbls./A. Ft.	724.				
Average Oil Recovery, Bbls./A. Ft.	296.				
Average Residual Oil Content, Bbls./A. Ft.	428.				
Total Original Oil Content, Bbls./Acre	3,398.				
Total Oil Recovery, Bbls./Acre	1,389.				
Total Residual Oil Content, Bbls./Acre	2,009.				
Average Effective Permeability, Millidarcys	5.25				
Average Initial Fluid Production Pressure, p.s.i.	21.4				

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