

OILFIELD RESEARCH LABORATORIES

- REGISTERED ENGINEERS -

700 NORTH MISSION
OKMULGEE, OKLAHOMA
PHONE: 4444

Chanute, Kansas

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

July 7, 1962

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 Freidline "C" Lease, Well No. 2, Wilson County, Kansas, and submitted to our laboratory on July 2, 1962.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman
Benjamin R. Pearman

BRP:rf

1 c. - Earlton, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Schermerhorn Oil Corp. Lease Freidline "C" Well No. 2

Location 184' West of East line & 1020' South of North line, NE

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

Name of Sand	Bartlesville
Top of Core	959.0
Bottom of Core	980.0
Top of Sand (Analyzed)	959.0
Bottom of Sand (Analyzed)	967.7
Total Feet of Permeable Sand (Analyzed)	7.5
Total Feet of Floodable Sand (Analyzed)	6.9

Distribution of Permeable Sand:
Permeability Range
Millidarcys

	Feet	Cum. Ft.
0 - 10	1.2	1.2
20 - 100	4.0	5.2
100 - 200	2.3	7.5

Average Permeability Millidarcys	83.9
Average Percent Porosity	19.3
Average Percent Oil Saturation	31.8
Average Percent Water Saturation	45.0
Average Oil Content, Bbls./A. Ft.	476.
Total Oil Content, Bbls./Acre	3,907.
Average Percent Oil Recovery by Laboratory Flooding Tests	6.4
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	97.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	671.
Total Calculated Oil Recovery, Bbls./Acre Foot (Primary & Secondary)	349.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

Some difficulty was experienced during coring operations and only 9 feet of core was recovered. It was reported that all measurements are questionable. Fresh water mud was used as the coring fluid. The core was sampled and the samples sealed in cans by a representative of the laboratory. The well was drilled in virgin territory.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth</u>	<u>Interval,</u>	<u>Description</u>
<u>Feet</u>		

959.0 - 963.3	-	Dark brown sandstone.
963.3 - 964.6	-	Grayish light brown, shaly sandstone.
964.6 - 967.2	-	Dark brown, slightly shaly sandstone.
967.2 - 967.4	-	Light brown shaly sandstone.
967.4 - 967.7	-	Dark carbonaceous sandstone.

Coring was started at a depth of 959.0 feet in sandstone and the bottom of the core received was at 967.7 feet made up of carbonaceous sandstone. This core shows a total of 8.7 feet of sandstone. For the most part, the pay is made up of dark brown 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 120.1 and 35.4 millidarcys respectively; the overall average being 83.9 (See Table III). By observing the data given on the coregraph, it is noticeable that the sand has a rather irregular permeability profile. The permeability of the sand varies from 0.84 to a maximum of 198. millidarcys.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a fairly good weighted average percent oil saturation, namely, 31.8. The weighted average percent oil saturation

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of the upper and lower sections is 30.6 and 33.2 respectively. The weighted average percent water saturation of the upper and lower sections is 41.8 and 48.0 respectively; the overall average being 45.0 (See Table III). This gives an overall weighted average total fluid saturation of 76.8 percent. This low total fluid saturation indicates considerable fluid was lost during coring most of which probably was oil.

The weighted average oil content of the upper and lower sections is 500 and 450 barrels per acre foot respectively; the overall average being 476. The total oil content, as shown by this core, is 3,907 barrels per acre (See Table III).

LABORATORY FLOODING TESTS

The sand in this core responded fairly well to laboratory flooding tests, as a total recovery of 671 barrels of oil per acre was obtained from 6.9 feet of sand. The weighted average percent oil saturation was reduced from 32.2 to 25.8, or represents an average recovery of 6.4 percent. The weighted average effective permeability of the samples is 10.92 millidarcys, while the average initial fluid production pressure is 20.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 9 samples tested, 8 produced water and oil. This indicates that approximately 89 percent of the sand represented by these samples is floodable pay sand. The tests also show that the sand has a wide variation in effective permeability to water.

CONCLUSION

Since only a portion of the cored section was recovered and analyzed, the calculated recovery values will be reported as barrels per acre foot; primary 113 and secondary 236. The following data and assumptions were used in calculating the above recovery values:

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Original formation volume factor	1.06
Reservoir water saturation, percent	36.0
Expected primary recovery, estimated, percent	8.0
Average porosity, percent	20.4
Oil saturation after flooding, percent	25.8
Performance factor, percent	55.0
Net floodable pay sand, feet	?

The recovered core shows a sand section having a fairly good oil saturation, a moderate water saturation and higher than average effective permeability to water.

The above secondary recovery value was calculated assuming that satisfactory injection rates will be maintained throughout the flood life of the property.

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Schermerhorn Oil Corp. Lease Freidline "C" Well No. 2

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation		Oil Content Bbbs. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.	
			Oil	Water			Ft.	Cum. Ft.			
1	959.1	15.5	31	49	372	198.	0.6	0.6	223	118.80	
2	960.1	21.7	29	46	488	137.	1.0	1.6	488	137.00	
3	961.1	19.4	33	39	496	83.	1.0	2.6	496	83.00	
4	962.1	23.6	31	36	567	77.	1.0	3.6	567	77.00	
F-5	963.1	24.0	29	-	539	144.	0.7	4.3	377	100.80	
5	963.4	16.3	37	51	467	-	0.3	4.6	140	-	
6	964.1	14.2	28	60	308	6.9	1.0	5.6	308	6.90	
7	965.1	20.0	33	49	511	83.	1.0	6.6	511	83.00	
8	966.1	17.5	35	40	475	23.	1.0	7.6	475	23.00	
9	967.1	18.7	37	38	536	-	0.6	8.2	322	-	
P-9	967.3	-	-	-	-	0.84	0.2	8.4	-	0.17	
Total							-----		3,907		

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Schermershorn Oil Corp.	Lease	Freidline "C"	Well No.	2
	Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.	
	959.0 - 963.3	4.3	120.1	516.60	
	963.3 - 967.4	3.2	35.4	113.07	
	959.0 - 967.4	7.5	83.9	629.67	
	Depth Interval, Feet	Feet of Core Analyzed	Average Percent Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
	959.0 - 963.3	4.3	30.6	500	2,151
	963.3 - 967.4	3.9	33.2	450	1,756
	959.0 - 967.4	8.2	31.8	476	3,907

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Schermerhorn Oil Corp. Lease Freidline "C" Well No. 2

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.
			%	Ehls./A. Ft.	%	Ehls./A. Ft.	% Oil	% Water			
1	959.1	16.0	31	384	6	74	25	71	229	12.22	20
2	960.1	21.5	29	483	3	50	26	71	221	23.30	10
3	961.1	19.8	33	506	4	61	29	65	192	10.40	20
4	962.1	23.5	31	565	6	110	25	68	323	20.63	10
5	963.1	24.0	29	539	3	56	26	63	185	13.50	20
6	964.1	14.6	26	294	0	0	26	63	0	Imp.	-
7	965.1	20.4	33	521	7	111	26	72	69	2.94	30
8	966.1	17.6	35	477	11	150	24	68	15	0.560	30
9	967.1	19.0	37	545	12	177	25	70	51	1.21	20

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	Schermerhorn Oil Corp.	Lease	Freidline "C"	Well No.	2
Depth Interval, Feet	959.0 - 963.3	963.3 - 967.4	959.0 - 967.4		
Feet of Core Analyzed	4.3	2.6	6.9		
Average Percent Porosity	21.2	19.0	20.4		
Average Percent Original Oil Saturation	30.8	34.7	32.2		
Average Percent Oil Recovery	4.4	9.7	6.4		
Average Percent Residual Oil Saturation	26.4	25.0	25.8		
Average Percent Residual Water Saturation	67.6	70.0	68.5		
Average Percent Total Residual Fluid Saturation	94.0	95.0	94.3		
Average Original Oil Content, Bbls./A. Ft.	502.	509.	505.		
Average Oil Recovery, Bbls./A. Ft.	71.	141.	97.		
Average Residual Oil Content, Bbls./A. Ft.	431.	368.	408.		
Total Original Oil Content, Bbls./Acre	2,161.	1,325.	3,486.		
Total Oil Recovery, Bbls./Acre	304.	367.	671.		
Total Residual Oil Content, Bbls./Acre	1,857.	958.	2,815.		
Average Effective Permeability, Millidarcys	16.59	1.63	10.92		
Average Initial Fluid Production Pressure, p.s.i.	16.0	26.7	20.0		

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