

# OILFIELD RESEARCH LABORATORIES

- REGISTERED ENGINEERS -

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June 12, 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. 1, Wilson County, Kansas, and submitted to our laboratory on June 8, 1962.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Carl L. Pate

CLP:rf

1 c. - Earlton, Kansas

# Oilfield Research Laboratories

## GENERAL INFORMATION & SUMMARY

Company Schermerhorn Oil Corp. Lease Freidline "C" Well No. 1

Location 184' West of East line & 1320' South of North line, NE $\frac{1}{4}$

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

Name of Sand	-	Bartlesville
Top of Core	-	943.0
Bottom of Core	-	971.0
Top of Sand	-	947.3
Pay Bottom of Sand	-	966.2
Total Feet of Permeable Sand	-	18.5
Total Feet of Floodable Sand	-	17.1

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.	
0 - 50	3.4	3.4	
50 - 100	4.1	7.5	
100 - 150	2.1	9.6	
150 - 200	3.5	13.1	
200 - 300	3.5	16.6	
300 & above	1.9	18.5	161.0
Average Permeability Millidarcys			20.1
Average Percent Porosity			44.9
Average Percent Oil Saturation			29.4
Average Percent Water Saturation			695.
Average Oil Content, Bbls./A. Ft.			13,404.
Total Oil Content, Bbls./Acre			15.2
Average Percent Oil Recovery by Laboratory Flooding Tests			237.
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.			4,052.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre			7,130.
Total Calculated Oil Recovery, Bbls./Acre (Primary & Secondary)			
Packer Setting, Feet			
Viscosity, Centipoises @			
A. P. I. Gravity, degrees @ 60 °F			
Elevation, Feet			

Drilling mud was used as a circulating fluid in the coring of the sand in this well. This well was drilled in a virgin area. The 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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943.0 - 946.0	Sandy shale.
946.0 - 947.3	Laminated sandstone and shale.
947.3 - 957.5	Brown, slightly laminated, micaceous sandstone.
957.5 - 958.5	Loss.
958.5 - 966.2	Dark brown, fine grained sandstone.
966.2 - 968.0	Dark carbonaceous, shaly sandstone.
968.0 - 971.0	Shale.

Coring was started at a depth of 943.0 feet in sandy shale and completed at 971.0 feet in shale. This core shows a total of 19.7 feet of sandstone. There was a core loss extending from a depth of 957.5 to 958.5 feet that was probably pay sand. For the most part, the pay is made up of brown to dark brown, fine grained 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 126.2 and 193.2 millidarcys respectively; the overall average being 161.0 (See Table III). By observing the data given on the coregraph, it is noticeable that the sand has a wide variation in permeability. The permeability of the sand varies from 17. to a maximum of 421. millidarcys.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a good weighted average percent oil saturation, namely, 44.9. The weighted average percent oil saturation of the upper and lower sections is 43.1 and 46.6 respectively. The weighted average percent water saturation of the upper and lower sections is 31.5 and 27.6 respectively; the overall average being 29.4 (See Table III). This gives an overall weighted average total fluid saturation of 74.3 percent. This low total fluid saturation indicates considerable fluid was lost during coring which probably was oil.

The weighted average oil content of the upper and lower sections is 672 and 715 barrels per acre foot respectively; the overall average being 695. The total oil content, as shown by this core, is 13,404 barrels per acre (See Table III).

LABORATORY FLOODING TESTS

The sand in this core responded very well to laboratory flooding tests, as a total recovery of 4,052 barrels of oil per acre was obtained from 17.1 feet of sand. The weighted average percent oil saturation was reduced from 44.0 to 28.8, or represents an average recovery of 15.2 percent. The weighted average effective permeability of the samples is 4.8 millidarcys, while the average initial fluid production pressure is 18.9 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 20 samples tested, 19 produced water and oil. This indicates that approximately 95 percent of the sand represented by these samples is floodable pay sand. The tests also show that the sand has a rather wide variation in effective permeability.

CONCLUSION

On the basis of the above data, it is evident that approximately 1,880 barrels of oil per acre can be recovered from the area, represented by this core, by efficient primary production methods. An additional

recovery of 5,250 barrels of oil per acre or an average of 307 barrels per acre foot can be expected from efficient water-repressuring. In calculating the above oil recovery values, the following data and assumptions were employed:

Original formation volume factor	1.06
Present formation volume factor	1.06
Irreducible water saturation, percent	25.0
Primary recovery	None.
Present oil saturation, percent	72.2
Average porosity, percent	20.2
Oil saturation after flooding, percent	28.8
Performance factor, percent	0.55
Net floodable pay sand, feet	17.1

This core shows a clean sand section having a good oil saturation, a rather low water saturation and a high average permeability.

This well should make a good oil producer provided the sand reservoir still has its original rock pressure.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Schermerhorn Oil Corp. Lease Freidline "C" Well No. 1

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation		Oil Content Bbbls. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water			Total	Ft.		
1	947.5	15.1	44	36	80	62.	0.5	0.5	258	31.00
2	948.2	23.0	37	36	73	416.	0.9	1.4	595	374.70
3	949.2	21.9	37	35	72	171.	0.9	2.3	567	154.00
4	949.9	12.5	29	30	79	-	0.4	2.7	190	-
F-4	950.1	18.2	39	-	-	66.	0.6	3.3	331	39.63
5	951.1	21.1	44	28	72	38.	1.0	4.3	722	38.00
6	952.1	21.4	49	29	78	91.	1.0	5.3	815	91.00
7	953.1	19.5	42	31	73	19.	1.0	6.3	636	19.00
8	954.1	22.2	45	29	74	58.	1.0	7.3	776	58.00
9	955.1	21.9	36	31	67	71.	1.0	8.3	614	71.00
10	956.1	18.2	53	32	85	247.	1.0	9.3	750	247.00
11	957.1	18.2	49	32	81	285.	0.9	10.2	623	266.50
12	959.1	13.8	60	21	81	117.	1.1	11.3	707	128.70
13	960.1	20.0	43	29	72	181.	1.0	12.3	669	181.00
14	961.1	21.5	43	27	70	140.	1.0	13.3	719	140.00
15	962.1	19.8	43	29	72	240.	1.0	14.3	661	240.00
16	962.9	14.1	29	25	74	-	0.4	14.7	214	-
F-16	963.1	18.7	41	-	-	247.	0.6	15.3	357	148.30
17	964.1	24.3	42	32	74	187.	1.0	16.3	795	187.00
18	965.1	22.7	40	25	65	421.	1.0	17.3	708	421.00
19	966.1	24.9	45	29	74	197.	0.6	17.9	522	118.25
20	967.1	20.3	53	27	80	17.	1.4	19.3	1,175	23.80
Total									13,404	

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**SUMMARY OF PERMEABILITY & SATURATION TESTS**

**TABLE III**

Company	Lease	Freidline "C"	Well No.		
Schermerhorn Oil Corp.			1		
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
947.3 - 956.6	8.9	126.2	1,123.33		
956.6 - 967.6	9.6	193.2	1,854.55		
947.3 - 967.6	18.5	161.0	2,977.88		
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
947.3 - 956.6	9.3	43.1	31.5	672	6,254
956.6 - 967.6	10.0	46.6	27.6	715	7,150
947.3 - 967.6	19.3	44.9	29.4	695	13,404

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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*	Effective Permeability Millidarcys**	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
1	947.5	15.7	44	536	9	110	35	51	426	73	1.21	20
2	948.2	22.9	37	657	12	213	25	74	444	250	11.35	10
3	949.2	21.4	37	614	12	199	25	67	415	70	1.41	20
4	950.1	18.2	39	551	14	198	25	73	353	42	0.766	20
5	951.1	20.8	44	710	18	291	26	68	419	125	3.35	10
6	952.1	21.2	49	806	26	428	23	69	378	38	0.868	20
7	953.1	19.0	42	620	14	207	28	63	413	7	0.265	30
8	954.1	21.6	45	754	18	302	27	63	452	29	0.520	20
9	955.1	20.5	36	573	11	175	25	69	398	40	0.973	30
10	956.1	18.7	53	769	25	363	28	64	406	72	1.19	20
11	957.1	18.8	49	714	24	350	25	70	364	400	16.67	10
12	959.1	14.2	60	661	22	242	38	58	419	38	0.884	30
13	960.1	19.5	43	651	16	242	27	68	409	308	6.90	20
14	961.1	21.2	43	708	8	132	35	58	576	292	15.40	10
15	962.1	20.2	43	659	10	157	33	61	502	92	2.30	20
16	963.1	18.7	41	595	4	58	37	59	537	214	12.35	10
17	964.1	24.7	42	806	15	288	27	70	518	213	4.86	20
18	965.1	23.1	40	717	14	251	26	71	466	205	6.37	20
19	966.1	24.9	45	869	4	77	41	55	792	228	5.25	10
20	967.1	20.8	50	806	0	0	50	34	806	0	Imp.	-

Company Schermerhorn Oil Corp. Lease Friedline "C" Well No. 1

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	Lease	Freidline "C"	Well No.
Schermerhorn Oil Corp.	947.3 - 956.6	956.6 - 966.2	947.3 - 966.2
	8.9	8.2	17.1
Depth Interval, Feet	20.3	20.2	20.2
Feet of Core Analyzed	42.8	45.4	44.0
Average Percent Porosity	16.5	13.8	15.2
Average Percent Original Oil Saturation	26.3	31.6	28.8
Average Percent Oil Recovery	66.6	63.8	65.2
Average Percent Residual Oil Saturation	92.9	95.4	94.0
Average Percent Residual Water Saturation	672.	707.	688.
Average Percent Total Residual Fluid Saturation	260.	212.	237.
Average Original Oil Content, Bbls./A. Ft.	412.	495.	451.
Average Oil Recovery, Bbls./A. Ft.	5,974.	5,798.	11,772.
Average Residual Oil Content, Bbls./A. Ft.	2,311.	1,741.	4,052.
Total Original Oil Content, Bbls./Acre	3,663.	4,057.	7,720.
Total Oil Recovery, Bbls./Acre	2.2	7.6	4.8
Total Residual Oil Content, Bbls./Acre	20.1	17.6	18.9
Average Effective Permeability, Millidarcys			
Average Initial Fluid Production Pressure, p.s.i.			

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