

OILFIELD RESEARCH LABORATORIES

• REGISTERED ENGINEERS •

700 NORTH MISSION
OKMULGEE, OKLAHOMA
PHONE: 4444

Chanute, Kansas

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

May 18, 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 Pavliceck Lease, Well No. W-19, Allen County, Kansas, and submitted to our laboratory on May 14, 1962.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman
Benjamin R. Pearman *B.R.*

BRP:rf

1 c. - Earlton, Kansas

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GENERAL INFORMATION & SUMMARY

Company Schermerhorn Oil Corp. Lease Pavlicek Well No. W-19

Location W $\frac{1}{2}$ NE

Section 34 Twp. 25S Rge. 21E County Allen State Kansas

Name of Sand - - - - - Bartlesville

Top of Core - - - - - 627.0

Bottom of Core - - - - - 651.0

Top of Sand - - - - - (Analyzed) 635.9

Bottom of Sand - - - - - (Analyzed) 650.4

Total Feet of Permeable Sand - - - - - 11.2

Total Feet of Floodable Sand - - - - - 11.2

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

0 - 10	0.7	0.7
10 - 50	7.4	8.1
50 - 100	2.3	10.4
100 & above	0.8	11.2

Average Permeability Millidarcys - - - - - 42.4

Average Percent Porosity - - - - - 20.0

Average Percent Oil Saturation - - - - - 61.8

Average Percent Water Saturation - - - - - 27.8

Average Oil Content, Bbls./A. Ft. - - - - - 960.

Total Oil Content, Bbls./Acre - - - - - 10,742.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 34.9

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 542.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 6,074.

Total Calculated Oil Recovery, Bbls./Acre - - - - - 4,110.

Packer Setting, Feet - - - - -

Viscosity, Centipoises @ - - - - -

A. P. I. Gravity, degrees @ 60 °F - - - - -

Elevation, Feet - - - - -

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

FORMATION CORED

The detailed log of the formation cored is as follows:

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

627.0 - 632.2	- Grayish light brown, sandy shale.
632.2 - 633.0	- Light brown sandstone.
633.0 - 635.9	- Grayish light brown, sandy shale.
635.9 - 636.6	- Brown sandstone.
636.6 - 636.9	- Grayish light brown, sandy shale.
636.9 - 637.5	- Dark brown sandstone.
637.5 - 640.0	- Gray shale.
640.0 - 643.3	- Dark brown sandstone.
643.3 - 643.8	- Gray sandy shale.
643.8 - 650.4	- Dark brown sandstone.
650.4 - 650.5	- Sandy shale.
650.5 - 650.8	- Coal.
650.8 - 651.0	- Brown shaly sandstone.

Coring was started at a depth of 627.0 feet in sandy shale and completed at 651.0 feet in shaly sandstone. For the most part, the pay is made up of brown to 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 39.8 and 45.0 millidarcys respectively; the overall average being 42.4 (See Table III). By observing the data given on the coregraph, it is noticeable that the sand has a rather uniform permeability profile.

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The permeability of the sand varies from 8.6 to a maximum of 102. millidarcys.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a very good weighted average percent oil saturation, namely, 61.8. The weighted average percent oil saturation of the upper and lower sections is 55.4 and 67.8 respectively. The weighted average percent water saturation of the upper and lower sections is 27.2 and 28.4 respectively; the overall average being 27.8 (See Table III). This gives an overall weighted average total fluid saturation of 89.6 percent.

The weighted average oil content of the upper and lower sections is 853 and 1,059 barrels per acre foot respectively; the overall average being 960. The total oil content, as shown by this core, is 10,742 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 6,074 barrels of oil per acre was obtained from 11.2 feet of sand. The weighted average percent oil saturation was reduced from 61.7 to 26.8, or represents an average recovery of 34.9 percent. The weighted average effective permeability of the samples is 2.28 millidarcys, while the average initial fluid production pressure is 13.1 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 13 samples tested, all produced water and oil. This indicates that 100 percent of the sand represented by these samples is floodable pay sand. The tests also show that the sand has a good effective permeability to water.

CONCLUSION

Based on the results of the laboratory tests, it appears that an efficient water-flood in the vicinity of this well should recover approx-

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imately 4,110 barrels of oil per acre. This is an average recovery of 367 barrels per acre foot from 11.2 feet of floodable pay sand analyzed in this core.

The above recovery values were calculated using the following data and assumptions:

Original formation volume factor	1.06
Present formation volume factor	1.02
Reservoir water saturation, percent	20.0
Primary recovery, estimated, percent	6.0
Present oil saturation, percent	70.9
Average porosity, percent	19.9
Oil saturation after flooding, percent	26.8
Performance factor, percent	55.0
Net floodable pay sand, feet	11.2

This core shows a pay sand section having a good oil saturation, a low water saturation and good effective permeability to water.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Schermerhorn Oil Corp. Lease Pavlicek Well No. W-19

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	636.1	18.5	49	28	77	8.6	0.7	0.7	492	6.02
2	637.1	19.6	45	28	73	49.	0.6	1.3	410	29.40
3	640.1	21.1	55	25	80	67.	0.6	1.9	540	40.20
4	641.1	18.7	53	32	85	19.	1.0	2.9	768	19.00
5	642.1	21.0	56	26	82	39.	1.0	3.9	911	39.00
6	643.1	19.7	61	20	81	58.	0.7	4.6	652	40.60
7	644.1	20.2	66	29	95	50	0.8	5.4	828	40.00
8	645.1	17.7	62	34	96	34.	1.0	6.4	851	34.00
9	646.1	20.5	73	24	97	37.	1.0	7.4	1,161	37.00
10	647.1	19.2	66	30	96	19.	1.0	8.4	982	19.00
11	648.1	21.3	72	24	96	67.	1.0	9.4	1,189	67.00
12	649.1	20.8	70	26	96	22.	1.0	10.4	1,129	22.00
13	650.1	21.2	63	33	96	102.	0.8	11.2	829	81.60
Total							-----		10,742	

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Schermerhorn Oil Corp.	Lease	Pavlicek	Well No.	W-19
	Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.	
	635.9 - 644.6	5.4	39.8	214.22	
	644.6 - 650.4	5.8	45.0	260.60	
	635.9 - 650.4	11.2	42.4	474.82	

	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
	635.9 - 644.6	5.4	19.9	55.4	27.2	853	4,601
	644.6 - 650.4	5.8	20.1	67.8	28.4	1,059	6,141
	635.9 - 650.4	11.2	20.0	61.8	27.8	960	10,742

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company			Schermmerhron Oil Corp.			Lease			Pavliceck			Well No.			W-19		
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.	%	Bbls./A. Ft.	%				Bbls./A. Ft.				
1	636.1	18.1	49	688	21	295	28	63	393	5	0.270	30					
2	637.1	19.5	45	681	14	212	31	64	469	132	3.90	10					
3	640.1	20.9	55	891	31	502	24	69	389	149	3.74	10					
4	641.1	18.9	53	776	28	410	25	68	366	38	0.900	10					
5	642.1	21.0	56	911	29	471	27	70	440	243	6.24	10					
6	643.1	20.0	61	946	38	589	23	74	357	141	3.65	10					
7	644.1	20.0	66	1023	39	605	27	70	418	81	1.83	10					
8	645.1	17.9	62	860	36	500	26	72	360	16	0.340	20					
9	646.1	20.4	73	1154	43	680	30	68	474	99	2.16	10					
10	647.1	19.2	66	982	42	625	24	71	357	50	0.795	10					
11	648.1	21.0	72	1172	37	602	35	64	570	92	1.80	10					
12	649.1	21.2	70	1151	44	724	26	70	427	72	2.16	10					
13	650.1	20.9	63	1020	41	664	22	77	356	54	2.65	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	Pavlicek	Well No.	W-19
Depth Interval, Feet	639.9 - 644.6	644.6 - 650.4	639.9 - 650.4		
Feet of Core Analyzed	5.4	5.8	11.2		
Average Percent Porosity	19.8	20.1	19.9		
Average Percent Original Oil Saturation	55.4	67.9	61.7		
Average Percent Oil Recovery	29.0	40.5	34.9		
Average Percent Residual Oil Saturation	26.4	27.4	26.8		
Average Percent Residual Water Saturation	68.4	70.0	69.4		
Average Percent Total Residual Fluid Saturation	94.8	97.4	96.2		
Average Original Oil Content, Bbls./A. Ft.	851.	1,057.	957.		
Average Oil Recovery, Bbls./A. Ft.	446.	631.	542.		
Average Residual Oil Content, Bbls./A. Ft.	405.	426.	415.		
Total Original Oil Content, Bbls./Acre	4,593.	6,135.	10,728.		
Total Oil Recovery, Bbls./Acre	2,412.	3,662.	6,074.		
Total Residual Oil Content, Bbls./Acre	2,181.	2,473.	4,654.		
Average Effective Permeability, Millidarcys	2.99	1.62	2.28		
Average Initial Fluid Production Pressure, p.s.i.	12.9	13.4	13.1		

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