OILFIELD RESEARCH LABORATORIES

Chanute, Kansas

May 4, 1960

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

Gentlemen:

Enclosed herewith is the report of the analysis of the 3" Rotary core taken from the Pavlcak Lease, Well No. W-6, Allen County, Kansas, and submitted to our laboratory on April 27, 1960.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Carl L. McElrea

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CLM:cs

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Route 1
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Well 5
L - 1
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Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Schermerhorn Oil Corporation, Lease Pavilcek, Well No. W-6

Location W½, NE¼

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

Name of Sand	Bartlesville
Top of Core	626.0
Bottom of Core	686.0
Top of Pay Sand	644.4
Bottom of Pay Sand	666.5
Total Feet of Permeable Sand (Analyzed)	17.8
Total Feet of Floodable Sand (Analyzed)	14.6

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 10	5.2	5.2
10 - 20	3.6	8.8
20 - 40	4.2	13.0
40 - 60	2.8	15.8
60 & above	2.0	17.8

Average Permeability Millidarcys	28.3
Average Percent Porosity	19.9
Average Percent Oil Saturation	51.6
Average Percent Water Saturation	36.1
Average Oil Content, Bbls./A. Ft.	794.
Total Oil Content, Bbls./Acre	14,053.
Average Percent Oil Recovery by Laboratory Flooding Tests	22.0
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	348.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	5,082.
Total Calculated Oil Recovery, Bbls./Acre	2,730.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

Fresh water was used as the circulating fluid during the coring of the sand. This core was sampled and the samples were sealed in cans by a representative of Oilfield Research Laboratories.

The core extending from the top of the cored section to a depth of 649.5 feet was out of the hole 17 hours before samples were taken.

This well is located 52 feet from an old hole.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
626.0 - 635.6	Grayish light brown shaley sandstone.
635.6 - 640.2	Alternate layers of sandstone and shale.
640.2 - 641.0	Light brown shaley sandstone.
641.0 - 642.0	Alternate layers of sandstone and shale.
642.0 - 643.0	Light brown laminated shaley sandstone.
643.0 - 644.4	Alternate layers of sandstone and shale.
644.4 - 649.5	Brown sandstone containing a vertical fracture.
649.5 - 657.0	Loss.
657.0 - 666.5	Brown slightly laminated shaley sandstone.
666.5 - 676.0	Dark carbonaceous shaley sandstone.
676.0 - 676.3	Dark carbonaceous conglomeratic sandstone.
676.3 - 682.5	Sandy shale.
682.5 - 683.0	Coal.
683.0 - 686.0	Sandy shale.

Coring was started at a depth of 626.0 feet in grayish light brown shaley sandstone and completed at 686.0 feet in sandy shale. This core shows a total of 35.8 feet of sandstone. For the most part, the pay is made up of brown slightly laminated shaley sandstone.

There was one loss of core, totaling 7.5 feet, part of which prob-

ably was sandstone.

The interval extending from the top of the core to a depth of 644.4 feet is gas sand. Effective permeability tests were run on the sand in this interval.

PERMEABILITY

For the sake of distribution, the core was divided into three sections. The weighted average permeability of the upper, middle and lower sections is 47.6, 26.8 and 1.7 millidarcys respectively; the overall average being 28.3 (See Table III). By observing the data given on the coregraph, it is noticeable that the sand has an irregular permeability profile. The permeability of the sand varies from 0.57 to a maximum of 115 millidarcys.

PERCENT SATURATION & OIL CONTENT

The oil sand in this core shows a very good weighted average percent oil saturation, namely, 51.6. The weighted average percent oil saturation of the upper, middle and lower sections is 61.6, 45.9 and 52.2 respectively. The weighted average percent water saturation of the upper, middle and lower sections is 17.0, 46.7 and 35.0 respectively; the overall average being 36.1 (See Table III). This gives an overall weighted average total fluid saturation of 87.7 percent.

The weighted average oil content of the upper, middle and lower sections is 981, 725 and 698 barrels per acre foot respectively; the overall average being 794. The total oil content, as shown by this core, is 14,C[illegible] barrels per acre (See Table III).

LABORATORY FLOODING TESTS

The oil sand in this core responded rather well to laboratory flooding tests, as a total recovery of 5,082 barrels of oil per acre was obtained from 14.6 feet of sand. The weighted average percent oil saturation was reduced from 51.4 to 29.4, or represents an average recovery of

22.0 percent. The weighted average effective permeability of the sand is 3.42 millidarcys, while the average initial fluid production pressure is 17.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 18 samples tested, 15 produced water and oil. This indicates that approximately 83 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.

CONCLUSION

It is evident from the enclosed data that an efficient water-flood will recover approximately 2,730 barrels of oil per acre from the area of which this core is representative. This represents an average recovery of 187 barrels of oil per acre foot from the 14.6 feet of floodable pay sand analyzed. The following factors and assumptions were used in calculating this recovery:

Original formation volume factor	1.06
Present formation volume factor	1.01
True water saturation, percent	36.0
Primary oil recovery, percent	8.0
Calculated present oil saturation, percent	53.0
Porosity, percent	20.3
Oil saturation at abandonment, percent	29.0
Performance factor, percent	50.0

The analysis results show 14.6 feet of floodable pay sand in the interval extending from the depth of 644.4 to 666.5 feet. The floodable sand has very good oil and rather high water saturations and a wide variation in effective permeability. Since this well is located 52 feet from an old hole, it is possible that the high water saturation is due to water invasion from the old well.

There was a 7.5 foot core loss, extending from the depth of 649.5 to 657.0 feet. Should the formation in this interval be sandstone having characteristics similar to that analyzed, the total recovery from the reservoir in the vicinity of this well will probably be greater than that given in this report.

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[illegible] OF PERMEABILITY TESTS

TABLE I

Company Schermerhorn Oil Corporation Lease Pavilcek Well No. W-6

Sample No.	Depth Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
1	643.9	48.	0.8	0.8	38.40
2	645.4	19.	0.5	1.3	9.50
3	645.9	20.	0.5	1.8	10.00
4	646.4	7.4	0.5	2.3	3.70
5	646.9	47.	0.5	2.8	23.50
6	647.4	68.	0.5	3.3	34.00
7	647.9	43.	0.5	3.8	21.50
8	648.4	85.	0.5	4.3	42.50
9	648.9	103.	0.5	4.8	51.50
10	649.4	28.	0.3	5.1	8.40
11	657.4	24.	0.6	5.7	14.40
12	657.9	12.	0.6	6.3	7.20
13	658.4	115.	0.5	6.8	57.50
14	658.9	9.4	0.5	7.3	4.70
15	659.4	48.	0.5	7.8	24.00
16	659.9	15.	0.5	8.3	7.50
17	660.4	18.	0.5	8.8	9.00
18	660.9	36.	0.5	9.3	18.00
19	661.4	10.	0.5	9.8	5.00
20	661.9	49.	0.5	10.3	24.50
21	662.4	30.	0.5	10.8	15.00
22	662.9	21.	0.5	11.3	10.50
23	663.4	28.	0.5	11.8	14.00
24	663.9	25.	0.5	12.3	12.50
25	664.4	18.	0.5	12.8	9.00
26	664.9	1.9	0.5	13.3	0.95
27	665.4	11.	0.5	13.8	5.50
28	665.9	8.0	0.5	14.3	4.00
29	666.4	38.	0.3	14.6	11.40
30	666.9	3.1	0.7	15.3	2.17
31	667.4	1.8	0.5	15.8	0.90
32	667.9	0.57	0.5	16.3	0.28
33	668.4	1.7	0.5	16.8	0.85
34	668.9	1.2	0.5	17.3	0.60
35	669.4	Imp.	0.5	17.8	0.00
36	669.9	1.1	0.5	18.3	0.55
37	670.4	Imp.	0.5	18.8	0.00

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[illegible]

Company Schermerhorn Oil Corporation Lease Pavilcek Well No. W-6

Sat. No.	Depth Feet	Effective Pressure Pounds	Percent Saturation			Oil Content Bbl.-Ac.-Ft.	Flood Data		Total Oil Recovery
			Oil	Water	Total		Bbl.	Cum. Bbl.	
8	645.1	21.1	53	18	71	867	1.2	1.2	1,040
9	646.1	18.2	79	12	91	1,116	1.0	2.2	1,116
10	647.1	21.4	66	19	85	1,098	1.0	3.2	1,098
11	648.1	22.0	59	16	75	1,008	1.0	4.2	1,008
12	649.1	20.5	52	20	72	827	0.9	5.1	745
13	657.1	20.4	46	54	100	728	0.6	5.7	437
14	658.1	22.0	45	44	89	768	1.0	6.7	768
15	659.1	21.4	41	52	93	681	1.0	7.7	681
16	660.1	19.6	35	55	90	532	1.0	8.7	532
17	661.1	20.9	56	30	85	567	1.0	9.7	567
18	662.1	19.9	48	48	96	741	1.0	10.7	741
19	663.1	18.9	44	49	93	645	1.0	11.7	645
20	664.1	19.9	37	55	92	571	1.0	12.7	571
21	665.1	19.6	60	35	95	912	1.0	13.7	912
22	666.1	20.7	71	27	98	1,140	0.9	14.6	1,026
23	667.1	18.3	51	35	86	724	1.0	15.7	797
24	668.1	16.7	50	44	94	648	1.0	16.7	648
25	669.1	16.6	56	26	82	721	1.0	17.7	721
							Total	- - - - -	-14,053

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Company Scherneerhorn Oil Corporation Lease Pavlicek Well No. 36-6

[redacted]	[redacted]	[redacted]	[redacted]
644.4 - 649.5	5.1	47.6	243.00
657.0 - 666.5	9.5	26.8	254.65
666.5 - 670.2	3.2	1.7	5.35
644.4 - 670.2	17.8	28.3	503.00

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
644.4 - 649.5	5.1	20.7	61.6	17.0	981	5,007
657.0 - 666.5	9.5	20.3	45.9	46.7	725	6,880
666.5 - 669.6	3.1	17.2	52.2	35.0	698	2,166
644.4 - 669.6	17.7	19.9	51.6	36.1	794	14,053

Oil and Gas Research Laboratories

Bureau of Mines

Schermerhorn Oil Corporation Lease Pavlosk Well No. V-6

Sample No.	Depth, Feet	Moisture Content, Per Cent	Original Oil Saturation		Oil Recovery		Residual Saturation			Volume of Water Recovered*		Soil Type Classification
			%	Bbls./A.F.	%	Bbls./A.F.	%	%	Bbls./A.F.			
1	626.5									143	7.60	2
2	628.5									79	4.18	2
3	630.5									204	13.18	3
4	632.5									5	0.300	3
5	634.5									18	0.888	3
6	640.7									15	0.794	3
7	642.7									4	0.300	3
8	645.1	20.4	53	838	22	346	31	88	488	25	0.966	4
9	646.1	18.8	72	1,152	49	715	30	61	437	12	0.465	4
10	647.1	21.3	68	1,091	44	727	22	67	364	84	7.84	2
11	648.1	21.9	59	1,002	37	628	22	73	374	93	3.14	2
12	649.1	21.1	52	851	30	491	22	64	360	158	10.35	2
13	657.1	20.0	46	713	16	248	30	68	465	24	0.694	3
14	658.1	21.9	45	764	14	238	31	62	526	129	7.11	3
15	659.1	20.9	41	669	7	114	34	65	551	121	6.39	3
16	660.1	19.6	35	532	3	46	32	66	486	117	3.15	3
17	661.1	21.4	35	582	6	100	29	65	482	111	6.34	3
18	662.1	19.5	46	726	24	363	24	65	363	60	1.48	3
19	663.1	18.3	44	624	7	99	37	61	525	17	0.500	3
20	664.1	19.4	37	596	14	210	23	66	346	51	1.50	3
21	665.1	19.7	60	917	21	321	39	60	596	18	0.600	3
22	666.1	20.4	71	1,124	36	570	35	62	554	35	0.800	3
23	666.7	18.2	51	720	0	0	51	42	720	0	Imp.	5+
24	668.1	16.7	49	635	0	0	49	47	635	0	Imp.	5+
25	669.1	17.1	55	729	0	0	55	26	729	0	Imp.	5+

Note: cc—cubic centimeter.

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

**—Determined by passing water through sample which will contain residual oil.

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company Schermerhorn Oil Corporation Lease Pavilcek Well No. W-6

Depth Interval, Feet	644.4 - 649.5	657.0 - 666.5	644.4 - 666.5
Feet of Core Analyzed	5.1	9.5	14.6
Average Percent Porosity	20.7	20.2	20.3
Average Percent Original Oil Saturation	61.5	46.0	51.4
Average Percent Oil Recovery	35.9	14.5	22.0
Average Percent Residual Oil Saturation	25.6	31.5	29.4
Average Percent Residual Water Saturation	66.8	63.9	64.9
Average Percent Total Residual Fluid Saturation	92.4	95.4	94.3
Average Original Oil Content, Bbls./A. Ft.	984.	718.	809.
Average Oil Recovery, Bbls./A. Ft.	574.	227.	348.
Average Residual Oil Content, Bbls./A. Ft.	410.	491.	461.
Total Original Oil Content, Bbls./Acre	5,016.	6,805.	11,821.
Total Oil Recovery, Bbls./Acre	2,929.	2,153.	5,082.
Total Residual Oil Content, Bbls./Acre	2,087.	4,652.	6,739.
Average Effective Permeability, Millidarcys	4.28	2.90	3.42
Average Initial Fluid Production Pressure, psi.	12.0	19.5	17.0

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