● CORE ANALYSIS ● WATER REPRESSURING ENGINEERING ● WATER ANALYSIS ● FLOODING WATER TREATMENT ● SURVEYING

OILFIELD RESEARCH LABORATORIES

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July 3, 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 "B" Lease, Well No. N-30, Wilson County, Kansas, and submitted to our laboratory on June 26, 1962.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman

Benjamin R. Pearman

BRP:rf

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Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Schermerhorn Oil Corp. Lease Freidline "B" Well No. N-30

Location 825' East of West line & 990' South of North line NW NE

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

Name of Sand	Bartlesville
Top of Core	978.0
Bottom of Core	995.0
Top of Sand	978.0
Bottom of Sand	988.5
Total Feet of Permeable Sand	10.5
Total Feet of Floodable Sand	6.6

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
1 - 2	0.5	0.5
15 - 50	7.0	7.5
50 - 80	3.0	10.5

Average Permeability Millidarcys	33.1
Average Percent Porosity	19.7
Average Percent Oil Saturation	38.4
Average Percent Water Saturation	37.4
Average Oil Content, Bbls./A. Ft.	605.
Total Oil Content, Bbls./Acre	6,350.
Average Percent Oil Recovery by Laboratory Flooding Tests	17.7
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	254.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	1,675.
Total Calculated Oil Recovery, Bbls./Acre	
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 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:

Depth Interval, Feet	Description
978.0 - 988.0	Brown, slightly laminated, slightly shaly sandstone.
988.0 - 988.5	Dark carbonaceous sandstone.
988.5 - 990.5	Dark carbonaceous, conglomeratic sandstone.
990.5 - 995.0	Shale.

Coring was started at a depth of 978.0 feet in sandstone and completed at 995.0 feet in shale. This core shows a total of 12.5 feet of sandstone. For the most part, the pay is made up of brown, slightly laminated, slightly shaly sandstone.

PERMEABILITY

The weighted average permeability of the cored section is 33.1 millidarcys (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 1.6 to a maximum of 77. millidarcys.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a good weighted average percent oil saturation, namely, 38.4. The weighted average percent water saturation is 37.4 (See Table III). This gives an overall weighted average total fluid saturation of 75.8 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 core is 605 barrels per acre

foot. The total oil content, as shown by this core, is 6,350 barrels per acre (See Table III).

LABORATORY FLOODING TESTS

The sand in this core responded rather well to laboratory flooding tests, as a total recovery of 1,675 barrels of oil per acre was obtained from 6.6 feet of sand. The weighted average percent oil saturation was reduced from 42.3 to 24.6, or represents an average recovery of 17.7 percent. The weighted average effective permeability of the samples is 0.569 millidarcys, while the average initial fluid production pressure is 28.6 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 11 samples tested, 7 produced water and oil. This indicates that approximately 64 percent of the sand represented by these samples is floodable pay sand. The tests also show that the sand has a rather uniform effective permeability to water.

CONCLUSION

A study of the laboratory data indicates that an efficient waterflood in the vicinity of this well should recover approximately 2,520 barrels of oil per acre. This represents an average recovery of 382 barrels per acre foot from the 6.6 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	27.0
Primary recovery, estimated, percent	0.0
Present oil saturation, percent	70.3
Average porosity, percent	20.0
Oil saturation after flooding, percent	24.6

Performance factor, percent	55.0
Net floodable pay sand, feet	6.6

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

The above recovery values were calculated assuming that satisfactory injection rates will be maintained throughout the flood life of the property.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Schermerhorn Oil Corp. Lease Freidline "B" Well No. N-30

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	17.9	43	38	81	597	15.	0.6	0.6	358	9.00
2	979.1	20.0	42	33	75	650	31.	1.0	1.6	650	31.00
3	980.1	18.6	34	44	78	490	25.	1.0	2.6	490	25.00
4	981.1	19.8	37	38	75	568	55.	1.0	3.6	568	55.00
5	982.1	21.9	42	34	76	714	77.	1.0	4.6	714	77.00
6	983.1	21.9	41	29	70	696	21.	1.0	5.6	696	21.00
7	984.1	19.6	45	34	79	684	17.	1.0	6.6	684	17.00
8	985.1	20.8	42	35	77	677	19.	1.0	7.6	677	19.00
9	986.1	16.8	36	46	82	469	51.	1.0	8.6	469	51.00
10	987.1	17.8	31	45	76	428	30.	1.4	10.0	599	42.00
11	988.1	22.1	52	27	79	891	1.6	0.5	10.5	445	0.80
								Total		6,350	

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Schermerhorn Oil Corp. Lease Freidline "B" Well No. N-30

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
978.0 - 988.5	10.5	33.1	347.80

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
978.0 - 988.5	10.5	19.7	38.4	37.4	605	6,350

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Schermerhorn Oil Corp. Lease Freidline "B" Well No. N-30

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	978.1	18.4	43	613	18	256	25	60	357	47	0.910	20
2	979.1	20.6	42	671	18	288	24	66	383	51	0.980	20
3	980.1	18.4	30	428	0	0	30	49	428	0	Imp.	-
4	981.1	20.0	37	574	16	248	21	67	326	12	0.320	30
5	982.1	22.1	42	719	19	325	23	65	394	40	0.697	20
6	983.1	21.5	41	684	16	267	25	64	417	12	0.312	40
7	984.1	20.0	45	698	17	264	28	55	434	35	0.660	20
8	985.1	20.6	40	639	0	0	40	36	639	0	Imp.	-
9	986.1	16.6	36	464	10	129	26	69	335	9	0.242	50
10	987.1	17.9	34	471	0	0	34	44	471	0	Imp.	-
11	988.1	22.0	55	938	0	0	55	25	938	0	Imp.	-

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 Schermerhorn Oil Corp. Lease Freidline "B" Well No. N-30

Depth Interval, Feet	978.0 - 988.5
Feet of Core Analyzed	6.6
Average Percent Porosity	20.0
Average Percent Original Oil Saturation	42.3
Average Percent Oil Recovery	17.7
Average Percent Residual Oil Saturation	24.6
Average Percent Residual Water Saturation	64.0
Average Percent Total Residual Fluid Saturation	88.6
Average Original Oil Content, Bbls./A. Ft.	634.
Average Oil Recovery, Bbls./A. Ft.	254.
Average Residual Oil Content, Bbls./A. Ft.	380.
Total Original Oil Content, Bbls./Acre	4,178.
Total Oil Recovery, Bbls./Acre	1,675.
Total Residual Oil Content, Bbls./Acre	2,503.
Average Effective Permeability, Millidarcys	0.569
Average Initial Fluid Production Pressure, p.s.i.	28.6

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