

OILFIELD RESEARCH LABORATORIES

- REGISTERED ENGINEERS -

700 NORTH MISSION
OKMULGEE, OKLAHOMA
PHONE: 4444

Chanute, Kansas

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

October 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 Dickerson Lease, Well No. W-1, Labette County, Kansas, and submitted to our laboratory on October 9, 1962.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Benjamin R. Pearman

BRP:rf

1 c. - Earlton, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Schermerhorn Oil Corp. Lease Dickerson Well No. W-1

Location NW SW NW

Section 8 Twp. 33-S Rge. 18-E County Labette State Kansas

Name of Sand - - - - - Bartlesville

Top of Core - - - - - 577.0

Bottom of Core - - - - - 610.0

Top of Sand - - - - - 577.5

Bottom of Sand - - - - - 606.8

Total Feet of Permeable Sand - - - - - 26.3

Total Feet of Floodable Sand - - - - - 21.0

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

0 - 10	3.0	3.0
10 - 50	7.0	10.0
50 - 100	4.3	14.3
100 - 200	8.0	22.3
200 - 400	3.0	25.3
400 & above	1.0	26.3

Average Permeability Millidarcys - - - - - 103.0

Average Percent Porosity - - - - - 18.5

Average Percent Oil Saturation - - - - - 32.8

Average Percent Water Saturation - - - - - 54.2

Average Oil Content, Bbls./A. Ft. - - - - - 474.

Total Oil Content, Bbls./Acre - - - - - 12,455.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 8.0

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 119.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 2,507.

Total Calculated Oil Recovery, Bbls./Acre - - - - - 3,380.

Packer Setting, Feet - - - - -

Viscosity, Centipoises @ - - - - -

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

Elevation, Feet - - - - -

-2-

Fresh water mud was used as the circulating fluid while taking this core. The core was sampled and the samples sealed in cans by a representative of the laboratory.

FORMATION CORED

The detailed log of the formation cored is as follows:

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

577.0 - 577.2 - Gray, laminated, shaly sandstone.

577.2 - 577.5 - Sandy shale.

577.5 - 583.5 - Light brown, slightly shaly sandstone.
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583.5 - 584.1 - Laminated sandstone and shale.
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584.1 - 584.5 - Sandy shale.

584.5 - 597.2 - Brown, slightly shaly sandstone.
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597.2 - 599.2 - Sandy shale.

599.2 - 606.8 - Brown, slightly calcareous sandstone.

606.8 - 607.1 - Coal.

607.1 - 610.0 - Shale.

Coring was started at a depth of 577.0 feet in shaly sandstone and completed at 610.0 feet in shale. This core shows a total of 26.3 feet of sandstone. For the most part, the pay is made up of brown, slightly shaly sandstone.

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 16.6, 114.2 and 183.4 millidarcys respectively; the overall average being 103.0 (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 3.8 to a maximum of 408. millidarcys.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a fairly good weighted average percent

-3-

oil saturation, namely, 32.8. The weighted average percent oil saturation of the upper, middle and lower sections is 30.4, 33.6 and 32.7 respectively. The weighted average percent water saturation of the upper, middle and lower sections is 53.1, 52.9 and 56.0 respectively; the overall average being 54.2 (See Table III). This gives an overall weighted average total fluid saturation of 87.0 percent.

The weighted average oil content of the upper, middle and lower sections is 420, 487 and 479 barrels per acre foot respectively; the overall average being 474. The total oil content, as shown by this core, is 12,455 barrels per acre (See Table III).

LABORATORY FLOODING TESTS

The sand in this core responded well to laboratory flooding tests, as a total recovery of 2,507 barrels of oil per acre was obtained from 21.0 feet of sand. The weighted average percent oil saturation was reduced from 34.2 to 26.2, or represents an average recovery of 8.0 percent. The weighted average effective permeability of the samples is 9.31 millidarcys while the average initial fluid production pressure is 16.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 25 samples tested, 24 produced water and 20 oil. This indicates that approximately 80 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

The results of the laboratory tests indicate that an efficient water-flood, in the vicinity of this well, should recover approximately 3,380 barrels of oil per acre. This is an average recovery of 161 barrels of oil per acre foot from the 21.0 feet of floodable pay sand analyzed in

-4-

this core.

These recovery values were calculated using the following data and assumptions:

Original formation volume factor	1.04
Present formation volume factor	1.02
Reservoir water saturation, percent	40.0
Primary recovery, estimated, percent	10.0
Present oil saturation, percent	48.8
Average porosity, percent	18.7
Oil saturation after flooding, percent	26.2
Performance factor, percent	50.0
Net floodable pay sand, feet	21.0

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

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

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	Total			Ft.	Cum. Ft.		
1	578.1	15.8	21	64	85	257	8.0	1.0	1.0	257	8.00
2	579.1	17.8	28	54	82	386	15.	1.0	2.0	386	15.00
3	580.1	18.7	38	45	83	551	53.	1.0	3.0	551	53.00
4	581.1	15.8	37	56	93	454	3.8	1.0	4.0	454	3.80
5	582.1	17.8	27	54	81	372	7.7	1.0	5.0	372	7.70
6	583.1	20.8	31	46	77	500	12.	1.0	6.0	500	12.00
7	585.1	18.8	36	52	88	524	20.	1.0	7.0	524	20.00
8	586.1	19.7	34	48	82	519	50.	1.0	8.0	519	50.00
9	587.1	21.0	44	42	86	716	183.	1.0	9.0	716	183.00
10	588.1	20.6	36	52	88	575	114.	1.0	10.0	575	114.00
11	589.1	19.8	37	59	96	568	200.	1.0	11.0	568	200.00
12	590.1	19.7	36	55	91	550	208.	1.0	12.0	550	208.00
13	591.1	20.0	34	49	83	527	77.	1.0	13.0	527	77.00
14	592.1	17.4	29	64	93	391	194.	1.0	14.0	391	194.00
15	593.1	17.7	31	56	89	425	63.	1.0	15.0	425	63.00
16	594.1	14.8	26	51	77	298	15.	1.0	16.0	298	15.00
17	595.1	15.3	32	50	82	379	45.	1.0	17.0	379	45.00
18	596.1	17.9	35	62	97	485	180.	1.7	18.7	825	306.00
19	600.1	17.7	39	58	97	535	122.	1.3	20.0	695	158.60
20	601.1	18.7	32	64	96	464	408.	1.0	21.0	464	408.00
21	602.1	19.8	43	54	97	660	310.	1.0	22.0	660	310.00
22	603.1	18.3	35	61	86	496	265.	1.0	23.0	496	265.00
23	604.1	20.5	26	58	84	414	135.	1.0	24.0	414	135.00
24	605.1	18.9	29	47	76	425	33.	1.0	25.0	428	33.00
25	606.1	19.1	25	51	76	370	64.	1.3	26.3	481	83.20
Total								-----		12,455	

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Schermerhorn Oil Corp.	Lease	Dickerson	Well No.	W-1
Depth Interval, Feet	Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.	Total Oil Content Bbls./Acre
577.5 - 583.5	577.5 - 583.5	6.0	16.6	99.50	2,520
584.5 - 597.2	584.5 - 597.2	12.7	114.2	1475.00	6,297
599.2 - 606.8	599.2 - 606.8	7.6	183.4	1392.80	3,638
577.5 - 606.8	577.5 - 606.8	26.3	103.0	2967.30	12,455
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.
577.5 - 583.5	6.0	17.8	30.4	53.1	420
584.5 - 597.2	12.7	18.2	33.6	52.9	487
599.2 - 606.8	7.6	19.0	32.7	56.0	479
577.5 - 606.8	26.3	18.5	32.8	54.2	474

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company			Schermmerhorn Oil Corp.			Lease			Dickerson			Well No. W-1		
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.	% Oil	% Water				Bbls./A. Ft.		
1	578.1	16.0	23	285	0	0	23	70	14	0.521	30			
2	579.1	17.6	28	382	4	55	24	72	19	0.550	20			
3	580.1	19.0	38	560	13	191	25	69	155	4.16	20			
4	581.1	15.5	35	421	0	0	35	60	0	Imp.	-			
5	582.1	17.6	27	368	3	41	24	74	16	0.588	30			
6	583.1	20.4	31	490	8	127	23	75	45	1.47	30			
7	585.1	18.5	36	516	11	158	25	68	14	0.446	30			
8	586.1	20.0	34	527	17	47	31	68	306	10.61	10			
9	587.1	21.2	44	724	17	280	27	71	294	11.35	10			
10	588.1	21.0	36	586	12	195	24	73	398	17.63	10			
11	589.1	20.0	37	574	12	186	25	66	321	9.61	10			
12	590.1	20.0	36	559	11	171	25	66	229	5.69	10			
13	591.1	19.7	34	519	9	137	25	67	183	5.50	20			
14	592.1	17.8	29	400	4	55	25	71	271	10.80	10			
15	593.1	17.8	31	428	2	28	29	68	257	7.34	10			
16	594.1	14.7	26	296	2	23	24	69	15	0.573	30			
17	595.1	15.8	32	392	5	61	27	71	164	5.09	20			
18	596.1	18.2	35	494	8	113	27	70	261	25.90	10			
19	600.1	17.6	39	532	11	150	28	70	166	10.22	10			
20	601.1	18.9	32	469	6	88	26	69	203	22.41	10			
21	602.1	20.0	43	667	16	248	27	71	189	11.81	10			
22	603.1	18.4	35	499	2	29	33	63	211	12.83	10			
23	604.1	20.4	25	395	0	0	25	72	270	7.74	10			
24	605.1	19.0	27	398	0	0	27	70	73	1.96	20			
25	606.1	19.4	24	361	0	0	24	71	247	11.11	10			

Well No. W-1

Dickerson

Lease

Schermerhorn Oil Corp.

Notes: cc—cubic centimeter.

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

^{cc}—Determined by passing water through sample which still contains residual oil.

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Schmerhorn Oil Corp.		Lease	Dickerson	Well No.	W-1
Depth Interval, Feet	577.5 - 583.5	584.5 - 597.2	597.2 - 606.8	577.5 - 606.8		
Feet of Core Analyzed	4.0	12.7	4.3	21.0		
Average Percent Porosity	18.7	18.7	18.7	18.7		
Average Percent Original Oil Saturation	31.0	34.2	37.4	34.2		
Average Percent Oil Recovery	7.0	8.0	8.9	8.0		
Average Percent Residual Oil Saturation	24.0	26.2	28.5	26.2		
Average Percent Residual Water Saturation	72.5	69.6	68.4	69.9		
Average Percent Total Residual Fluid Saturation	96.5	95.8	96.9	96.1		
Average Original Oil Content, Bbls./A. Ft.	450.	501.	541.	499.		
Average Oil Recovery, Bbls./A. Ft.	104.	121.	130.	119.		
Average Residual Oil Content, Bbls./A. Ft.	346.	380.	411.	380.		
Total Original Oil Content, Bbls./Acre	1,800.	6,361.	2,326.	10,487.		
Total Oil Recovery, Bbls./Acre	414.	1,533.	560.	2,507.		
Total Residual Oil Content, Bbls./Acre	1,386.	4,828.	1,766.	7,980.		
Average Effective Permeability, Millidarcys	1.69	10.11	14.03	9.31		
Average Initial Fluid Production Pressure, p.s.i.	25.0	15.0	10.0	16.0		

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