OILFIELD RESEARCH LABORATORIES
P. O. BOX 647 - CHANUTE, KANSAS 66720 - PHONE (316) 431-2650

January 6, 1984

Jackson Brothers
514 North Main
Eureka, Kansas 67045

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Barker Lease, Well No. 4, located in Greenwood County, Kansas and submitted to our laboratory on December 28, 1983.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman

BRP/ph

5 c to Eureka, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Jackson Brothers Lease Barker Well No. 4

Location S½, SW¼, SE¼

Section 2 Twp. 25S Rge. 8E County Greenwood State Kansas

Elevation, Feet	
Name of Sand	Bartlesville
Top of Core	2285.0
Bottom of Core	2305.0
Top of Sand (Tested)	2285.5
Bottom of Sand	2299.8
Total Feet of Permeable Sand	14.3
Total Feet of Floodable Sand	7.0

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
2 - 4	4.5	4.5
4 - 7	5.0	9.5
9 - 10	3.0	12.5
13 - 19	1.8	14.3

Average Permeability Millidarcys	6.9
Average Percent Porosity	16.3
Average Percent Oil Saturation	31.3
Average Percent Water Saturation	56.5
Average Oil Content, Bbls./A. Ft.	393.
Total Oil Content, Bbls./Acre	5,613.
Average Percent Oil Recovery by Laboratory Flooding Tests	3.7
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	48.
Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	337.
lated Oil Recovery, Bbls./Acre	See "Calculated Recovery" Section

The core was sampled by a representative of Oilfield Research Laboratories.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
2285.0 - 2285.5	Grayish light brown shaly sandstone.
2285.5 - 2295.0	Light brown slightly shaly sandstone.
2295.0 - 2299.8	Light brown fine grained sandstone.
2299.8 - 2300.4	Dark gray shale.
2300.4 - 2303.0	Gray shale.
2303.0 - 2305.0	Dark gray shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 337 barrels of oil per acre was obtained from 7.2 feet of sand. The weighted average percent oil saturation was reduced from 31.3 to 27.6, or represents an average recovery of 3.7 percent. The weighted average effective permeability of the samples is 0.59 millidarcys, while the average initial fluid production pressure is 39.3 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 15 samples tested, 7 produced water and oil, and 2 produced water only. This indicates that approximately 47 percent of the sand represented by these samples is floodable pay sand.

CALCULATED RECOVERY

It would appear from a study of the core data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 1,120 barrels of oil per acre. This is an average recovery of 161 barrels per acre foot from 7.0 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.20
Reservoir water saturation, percent, estimated	40.0
Average porosity, percent	16.8
Oil saturation after flooding, percent	27.6
Performance factor, percent, estimated	55.0
Net floodable sand, feet	7.0

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Jackson Brothers Lease Barker Well No. 4

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	2285.6	15.0	30	54	84	349	2.4	0.5	0.5	175	1.20
2	2286.5	15.0	33	56	89	384	3.5	1.0	1.5	384	3.50
3	2287.5	15.7	43	42	85	524	4.5	1.0	2.5	524	4.50
4	2288.5	15.7	37	51	88	451	3.7	1.0	3.5	451	3.70
5	2289.5	15.7	37	51	88	451	5.2	1.0	4.5	451	5.20
6	2290.5	14.8	28	57	85	322	5.2	1.0	5.5	322	5.20
7	2291.4	15.7	34	57	91	414	6.0	1.0	6.5	414	6.00
8	2292.5	15.1	34	57	91	398	3.0	1.0	7.5	398	3.00
9	2293.5	15.7	32	54	86	390	3.9	1.0	8.5	390	3.90
10	2294.6	17.4	23	64	87	311	5.8	1.0	9.5	311	5.80
11	2295.5	17.4	25	62	87	338	13.	1.0	10.5	338	13.00
12	2296.4	16.3	28	63	91	354	9.6	1.0	11.5	354	9.60
13	2297.5	16.7	30	58	88	389	9.4	1.0	12.5	389	9.40
14	2298.5	18.3	33	57	90	469	9.9	1.0	13.5	469	9.90
15	2299.4	20.6	19	65	84	304	18.	0.8	14.3	243	14.40

SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Jackson Brothers Lease Barker Well No. 4

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
2285.5 - 2299.8	14.3	6.9	98.30

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
2285.5 - 2299.8	14.3	16.3	31.3	56.5	393	5,613

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Jackson Brothers Lease Barker Well No. 4

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	2285.6	15.5	29	349	0	0	29	55	349	0	Imp.	-
2	2286.5	15.2	33	389	0	0	33	56	389	0	Imp.	-
3	2287.5	16.1	42	525	0	0	42	43	525	0	Imp.	-
4	2288.5	15.7	37	451	0	0	37	51	451	0	Imp.	-
5	2289.5	16.2	37	465	7	88	30	59	377	8	0.15	50
6	2290.5	14.4	29	324	0	0	29	56	324	0	Imp.	-
7	2291.4	16.0	34	422	3	37	31	61	385	12	0.15	45
8	2292.5	15.4	34	406	0	0	34	58	406	0	Imp.	-
9	2293.5	16.2	32	402	4	50	28	61	352	12	0.22	45
10	2294.6	17.9	23	319	0	0	23	65	319	20	0.50	40
11	2295.5	17.6	25	341	2	27	23	75	314	40	0.60	35
12	2296.4	16.7	28	363	4	52	24	74	311	36	0.52	35
13	2297.5	17.1	30	398	2	27	28	70	371	40	0.97	35
14	2298.5	18.0	33	461	4	56	29	65	405	82	1.50	30
15	2299.4	21.1	19	311	0	0	19	67	311	22	0.37	40

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 Jackson Brothers Lease Barker Well No. 4

Depth Interval, Feet	2285.5 - 2299.8
Feet of Core Analyzed	7.0
Average Percent Porosity	16.8
Average Percent Original Oil Saturation	31.3
Average Percent Oil Recovery	3.7
Average Percent Residual Oil Saturation	27.6
Average Percent Residual Water Saturation	66.4
Average Percent Total Residual Fluid Saturation	94.0
Average Original Oil Content, Bbls./A. Ft.	407.
Average Oil Recovery, Bbls./A. Ft.	48.
Average Residual Oil Content, Bbls./A. Ft.	359.
Total Original Oil Content, Bbls./Acre	2,852.
Total Oil Recovery, Bbls./Acre	337.
Total Residual Oil Content, Bbls./Acre	2,515.
Average Effective Permeability, Millidarcys	0.59
Average Initial Fluid Production Pressure, p.s.i.	39.3

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

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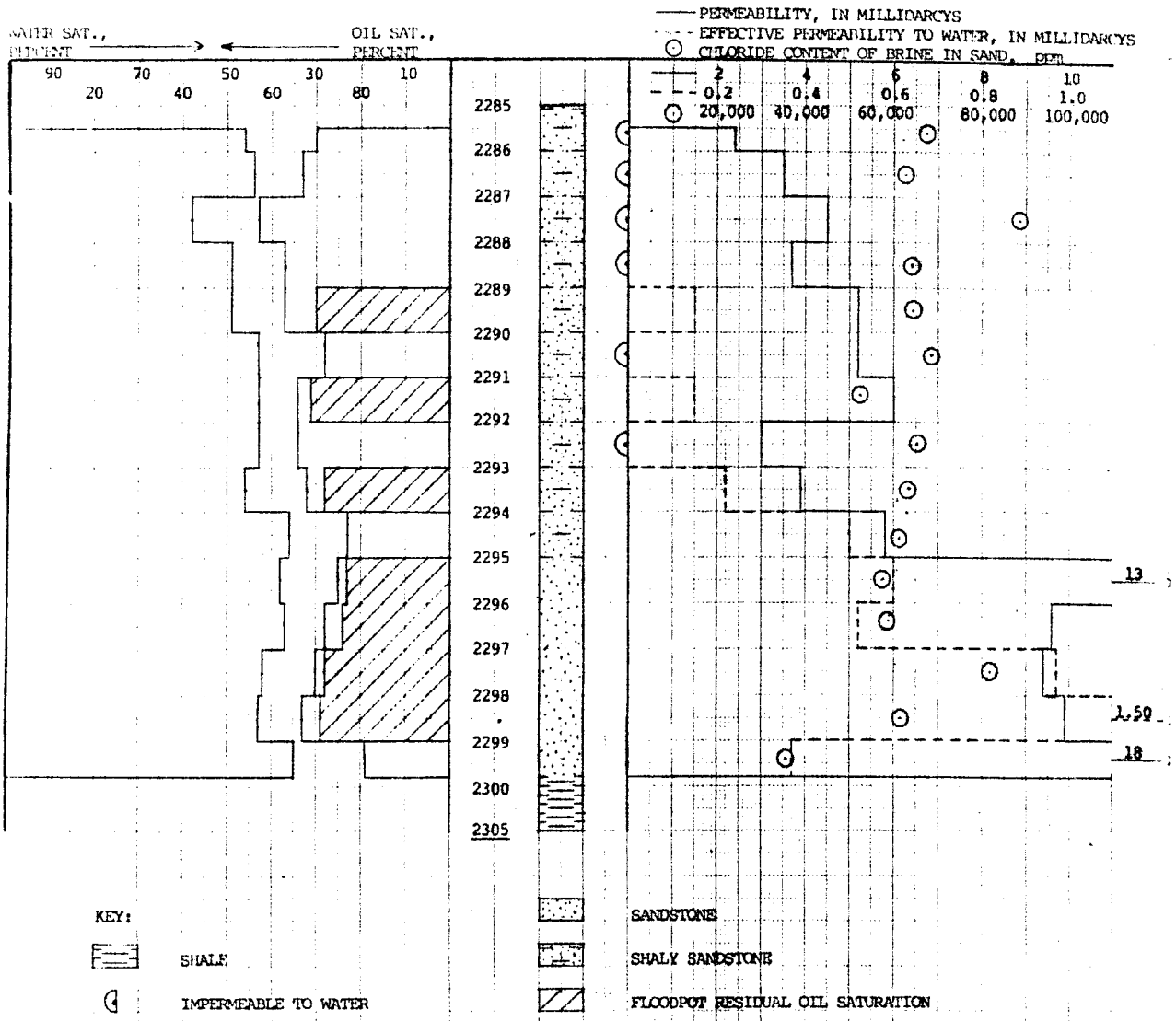
RESULTS OF WATER DIFFERENTIATION TESTS

TABLE VI

Company Jackson Brothers Lease Barker Well No. 4

Sample No.	Depth, Feet	Chloride Content of Brine in Sand ppm	Percent Water Saturation		
			Connate	Drilling & Foreign	Total
1	2285.6	67,042.			
2	2286.5	62,643.			
3	2287.5	88,733.			
4	2288.5	64,006.			
5	2289.5	64,184.			
6	2290.5	68,744.			
7	2291.4	52,220.			
8	2292.5	65,174.			
9	2293.5	63,517.			
10	2294.6	61,018.			
11	2295.5	57,654.			
12	2296.4	58.976.			
13	2297.5	81,892.			
14	2298.5	61,568.			
15	2299.4	35,976.			

Note: ppm — parts per million



KEY:

SHALE

IMPERMEABLE TO WATER

SANDSTONE

SHALY SANDSTONE

FLOODPOT RESIDUAL OIL SATURATION

JACKSON BROTHERS

BARKER LEASE — WELL NO. 8

GREENWOOD COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY BBLS. / ACRE
2285.5 - 2299.8	14.3	16.3	31.3	56.5	6.9	1120 (PRIMARY AND WATERFLOODING)

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CHANUTE, KANSAS
JANUARY, 1966 RAL