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OILFIELD RESEARCH LABORATORIES

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

October 17, 1983

Jackson Brothers
514 North Main
Eureka, Kansas 67045

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Nixon Lease, Well No. 8, located in Greenwood County, Kansas and submitted to our laboratory on October 10, 1983.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Sanford A. Michel

SAM/rmc

5 c to Eureka, Kansas

- REGISTERED ENGINEERS -

CORE ANALYSIS - WATER ANALYSIS - REPRESSURING ENGINEERING - SURVEYING & MAPPING - PROPERTY EVALUATION & OPERATION

Oilfield Research Laboratories
GENERAL INFORMATION & SUMMARY

Company Jackson Brothers Lease Nixon Well No. 8
 Location 792' EWL & 330' SNL, SE $\frac{1}{4}$
 Section 34 Twp. 24S Rge. 9E County Greenwood State Kansas

Elevation, Feet

Name of Sand

Bartlesville

Top of Core

2165.0

Bottom of Core

2193.4

Top of Sand

2165.0

Bottom of Sand

2187.5

Total Feet of Permeable Sand

17.3

Total Feet of Floodable Sand

8.1

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 1	4.3	4.3
1 - 2	2.6	6.9
2 - 4	3.3	10.2
6 - 9	1.6	11.8
22 - 29	3.0	14.8
35 - 40	2.5	17.3

Average Permeability Millidarcys

11.0

Average Percent Porosity

15.2

Average Percent Oil Saturation

23.5

Average Percent Water Saturation

60.6

Average Oil Content, Bbls./A. Ft.

287.

Total Oil Content, Bbls./Acre

5,116.

Average Percent Oil Recovery by Laboratory Flooding Tests

8.9

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

118.

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

952.

Total Calculated Oil Recovery, Bbls./Acre

See "Calculated Recovery"
Section

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The core was sampled and the samples sealed in plastic bags by a representative of the client. The core was reported to be from a virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
2165.0 - 2167.0	Grayish light brown very shaly sandstone.
2167.0 - 2167.5	Gray very shaly sandstone.
2167.5 - 2169.0	Gray shale.
2169.0 - 2169.3	Brown shaly sandstone.
2169.3 - 2169.5	Gray shale.
2169.5 - 2170.0	Brown shaly sandstone.
2170.0 - 2170.4	Gray very shaly sandstone.
2170.4 - 2172.0	Grayish light brown shaly sandstone.
2172.0 - 2172.4	Light brown very shaly sandstone.
2172.4 - 2172.8	Gray shale.
2172.8 - 2173.0	Grayish brown very shaly sandstone.
2173.0 - 2173.2	Gray shale.
2173.2 - 2173.6	Grayish brown very shaly sandstone.
2173.6 - 2174.5	Gray shale.
2174.5 - 2175.7	Brown slightly shaly sandstone.
2175.7 - 2177.0	Brown shaly sandstone with scattered gray shale and mica inclusions.
2177.0 - 2177.4	Brown slightly shaly sandstone.
2177.4 - 2177.9	Gray shale.
2177.9 - 2179.0	Light brown very shaly sandstone with scattered carbonaceous inclusions.
2179.0 - 2179.5	Gray shale.

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Depth Interval, Feet	Description
2179.5 - 2180.0	Light brown shaly sandstone.
2180.0 - 2181.0	Brown sandstone.
2181.0 - 2182.0	Brown shaly sandstone with scattered gray shale nodules and carbonaceous inclusions.
2182.0 - 2184.0	Brown sandstone.
2184.0 - 2185.0	Brown shaly sandstone.
2185.0 - 2187.5	Brown sandstone with scattered carbonaceous inclusions and scattered coal partings.
2187.5 - 2190.7	Gray shale.
2190.7 - 2191.7	Coal.
2191.7 - 2193.4	Gray shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 952 barrels of oil per acre was obtained from 8.1 feet of sand. The weighted average percent oil saturation was reduced from 29.3 to 20.4, or represents an average recovery of 8.9 percent. The weighted average effective permeability of the samples is 3.07 millidarcys, while the average initial fluid production pressure is 28.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 22 samples tested, 10 produced water and oil, and 1 produced water only. This indicates that approximately 45 percent of the sand represented by these samples is floodable pay sand.

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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 1,412 barrels of oil per acre. This is an average recovery of 174 barrels per acre foot from 8.1 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.18
Reservoir water saturation, percent, estimated	40.0
Average porosity, percent	16.4
Oil saturation after flooding, percent	20.4
Performance factor, percent, estimated	45.0
Net floodable sand, feet	8.1

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Jackson Brothers Lease Nixon Well No. 8

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	2165.3	13.1	17	67	84	173	0.35	1.0	1.0	173	0.35
2	2166.5	15.0	8	83	91	93	0.34	1.0	2.0	93	0.34
3	2167.3	10.9	2	89	91	17	Imp.	0.5	2.5	9	0.00
4	2169.8	14.8	34	46	80	390	2.4	0.5	3.0	195	1.20
5	2170.3	12.0	4	87	91	37	0.28	0.4	3.4	15	0.11
6	2171.3	15.2	24	57	81	283	1.3	1.6	5.0	453	2.08
7	2172.3	15.7	20	61	81	244	0.95	0.4	5.4	98	0.38
8	2173.5	10.3	10	88	98	80	0.48	0.4	5.8	32	0.19
9	2174.6	15.4	23	63	86	275	7.1	0.5	6.3	138	3.55
10	2175.5	16.5	27	45	72	346	8.9	0.7	7.0	242	6.23
11	2176.5	14.7	28	63	91	319	2.4	1.3	8.3	415	3.12
12	2177.3	16.4	25	60	85	318	6.0	0.4	8.7	127	2.40
13	2178.5	14.8	19	70	89	218	0.63	1.1	9.8	240	0.69
14	2179.6	14.4	24	63	87	268	2.5	0.5	10.3	134	1.25
15	2180.5	16.0	29	56	85	360	22.	1.0	11.3	360	22.00
16	2181.5	12.2	20	52	72	189	1.6	1.0	12.3	189	1.60
17	2182.5	18.4	29	55	84	414	28.	1.0	13.3	414	28.00
18	2183.5	18.3	38	42	80	540	39.	1.0	14.3	540	39.00
19	2184.5	15.3	17	64	81	202	3.1	1.0	15.3	202	3.10
20	2185.5	17.2	39	48	87	520	22.	1.0	16.3	520	22.00
21	2186.8	16.4	30	50	80	382	35.	1.0	17.3	382	35.00
22	2187.2	16.2	23	61	84	289	36.	0.5	17.8	145	18.00

Oilfield Research Laboratories

SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Jackson Brothers	Lease	Nixon	Well No.	8
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
2165.0 - 2173.6	5.3	0.88	4.65		
2174.5 - 2187.5	12.0	15.5	185.94		
2165.0 - 2187.5	17.3	11.0	190.59		

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
2165.0 - 2173.6	5.8	13.9	16.4	69.5	184	1,068
2174.5 - 2187.5	12.0	15.9	26.9	56.2	337	4,048
2165.0 - 2187.5	17.8	15.2	23.5	60.6	287	5,116

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company			Jackson Brothers			Lease			Nixon			Well No.		8	
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	2165.3	13.6	16	169	0	0	16	68	169	0	Imp.	-			
2	2166.5	15.3	8	95	0	0	8	83	95	0	Imp.	-			
3	2167.3	11.1	2	17	0	0	2	89	17	0	Imp.	-			
4	2169.8	15.3	33	392	0	0	33	47	392	0	Imp.	-			
5	2170.3	12.5	4	39	0	0	4	87	39	0	Imp.	-			
6	2171.3	14.7	25	285	0	0	25	56	285	0	Imp.	-			
7	2172.3	15.8	19	233	0	0	19	67	233	0	Imp.	-			
8	2173.5	10.6	10	82	0	0	10	88	82	0	Imp.	-			
9	2174.6	15.9	22	271	0	0	22	64	271	0	Imp.	-			
10	2175.5	16.0	27	335	11	137	16	71	198	68	1.12	25			
11	2176.5	15.2	27	318	0	0	27	64	318	0	Imp.	50			
12	2177.3	15.9	25	308	6	74	19	67	234	26	0.45	35			
13	2178.5	14.6	19	215	0	0	19	70	215	0	Imp.	-			
14	2179.6	14.8	24	276	6	69	18	76	207	4	0.15	45			
15	2180.5	16.5	29	371	11	141	18	70	230	42	0.67	30			
16	2181.5	11.7	20	182	3	27	17	61	155	10	0.22	35			
17	2182.5	18.8	29	423	6	88	23	74	335	204	3.67	25			
18	2183.5	18.6	38	548	16	231	22	71	317	394	9.00	20			
19	2184.5	15.8	17	208	0	0	17	73	208	20	0.30	40			
20	2185.5	17.5	39	529	16	217	23	70	312	84	1.27	25			
21	2186.8	16.0	30	372	6	74	24	66	298	528	7.57	20			
22	2187.2	16.7	23	298	2	26	21	70	272	112	2.85	20			

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.

Company Jackson Brothers

Lease Nixon

Well No. 8

Oilfield Research Laboratories

SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Jackson Brothers	Lease	Nixon	Well No.	8
Depth Interval, Feet	2174.5 - 2187.5				
Feet of Core Analyzed	8.1				
Average Percent Porosity	16.4				
Average Percent Original Oil Saturation	29.3				
Average Percent Oil Recovery	8.9				
Average Percent Residual Oil Saturation	20.4				
Average Percent Residual Water Saturation	69.3				
Average Percent Total Residual Fluid Saturation	89.7				
Average Original Oil Content, Ebbl./A. Ft.	380.				
Average Oil Recovery, Ebbl./A. Ft.	118.				
Average Residual Oil Content, Ebbl./A. Ft.	262.				
Total Original Oil Content, Ebbl./Acre	3,072.				
Total Oil Recovery, Ebbl./Acre	952.				
Total Residual Oil Content, Ebbl./Acre	2,120.				
Average Effective Permeability, MILLIdarcys	3.07				
Average Initial Fluid Production Pressure, p.s.i.	28.0				

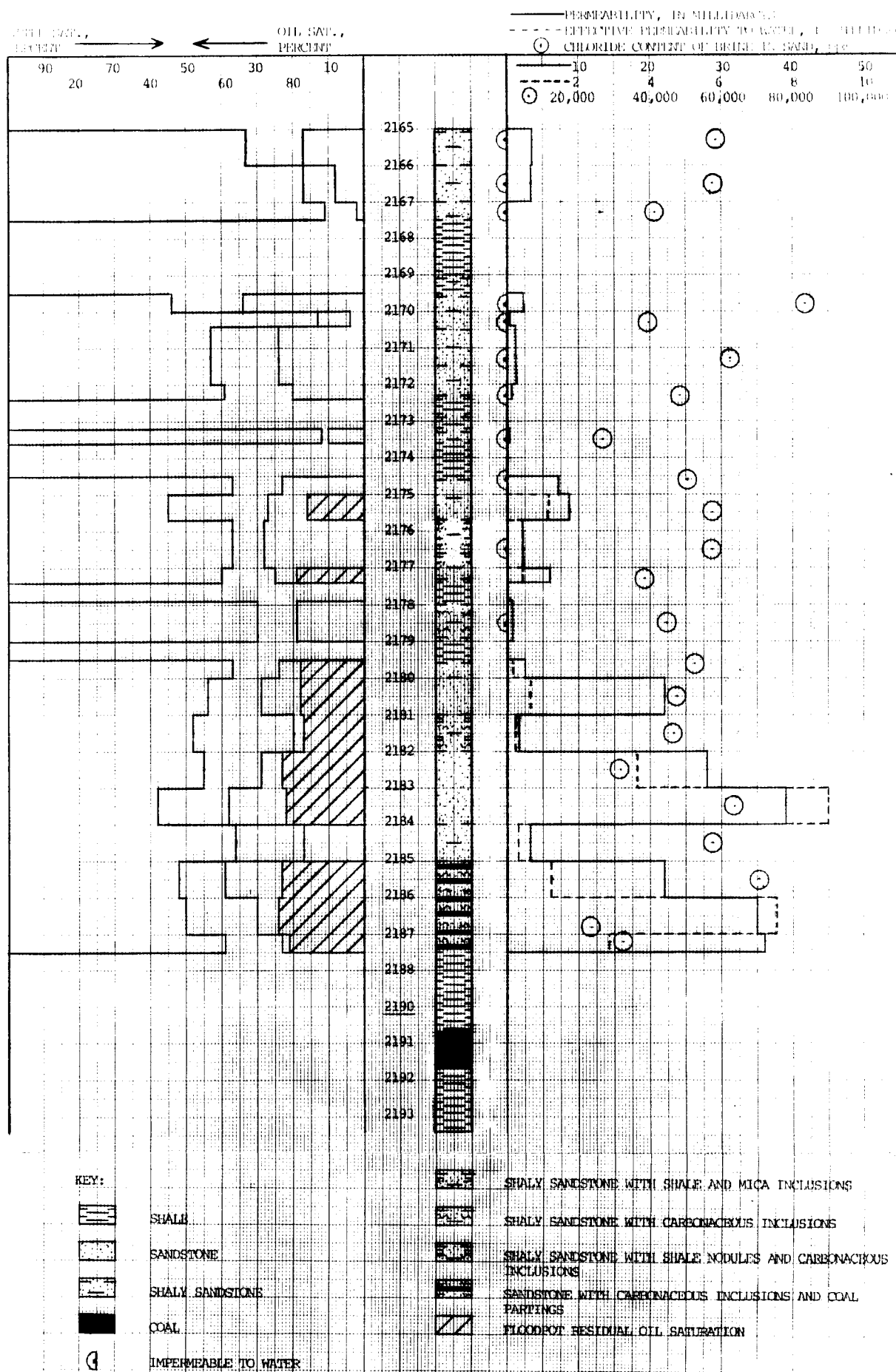
NOTE: Only those samples which recovered oil were used in calculating the above averages.

Oilfield Research Laboratories
RESULTS OF WATER DIFFERENTIATION TESTS
TABLE VI

Company Jackson Brothers Lease Nixon Well No. 8

Sample No.	Depth, Feet	Chloride Content of Brine in Sand ppm	Percent Water Saturation		
			Connate	Drilling & Foreign	Total
1	2165.3	58,577.			
2	2166.5	57,459.			
3	2167.3	41,394.			
4	2169.8	83,604.			
5	2170.3	39,669.			
6	2171.3	62,733.			
7	2172.3	48,086.			
8	2173.5	26,999.			
9	2174.6	50,124.			
10	2175.5	57,286.			
11	2176.5	57,145.			
12	2177.3	38,111.			
13	2178.5	44,246.			
14	2179.6	52,439.			
15	2180.5	47,315.			
16	2181.5	46,884.			
17	2182.5	31,986.			
18	2183.5	63,778.			
19	2184.5	57,418.			
20	2185.5	70,711.			
21	2186.8	23,635.			
22	2187.2	32,105.			

Note: ppm — parts per million



JACKSON BROTHERS

NIXON LEASE

GREENWOOD COUNTY, KANSAS

WELL NO. 8

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
2165.0 - 2173.6	5.8	13.9	16.4	69.5	0.88	
2174.5 - 2187.5	12.0	15.9	26.9	56.2	15.5	
2165.0 - 2187.5	17.8	15.2	23.5	60.6	11.0	1412 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
 CHANUTE, KANSAS
 OCTOBER, 1983 RAL