



OILFIELD RESEARCH LABORATORIES

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November 30, 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 Taylor Lease, Well No. 11, located in Greenwood County, Kansas and submitted to our laboratory on November 24, 1984.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Alan M. Dunning
Alan M. Dunning

AMD:bl

5 c to Eureka, Kansas

Oilfield Research Laboratories
GENERAL INFORMATION & SUMMARY

Company Jackson Brothers Lease Taylor Well No. 11
 Location NW $\frac{1}{4}$, SE $\frac{1}{4}$, SW $\frac{1}{4}$
 Section 25 Twp. 23S Rge. 08E County Greenwood State Kansas

Elevation, Feet

Name of Sand.....	Bartlesville
Top of Core	2575.0
Bottom of Core	2610.8
Top of Sand	2575.0
Bottom of Sand	2610.8
Total Feet of Permeable Sand	35.8
Total Feet of Floodable Sand	24.0

Distribution of Permeable Sand:
 Permeability Range
 Millidarcys

	Feet	Cum. Ft.
0 - 1	0.0	0.0
10 - 20	2.9	2.9
21 - 35	7.0	9.9
36 - 40	4.9	14.8
41 - 60	11.9	26.7
61 - 90	6.1	32.8
125 - 245	3.0	35.8

Average Permeability Millidarcys	55.7
Average Percent Porosity	19.6
Average Percent Oil Saturation	20.6
Average Percent Water Saturation.....	49.4
Average Oil Content, Bbls./A. Ft.	314.
Total Oil Content, Bbls./Acre.....	11,225.
Average Percent Oil Recovery by Laboratory Flooding Tests.....	4.2
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	62.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	1,483.
Total Calculated Oil Recovery, Bbls./Acre.....	See "Calculated Recovery" Section

The core was sampled by a representative of Oilfield Research Laboratories. Fresh water mud was used as a drilling fluid. 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>
2575.0 - 2578.0	Sandstone, brown. ← DRILLED 2 FT. OF SAND BEFORE CORING BEGAN.
2578.0 - 2583.0	Sandstone, light brown.
2583.0 - 2584.7	Sandstone, light brown, slightly calcareous with widely scattered shale nodules.
2584.7 - 2610.8	Sandstone, light brown.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 1483 barrels of oil per acre was obtained from 24.0 feet of sand. The weighted average percent oil saturation was reduced from 22.9 to 18.7, or represents an average recovery of 4.2 percent. The weighted average effective permeability of the samples is 6.05 millidarcys, while the average initial fluid production pressure is 16.3 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 36 samples tested, 24 produced water and oil and 12 produced water only. This indicates that approximately 67 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 6060 barrels of oil per acre. This is an average recovery of 252 barrels per acre foot from 24.0 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.24
Reservoir water saturation, percent, estimated	35.0
Average porosity, percent	19.3
Oil saturation after flooding, percent	18.7
Performance factor, percent, estimated	50.0
Net floodable sand, feet	24.0

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RESULTS OF PERMEABILITY AND POROSITY TESTS
TABLE I A

Company Jackson Brothers Lease Taylor Well No. 11

VERTICAL PERMEABILITY

Sample No.	Depth Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.	Percent Porosity
			Ft.	Cum. Ft.		
1	2575.5	24.				
2	2576.5	102.				
3	2577.6	84.				
4	2578.5	84.				
5	2579.4	21.				
6	2580.6	24.				
7	2581.5	34.				
8	2582.5	21.				
9	2583.6	5.7				
10	2584.5	40.				
11	2585.5	35.				
12	2586.5	39.				
13	2587.4	20.				
14	2588.4	15.				
15	2589.6	6.4				
16	2590.5	0.43				
17	2591.6	12.				
18	2592.6	39.				
19	2593.5	67.				
20	2594.5	44.				
21	2595.5	62.				
22	2596.6	22.				
23	2597.4	32.				
24	2598.5	23.				
25	2599.5	37.				
26	2600.3	31.				
27	2601.6	35.				
28	2602.5	27.				
29	2603.5	26.				
30	2604.4	22.				
31	2605.5	28.				
32	2606.6	16.				
33	2607.5	32.				
34	2608.5	35.				
35	2609.5	23.				
36	2610.5	31.				

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Jackson Brothers Lease Taylor Well No. 11

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	2575.5	20.5	22	43	65	350	71.	1.0	1.0	350	71.00
2	2576.5	22.5	26	39	65	454	241.	1.0	2.0	454	241.00
3	2577.6	22.2	33	35	68	568	157.	1.0	3.0	568	157.00
4	2578.5	21.4	16	45	61	266	127.	1.0	4.0	266	127.00
5	2579.4	16.9	22	52	74	288	43.	1.0	5.0	288	43.00
6	2580.6	17.7	27	46	73	371	29	1.0	6.0	371	29.00
7	2581.5	17.8	21	46	67	290	47.	1.0	7.0	290	47.00
8	2582.5	17.8	20	50	70	276	31.	1.0	8.0	276	31.00
9	2583.6	18.1	40	47	87	562	13.	0.9	8.9	506	11.70
10	2584.5	19.1	16	49	65	237	54.	0.8	9.7	190	43.20
11	2585.5	19.4	21	49	70	316	43.	1.1	10.8	348	47.30
12	2586.5	19.8	14	43	57	215	89.	1.1	11.9	237	97.90
13	2587.4	19.4	23	49	72	346	41.	1.1	13.0	381	45.10
14	2588.4	18.8	21	54	75	306	34.	1.0	14.0	306	34.00
15	2589.6	17.5	22	51	73	299	23.	1.0	15.0	299	23.00
16	2590.5	15.7	19	58	77	231	12.	1.0	16.0	231	12.00
17	2591.6	18.6	28	52	80	404	22.	1.0	17.0	404	22.00
18	2592.6	21.5	20	50	70	334	60.	1.0	18.0	334	60.00
19	2593.5	20.8	20	43	63	323	87	1.0	19.0	323	87.00
20	2594.5	20.8	25	50	75	403	83	1.0	20.0	403	83.00
21	2595.5	21.2	9	55	64	148	78.	1.0	21.0	148	78.00
22	2596.6	15.3	25	60	85	297	13.	1.0	22.0	297	13.00
23	2597.4	19.8	17	50	67	261	44.	1.0	23.0	261	44.00
24	2598.5	20.2	21	52	73	329	35.	1.0	24.0	329	35.00
25	2599.5	20.5	19	53	72	302	49.	1.0	25.0	302	49.00
26	2600.3	21.3	18	57	75	297	50.	1.0	26.0	297	50.00
27	2601.6	20.5	20	43	63	318	69	1.0	27.0	318	69.00
28	2602.5	19.9	20	48	68	309	43.	1.0	28.0	309	43.00
29	2603.5	20.8	18	58	76	291	36.	1.0	29.0	291	36.00
30	2604.4	20.5	13	57	70	207	38.	1.0	30.0	207	38.00

Oilfield Research Laboratories
RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Jackson Brothers Lease Taylor Well No. 11

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.		
31	2605.5	19.5	16	46	62	242	39.	1.0	31.0	242	39.00
32	2606.6	20.1	20	50	70	312	32	1.0	32.0	312	32.00
33	2607.5	19.9	18	46	64	278	43.	1.0	33.0	278	43.00
34	2608.5	19.5	18	49	67	272	37.	1.0	34.0	272	37.00
35	2609.5	19.1	14	54	68	207	39.	0.9	34.9	187	35.10
36	2610.5	22.8	22	51	73	389	44.	0.9	35.8	350	39.60

Oilfield Research Laboratories

SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Lease	Taylor	Well No.			
Jackson Brothers			11			
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.			
2575.0 - 2579.0	24.0	61.8	1482.20			
2579.0 - 2610.8	11.8	43.3	510.70			
2575.0 - 2610.8	35.8	55.7	1992.90			
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
2575.0 - 2579.0	24.0	19.3	21.9	48.7	328	7,860
2579.0 - 2610.8	11.8	20.4	18.0	51.0	285	3,365
2575.0 - 2610.8	35.8	19.6	20.6	49.4	314	11,225

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

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			
1	2575.5	20.3	22	346	6	94	16	74	263	4.87	20
2	2576.5	22.1	26	446	4	69	22	69	232	12.00	20
3	2577.6	21.9	33	561	6	102	27	66	294	5.55	20
4	2578.5	20.9	16	259	0	0	16	79	371	7.12	20
5	2579.4	16.7	22	285	2	26	20	75	155	3.07	25
6	2580.6	17.3	27	362	5	67	22	74	220	3.90	20
7	2581.5	17.3	21	282	5	67	16	79	248	4.65	20
8	2582.5	17.6	20	273	2	27	18	67	106	1.65	20
9	2583.6	18.0	40	559	18	251	22	75	276	9.00	20
10	2584.5	18.9	16	235	0	0	16	76	124	2.32	25
11	2585.5	18.9	21	308	2	29	19	80	258	4.65	25
12	2586.5	19.5	15	227	0	0	15	78	100	1.42	25
13	2587.4	19.3	23	344	2	30	21	68	84	0.82	20
14	2588.4	19.1	21	311	2	30	19	70	182	2.25	15
15	2589.6	17.5	22	299	3	41	19	68	216	3.22	15
16	2590.5	15.8	19	233	0	0	19	69	50	0.60	20
17	2591.6	19.0	28	413	11	162	17	67	286	5.40	15
18	2592.6	21.3	20	330	3	50	17	70	364	6.37	15
19	2593.5	20.3	20	315	2	31	18	72	348	7.42	10
20	2594.5	20.7	25	401	4	64	21	74	378	11.33	10
21	2595.5	20.7	9	145	0	0	9	81	392	11.08	10
22	2596.6	15.3	25	297	7	83	18	74	378	5.92	10
23	2597.4	19.4	17	256	2	30	15	82	376	6.45	15
24	2598.5	19.8	21	323	4	61	17	70	218	2.47	15
25	2599.5	20.0	19	295	3	47	16	73	354	9.83	10
26	2600.3	21.1	18	295	0	0	18	79	108	1.20	15
27	2601.6	20.5	20	318	0	0	20	76	244	11.35	10
28	2602.5	19.4	21	316	0	0	21	76	366	10.50	10
29	2603.5	20.5	18	286	2	32	16	77	264	8.33	10

Company Jackson Brothers Lease Taylor Well No. 11

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.

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

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.			
30	2604.4	20.3	13	205	0	0	13	74	205	426	6.75	10
31	2605.5	19.4	16	241	0	0	16	81	241	394	11.49	15
32	2606.6	20.3	20	315	2	31	18	72	284	298	8.66	10
33	2607.5	19.6	18	274	3	46	15	84	228	302	9.00	15
34	2608.5	19.4	18	271	0	0	18	75	271	262	6.76	20
35	2609.5	18.9	14	205	0	0	14	83	205	450	7.42	20
36	2610.5	22.3	22	381	2	35	20	74	346	300	9.66	15

Company Jackson Brothers
Lease Taylor
Well No. 11

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.

Oilfield Research Laboratories

SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Jackson Brothers	Lease	Taylor	Well No.	11
Depth Interval, Feet	2575.0 - 2579.0	2579.0 - 2610.8	2610.8 - 2575.0	2575.0 - 2610.8	2610.8
Feet of Core Analyzed	19.1	4.9	24.0		
Average Percent Porosity	19.0	20.5	19.3		
Average Percent Original Oil Saturation	23.8	19.3	22.9		
Average Percent Oil Recovery	4.6	2.4	4.2		
Average Percent Residual Oil Saturation	19.2	16.9	18.7		
Average Percent Residual Water Saturation	72.3	76.0	73.1		
Average Percent Total Residual Fluid Saturation	91.5	92.9	91.8		
Average Original Oil Content, Bbls./A. Ft.	352.	308.	343.		
Average Oil Recovery, Bbls./A. Ft.	68.	38.	62.		
Average Residual Oil Content, Bbls./A. Ft.	284.	270.	281.		
Total Original Oil Content, Bbls./Acre	6,720.	1,513.	8,233.		
Total Oil Recovery, Bbls./Acre	1,295.	188.	1,483.		
Total Residual Oil Content, Bbls./Acre	5,425.	1,325.	6,750.		
Average Effective Permeability, Millidarcys	5.27	9.08	6.05		
Average Initial Fluid Production Pressure, p.s.i.	17.3	12.0	16.3		

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 Taylor Well No. 11

Sample No.	Depth, Feet	Chloride Content of Brine in Sand ppm	Percent Water Saturation		
			Connate	Drilling & Foreign	Total
1	2575.5	9,549.			
2	2576.5	6,110.			
3	2577.6	9,509.			
4	2578.5	6,951.			
5	2579.4	9,003.			
6	2580.6	29,873.			
7	2581.5	28,032.			
8	2582.5	12,284.			
9	2583.6	31,346.			
10	2584.5	33,885.			
11	2585.5	32,345.			
12	2586.5	42,294.			
13	2587.4	46,936.			
14	2588.4	9,887.			
15	2589.6	32,319.			
16	2590.5	49,757.			
17	2591.6	33,334.			
18	2592.6	6,262.			
19	2593.5	9,279.			
20	2594.5	7,989.			
21	2595.5	10,977.			
22	2596.6	10,148.			
23	2597.4	10,735.			
24	2598.5	12,222.			
25	2599.5	10,526.			
26	2600.3	10,606.			
27	2601.6	18,651.			
28	2602.5	10,367.			
29	2603.5	9,967.			
30	2604.4	10,436.			
31	2605.5	17,308.			
32	2606.6	12,133.			
33	2607.5	13,277.			
34	2608.5	10,391.			
35	2609.5	8,951.			
36	2610.5	10,128.			

Note: ppm — parts per million

