

# OILFIELD RESEARCH LABORATORIES

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May 30, 1980

Cherokee Oil Producers  
210 West Watermelon Road  
Box 158  
Thayer, Kansas 66776

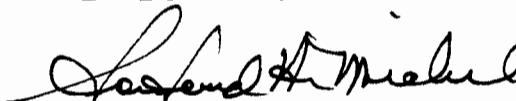
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Dickens Lease, Well No. 3, Montgomery County, Kansas, and submitted to our laboratory on April 24, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

  
Sanford A. Michel

SAM/tem

5 c to Thayer, Kansas

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## GENERAL INFORMATION & SUMMARY

Company Cherokee Oil Producers Lease Dickens Well No. 3

Location W $\frac{1}{2}$  NW $\frac{1}{4}$  NW $\frac{1}{4}$

Section 1 Twp. 31S Rge. 16E County Montgomery State Kansas

Elevation, Feet - - - - -

Name of Sand - - - - - Bartlesville

Top of Core - - - - - 840.0

Bottom of Core - - - - - 858.0

Top of Sand - - - - - 842.2

Bottom of Sand - - - - - 858.0

Total Feet of Permeable Sand - - - - - 14.2

Total Feet of Floodable Sand - - - - - 6.5

Distribution of Permeable Sand:  
Permeability Range  
Millidarcys

Feet

Cum. Ft.

0 - 10 9.2 9.2

10 - 20 5.0 14.2

Average Permeability Millidarcys - - - - - 8.8

Average Percent Porosity - - - - - 14.4

Average Percent Oil Saturation - - - - - 29.2

Average Percent Water Saturation - - - - - 41.2

Average Oil Content, Bbls./A. Ft. - - - - - 324.

Total Oil Content, Bbls./Acre - - - - - 5,124.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 2.2

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 27.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 172.

Total Calculated Oil Recovery, Bbls./Acre - - - - - See "Calculated Recovery" Section.

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The core was sampled in the laboratory after being delivered by the client. The client reported that the core had been out approximately fourteen hours before sampling. Fresh water mud was used as a drilling fluid. The core was reported to be from a non-virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
840.0 - 842.2	Gray shale.
842.2 - 842.9	Grayish light brown very shaly sandstone.
842.9 - 844.6	Light brown sandstone.
844.6 - 848.7	Light brown shaly sandstone.
848.7 - 849.8	Light brown sandstone.
849.8 - 856.4	Brown shaly sandstone.
856.4 - 858.0	Grayish brown very shaly sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 172 barrels of oil per acre was obtained from 6.5 feet of sand. The weighted average percent oil saturation was reduced from 32.3 to 30.1, or represents an average recovery of 2.2 percent. The weighted average effective permeability of the samples is 1.50 millidarcys, while the average initial fluid production pressure is 38.3 pounds per square inch (See Table V).

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By observing the data given in Table IV, you will note that of the 16 samples tested, 6 produced water and oil, and 5 samples produced water only. This indicates that approximately 38 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 1,430 barrels of oil per acre. This is an average recovery of 220 barrels per acre foot from 6.5 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.06
Reservoir water saturation, percent, estimated	30.0
Average porosity, percent	15.8
Oil saturation after flooding, percent	30.1
Performance factor, percent, estimated	50.0
Net floodable sand, feet	6.5

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**RESULTS OF SATURATION & PERMEABILITY TESTS**

**TABLE 1-B**

Company Cherokee Oil Producers Lease Dickens Well No. 3

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.		
1	842.7	13.6	29	45	74	0.48	0.7	0.7	214	0.34
2	843.3	14.3	24	37	61	16.	1.1	1.8	293	17.60
3	844.5	14.9	24	35	59	13.	0.6	2.4	166	7.80
4	845.5	17.3	33	60	93	3.9	1.4	3.8	620	5.46
5	846.7	15.1	21	45	66	8.2	1.0	4.8	246	8.20
6	847.7	14.1	5	50	55	3.0	1.0	5.8	55	3.00
7	848.6	13.5	26	42	68	5.1	0.7	6.5	190	3.57
8	849.6	15.9	26	39	64	20.	1.1	7.6	353	22.00
9	850.3	13.3	18	42	60	12.	1.2	8.8	223	14.40
10	851.5	14.5	34	38	72	12.	1.0	9.8	383	12.00
11	852.7	14.3	32	40	72	10.	1.0	10.8	355	10.00
12	853.6	15.8	35	33	68	6.1	1.0	11.8	429	6.10
13	854.5	16.1	34	31	65	6.9	1.0	12.8	425	6.90
14	855.5	14.5	38	36	74	5.0	1.0	13.8	428	5.00
15	856.3	10.7	44	53	97	6.0	0.4	14.2	146	2.40
16	857.6	11.2	43	35	78	Imp.	1.6	15.8	598	0.00

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## SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Lease	Dickens	Well No.		
Cherokee Oil Producers			3		
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
842.2 - 851.0	8.8	9.4	82.37		
851.0 - 858.0	5.4	7.9	42.40		
842.2 - 858.0	14.2	8.8	124.77		
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
842.2 - 851.0	8.8	14.8	22.9	44.9	2,360
851.0 - 858.0	7.0	13.9	37.1	36.5	2,764
842.2 - 858.0	15.8	14.4	29.2	41.2	5,124

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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.
			%	Bbbs./A. Ft.	%	Bbbs./A. Ft.	% Oil	% Water			
1	842.7	14.0	28	304	0	0	28	60	0	Imp.	-
2	843.3	14.5	24	270	0	0	24	40	166	2.85	20
3	844.5	15.2	24	283	0	0	24	65	101	1.87	25
4	845.5	17.2	33	440	2	27	31	54	13	0.22	40
5	846.7	15.3	21	249	0	0	21	73	268	6.30	20
6	847.7	13.6	6	63	0	0	6	60	0	Imp.	-
7	848.6	13.9	25	270	0	0	25	45	0	Imp.	-
8	849.6	16.0	26	323	2	25	24	72	226	4.20	25
9	850.3	13.6	18	190	0	0	18	80	21	0.30	25
10	851.5	14.7	34	388	2	23	32	56	17	0.15	45
11	852.7	14.5	32	360	2	22	30	61	182	3.97	30
12	853.6	15.8	35	429	3	37	32	54	31	0.52	40
13	854.5	16.0	34	422	2	25	32	52	7	0.15	50
14	855.5	14.9	37	428	0	0	37	47	19	0.30	45
15	856.3	11.0	43	367	0	0	43	54	0	Imp.	-
16	857.6	11.0	43	367	0	0	43	38	0	Imp.	-

Well No. 3

Lease Dickens

Company Cherokee Oil Producers, Inc.

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	Cherokee Oil Producers	Lease	Dickens	Well No.
Depth Interval, Feet	842.2 - 851.0	851.0 - 858.0	842.2 - 858.0	3
Feet of Core Analyzed	2.5	4.0	6.5	
Average Percent Porosity	16.7	15.3	15.8	
Average Percent Original Oil Saturation	29.7	33.8	32.3	
Average Percent Oil Recovery	2.0	2.3	2.2	
Average Percent Residual Oil Saturation	27.9	31.5	30.1	
Average Percent Residual Water Saturation	61.9	55.8	58.1	
Average Percent Total Residual Fluid Saturation	89.8	87.3	88.2	
Average Original Oil Content, Bbls./A. Ft.	388.	400.	396.	
Average Oil Recovery, Bbls./A. Ft.	26.	27.	27.	
Average Residual Oil Content, Bbls./A. Ft.	362.	373.	369.	
Total Original Oil Content, Bbls./Acre	971.	1,599.	2,570.	
Total Oil Recovery, Bbls./Acre	65.	107.	172.	
Total Residual Oil Content, Bbls./Acre	906.	1,492.	2,398.	
Average Effective Permeability, Millidarcys	1.97	1.20	1.50	
Average Initial Fluid Production Pressure, p.s.i.	32.5	41.3	38.3	

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