

# OILFIELD RESEARCH LABORATORIES

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AP5: 15-133-21433

February 27, 1980

Hickory Creek Oil Company  
P.O. Box 379  
Parsons, Kansas 67357

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from Well No. HCO-118, and submitted to our laboratory on February 7, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

  
Sanford A. Michel

SAM/tem

4c to Parsons, Kansas  
1 c to Chanute, Kansas

SARTIN # 19

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GENERAL INFORMATION & SUMMARY

Company Hickory Creek Oil Company Lease - Well No HCO-118

Location -

Section - Twp. - Rge. - County - State -

Elevation, Feet - - - - -

Name of Sand - - - - -

Top of Core - - - - - 191.0

Bottom of Core - - - - - 202.0

Top of Sand - - - - - 191.0

Bottom of Sand - - - - - (Tested) 201.7

Total Feet of Permeable Sand - - - - - 10.7

Total Feet of Floodable Sand - - - - - 9.7

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 5	3.0	3.0
5 - 100	1.7	4.7
100 - 200	4.5	9.2
200 - 300	1.5	10.7

Average Permeability Millidarcys - - - - - 112.7

Average Percent Porosity - - - - - 23.3

Average Percent Oil Saturation - - - - - 44.6

Average Percent Water Saturation - - - - - 44.0

Average Oil Content, Bbls./A. Ft. - - - - - 803.

Total Oil Content, Bbls./Acre - - - - - 8,589.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 3.3

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - .59.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 572.

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

See "Calculated Recovery" Section.

-2-

The core was sampled and the samples sealed in plastic bags by a representative of the client.

#### FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
191.0 - 198.7	Brown sandstone.
198.7 - 201.7	Brown shaly sandstone.
201.7 - 202.0	Brown and gray laminated sandstone and shale.

#### LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 572 barrels of oil per acre was obtained from 9.7 feet of sand. The weighted average percent oil saturation was reduced from 44.2 to 40.9, or represents an average recovery of 3.3 percent. The weighted average effective permeability of the samples is 13.05 millidarcys, while the average initial fluid production pressure is 12.9 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 8 samples tested, 7 produced water and oil. This indicates that approximately 88 percent of the sand represented by these samples is floodable pay sand.

SARTIN 19

-3-

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 2,410 barrels of oil per acre. This is an average recovery of 249 barrels per acre foot from 9.7 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	✓ 1.03
Reservoir water saturation, percent, estimated	30.0/48.3 ✓
Average porosity, percent	✓ 23.7
Oil saturation after flooding, percent	✓ 40.9
Performance factor, percent, estimated	✓ 50.0
Net floodable sand, feet	9.7/17.0 ✓

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Hickory Creek Oil Company Lease - 5 19 Well No. HCO-118

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.		
	1572.	182.4	257					882.3			
1	191.5	24.0	42	41	83	782	99.	1.0	1.0	782	99.00
2	192.5	24.4	41	51	92	776	145.	1.5	2.5	1164	217.50
4	194.5	25.3	42	46	88	824	153.	1.5	4.0	1236	229.50
5	195.5	23.6	44	50	94	806	247.	1.5	5.5	1209	370.50
7	197.5	24.7	45	50	95	862	146.	1.5	7.0	1293	219.00
8	198.5	18.4	43	52	95	614	87.	0.7	7.7	430	60.90
10	200.5	23.1	49	31	80	878	3.7	2.0	9.7	1756	7.40
11	201.5	18.9	49	36	85	719	1.6	1.0	10.7	719	1.60

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**SUMMARY OF PERMEABILITY & SATURATION TESTS**

**TABLE III**

Company Hickory Creek Oil Company Lease - Well No. HCO-118

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
191.0 - 201.7	10.7	112.7	1205.40

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
191.0 - 201.7	10.7	23.3	44.6	44.0	803	8,589

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## RESULTS OF LABORATORY FLOODING TESTS

### TABLE IV

Company Hickory Creek Oil Company Lease - 519 Well No. HCO-118

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		332 Residual Saturation			Volume of Water Recovered cc*	89.18 Effective Permeability Millidarcys**	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
<del>1</del>	<del>191.5</del>	<del>24.3</del>	<del>42</del>	<del>792</del>	<del>3</del>	<del>57</del> <del>4.0</del>	<del>39</del>	<del>55</del>	<del>735</del>	<del>254</del>	<del>17.99</del>	<del>10</del>
<del>2</del>	<del>192.5</del>	<del>24.4</del>	<del>41</del>	<del>776</del>	<del>2</del>	<del>38</del> <del>1.5</del>	<del>39</del>	<del>58</del>	<del>738</del>	<del>258</del>	<del>17.99</del>	<del>10</del>
<del>4</del>	<del>194.5</del>	<del>25.0</del>	<del>42</del>	<del>815</del>	<del>2</del>	<del>39</del> <del>1.5</del>	<del>40</del>	<del>56</del>	<del>776</del>	<del>420</del>	<del>6.60</del>	<del>10</del>
<del>5</del>	<del>195.5</del>	<del>23.8</del>	<del>44</del>	<del>812</del>	<del>3</del>	<del>55</del> <del>1.5</del>	<del>41</del>	<del>57</del>	<del>757</del>	<del>220</del>	<del>24.37</del>	<del>10</del>
7	197.5	24.6	45	859	4	76 <del>1.5</del>	41	57	783	256	12.49	10
8	198.5	18.9	43	630	3	44 <del>.7</del>	40	56	586	326	9.37	10
10	200.5	22.8	49	867	5	86 <del>2.0</del>	44	48	779	28	0.37	30
11	201.5	19.3	48	719	0	0 <del>1.0</del>	48	42	719	0	Imp.	-

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	Hickory Creek Oil Company	Lease	-	Well No.	HCO-118
Depth Interval, Feet	191.0 - 201.7				
Feet of Core Analyzed	9.7				
Average Percent Porosity	23.7				
Average Percent Original Oil Saturation	44.2				
Average Percent Oil Recovery	3.3				
Average Percent Residual Oil Saturation	40.9				
Average Percent Residual Water Saturation	54.9				
Average Percent Total Residual Fluid Saturation	95.8				
Average Original Oil Content, Bbls./A. Ft.	810.				
Average Oil Recovery, Bbls./A. Ft.	59.				
Average Residual Oil Content, Bbls./A. Ft.	751.				
Total Original Oil Content, Bbls./Acre	7,856.				
Total Oil Recovery, Bbls./Acre	572.				
Total Residual Oil Content, Bbls./Acre	7,284.				
Average Effective Permeability, Millidarcys	13.05				
Average Initial Fluid Production Pressure, p.s.i.	12.9				

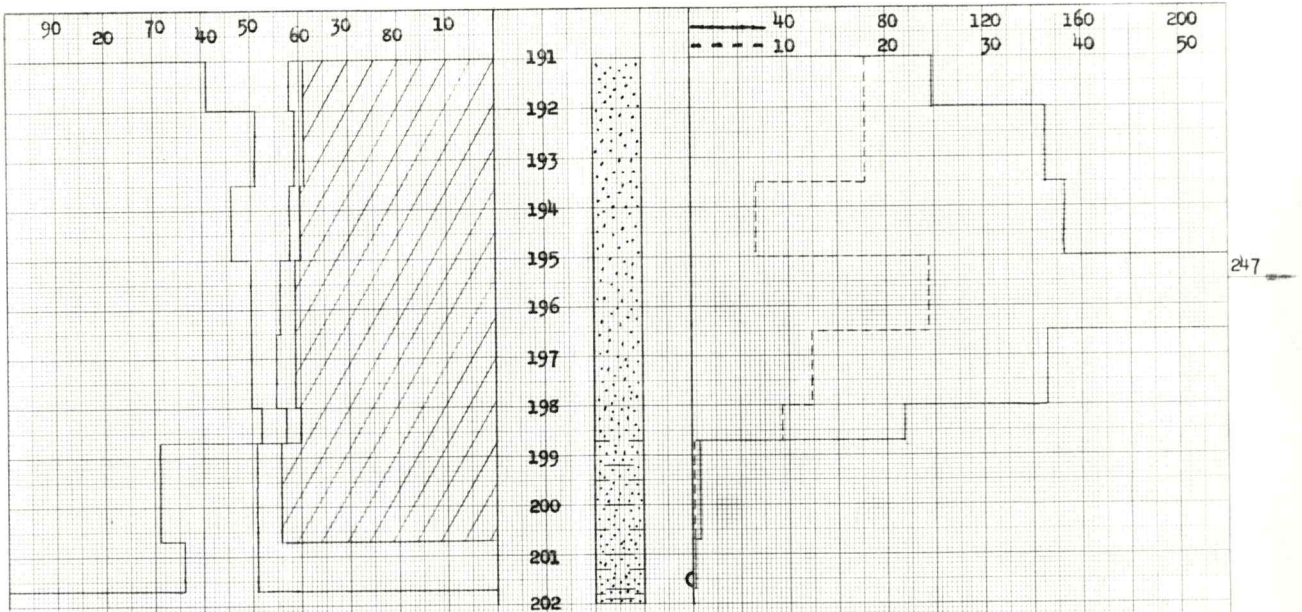
NOTE: Only those samples which recovered oil were used in calculating the above averages.

WATER SAT., PERCENT

OIL SAT., PERCENT

PERMEABILITY, IN MILLIDARCYs

EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYs



KEY:



SANDSTONE



SHALY SANDSTONE



LAMINATED SANDSTONE AND SHALE



FLOODPOT RESIDUAL OIL SATURATION



IMPERMEABLE TO WATER

# HICKORY CREEK OIL COMPANY

— LEASE

— COUNTY, —

WELL NO. HCO - 118

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
191.- 201.7	10.7	23.3	44.6	44.0	112.7	2,410 (PRIMARY AND WATERFLOODING)

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 CHANUTE, KANSAS  
 FEBRUARY, 1980. HR