

OILFIELD RESEARCH LABORATORIES

536 NORTH HIGHLAND - CHANUTE, KANSAS 66720 - PHONE (316) 431-2650

April 8, 1980

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

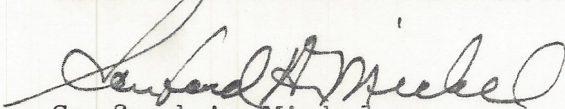
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from Well No. HCO-139, and submitted to our laboratory on March 13, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Sanford A. Michel

SAM/tem
4 c to Parsons, Kansas
1 c to Chanute, Kansas

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GENERAL INFORMATION & SUMMARY

Company Hickory Creek Oil Company Lease - Well No. HCO-139

Location -

Section - Twp - Rge - County - State -

Elevation, Feet -

Name of Sand -

Top of Core - 198.0

Bottom of Core - 253.8

Top of Sand - 198.0

Bottom of Sand - (Tested) 245.0

Total Feet of Permeable Sand - (Tested) 20.0

Total Feet of Floodable Sand - (Tested) 9.2

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
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0 - 5	4.8	4.8
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5 - 50	4.0	8.8
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50 - 100	6.0	14.8
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100 - 200	1.2	16.0
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300 - 800	4.0	20.0
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Average Permeability Millidarcys - 143.0

Average Percent Porosity - 19.5

Average Percent Oil Saturation - 33.2

Average Percent Water Saturation - 50.7

Average Oil Content, Bbls./A. Ft. - 533.

Total Oil Content, Bbls./Acre - 16,521.

Average Percent Oil Recovery by Laboratory Flooding Tests - 3.7

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - 68.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - 622.

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

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>
198.0 - 213.2	Brown sandstone.
213.2 - 218.6	Black carbonaceous shaly sandstone.
233.0 - 234.0	Brown shaly sandstone.
234.0 - 245.0	Brown and gray laminated sandstone and shale.
245.0 - 248.8	Gray laminated sandstone and shale.
248.8 - 253.8	Gray sandy shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests as a total recovery of 622 barrels of oil per acre was obtained from 9.2 feet of sand. The weighted average percent oil saturation was reduced from 40.6 to 36.9, or represents an average recovery of 3.7 percent. The weighted average effective permeability of the samples is 27.87 millidarcys, while the average initial fluid production pressure is 13.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 18 samples tested, 5 produced water and oil, and 5 samples produced water only. This indicates that approximately 28 percent of the sand represented by these samples is floodable pay sand.

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4.8

-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 2,600 barrels of oil per acre. This is an average recovery of 283 barrels per acre foot from 9.2 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 / 44.4
Average porosity, percent	23.5
Oil saturation after flooding, percent	36.9
Performance factor, percent, estimated	50.0
Net floodable sand, feet	9.2 / 7

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Hickory Creek Oil Company

Lease

- LONG 8

Well No. HCO-139

2984. 346.3

933

1480.1

152

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation		Oil Content Bbbls. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water			Total	Ft.		
1	198.5	25.1	36	44	80	35.	2.0	2.0	1402	70.00
3	200.5	25.5	42	32	74	745.	2.0	4.0	1662	1490.00
5	202.5	26.1	33	56	89	346.	2.0	6.0	1336	692.00
7	204.5	22.4	41	56	97	60.	2.0	8.0	1426	120.00
9	206.5	20.2	42	51	93	62.	2.0	10.0	1316	124.00
11	208.5	19.6	32	47	79	50.	2.0	12.0	974	100.00
13	210.5	24.2	40	46	86	52.	2.0	14.0	1502	104.00
15	212.5	25.1	36	37	73	121.	1.2	15.2	841	145.20
17	214.5	19.7	37	28	65	2.0	1.8	17.0	1019	3.60
19	216.5	23.9	54	25	79	4.3	2.0	19.0	2002	8.60
22	233.5	18.3	25	61	86	2.8	1.0	20.0	355	2.80
23	234.5	17.0	28	31	59	Imp.	2.0	22.0	738	0.00
24	237.5	11.9	18	77	95	Imp.	2.0	24.0	332	0.00
25	238.5	14.5	35	59	94	Imp.	1.0	25.0	394	0.00
26	239.5	15.0	32	66	98	Imp.	1.0	26.0	372	0.00
27	240.5	15.2	11	73	84	Imp.	1.0	27.0	130	0.00
28	241.5	10.7	30	63	93	Imp.	2.0	29.0	498	0.00
30	243.5	11.9	12	81	93	Imp.	2.0	31.0	222	0.00

ASPHALT

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Lease	Well No.				
Hickory Creek Oil Company	-	HCO-139				
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.			
198.0 - 213.2	15.2	187.2	2845.20			
213.2 - 245.0	4.8	3.1	15.00			
198.0 - 245.0	20.0	143.0	2860.20			
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
198.0 - 213.2	15.2	23.4	37.8	46.6	688	10,459
213.2 - 245.0	15.8	15.8	28.7	54.7	384	6,062
198.0 - 245.0	31.0	19.5	33.2	50.7	533	16,521

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Hickory Creek Oil Company

Lease

- LONG 8

Well No. HCO-139

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	Ebbs./A. Ft.			
1	198.5	24.8	36	693	0	0	36	54	693	256	16.80	10
3	200.5	25.7	42	837	3	60	39	51	777	141	52.48	10
5	202.5	25.9	33	663	0	0	33	55	663	360	28.19	10
7	204.5	22.9	41	728	4	71	37	51	657	151	56.23	10
9	206.5	20.4	42	665	3	47	39	60	618	409	6.00	15
11	208.5	19.4	32	482	0	0	32	62	482	74	0.97	25
13	210.5	24.2	40	751	4	75	36	54	676	322	10.50	15
15	212.5	25.1	36	701	5	97	31	56	604	340	5.02	15
17	214.5	20.2	36	564	0	0	36	40	564	0	Imp.	-
19	216.5	23.8	54	997	0	0	54	33	997	7	0.15	50
22	233.5	17.9	26	361	0	0	26	62	361	60	1.35	35
23	234.5	17.2	28	374	0	0	28	40	374	0	Imp.	-
24	237.5	12.3	17	162	0	0	17	80	162	0	Imp.	-
25	238.5	14.8	35	402	0	0	35	49	402	0	Imp.	-
26	239.5	15.0	32	372	0	0	32	66	372	0	Imp.	-
27	240.5	14.8	12	138	0	0	12	74	138	0	Imp.	-
28	241.5	11.0	30	256	0	0	30	65	256	0	Imp.	-
30	243.5	12.2	11	104	0	0	11	85	104	0	Imp.	-

50 FT. 15
136.5

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-139
Depth Interval, Feet	198.0 - 213.2				
Feet of Core Analyzed	9.2				
Average Percent Porosity	23.5				
Average Percent Original Oil Saturation	40.6				
Average Percent Oil Recovery	3.7				
Average Percent Residual Oil Saturation	36.9				
Average Percent Residual Water Saturation	54.3				
Average Percent Total Residual Fluid Saturation	91.2				
Average Original Oil Content, Bbls./A. Ft.	740.				
Average Oil Recovery, Bbls./A. Ft.	68.				
Average Residual Oil Content, Bbls./A. Ft.	672.				
Total Original Oil Content, Bbls./Acre	6,803.				
Total Oil Recovery, Bbls./Acre	622.				
Total Residual Oil Content, Bbls./Acre	6,181.				
Average Effective Permeability, Millidarcys	27.87				
Average Initial Fluid Production Pressure, p.s.i.	13.0				

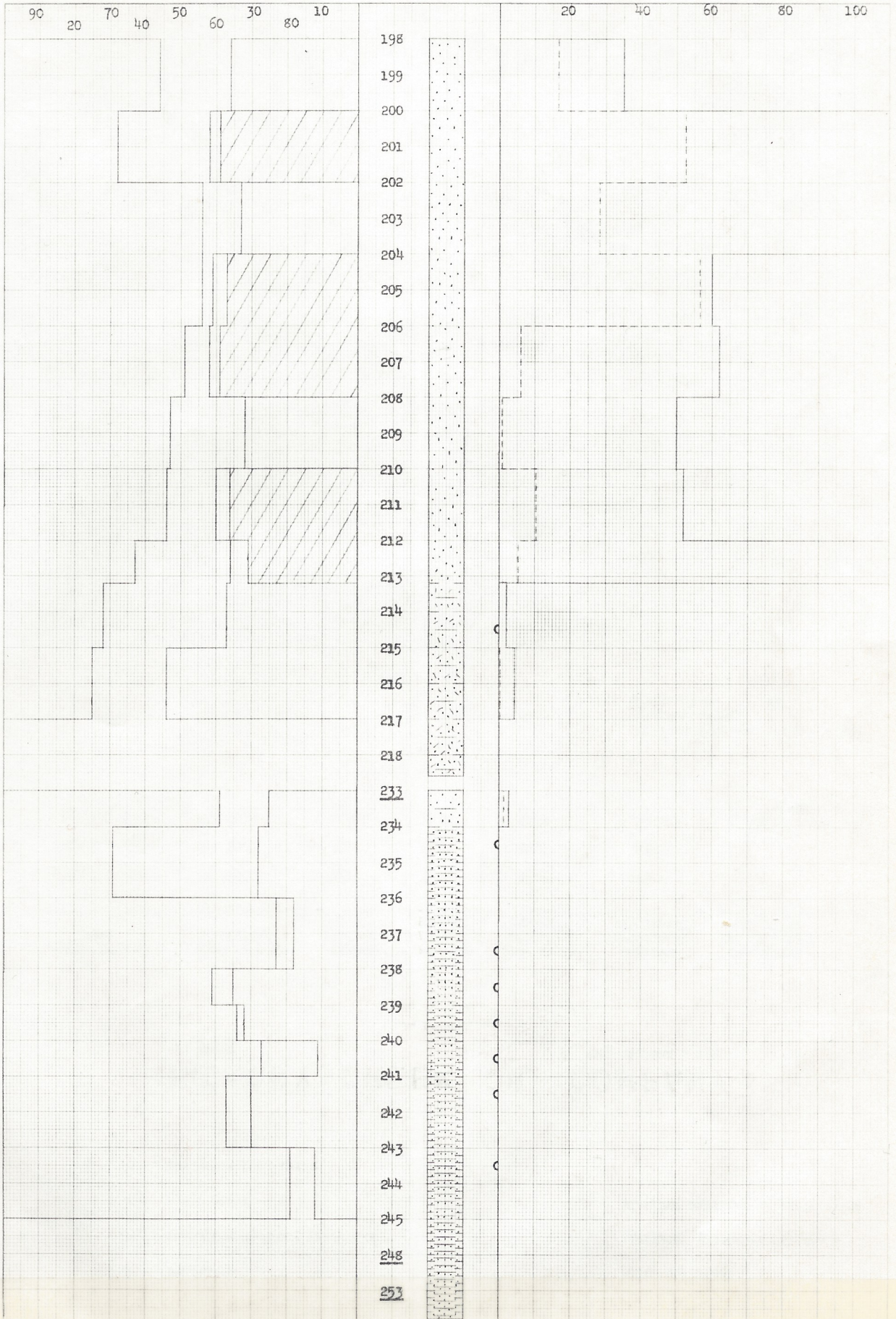
NOTE: Only those samples which recovered oil were used in calculating the above averages.

WATER SAT.,
PERCENT

OIL SAT.,
PERCENT

PERMEABILITY, IN MILLIDARCS

EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCS



745

346

121

248

253

KEY:



SANDSTONE



SHALY SANDSTONE



CARBONACEOUS SHALY SANDSTONE



LAMINATED SANDSTONE AND SHALE



SANDY SHALE



FLOODPOT RESIDUAL OIL SATURATION



IMPERMEABLE TO WATER

HICKORY CREEK OIL COMPANY

-- LEASE

WELL NO. HCO - 139

-- COUNTY, --

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCY'S	CALCULATED OIL RECOVERY, BBL'S./ACRE
198.0 - 213.2	15.2	23.4	37.8	46.6	187.2	
213.2 - 245.0	15.8	15.8	28.7	54.7	3.1	
198.0 - 245.0	31.0	19.5	33.2	50.7	143.0	2,600 (PRIMARY AND WATERFLOODING)

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CHANDLER, KANSAS
APRIL, 1960. HR