

HICKORY CREEK OIL COMPANY

CORE ANALYSIS REPORT

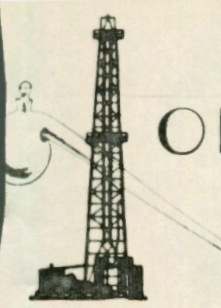
WELL NO. HCO-59

DEVUN #12

OILFIELD RESEARCH LABORATORIES

536 N. HIGHLAND

CHANUTE, KANSAS



OILFIELD RESEARCH LABORATORIES

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

November 15, 1979

Hickory Creek Oil Company
1128 Main Street
Parsons, Kansas 67357

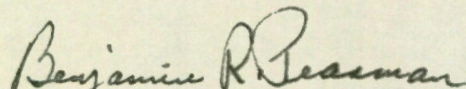
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from Well No. HCO-59, and submitted to our laboratory on October 30, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Benjamin R. Pearman

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



- REGISTERED ENGINEERS -

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

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GENERAL INFORMATION & SUMMARY

Company Hickory Creek Oil Company Lease - Well No. HCO-59

Location -

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

Name of Sand	-	
Top of Core	-	194.0
Bottom of Core	-	215.6
Top of Sand	-	194.0
Bottom of Sand	-	215.6
Total Feet of Permeable Sand	-	18.9
Total Feet of Floodable Sand	-	14.8

Distribution of Permeable Sand:
Permeability Range
Millidarcys

	Feet	Cum. Ft.
0 - 15	2.8	2.8
15 - 50	2.4	5.2
50 - 100	5.0	10.2
100 - 300	7.7	17.9
300 & Above	1.0	18.9

Average Permeability Millidarcys	-	101.4
Average Percent Porosity	-	21.0
Average Percent Oil Saturation	-	49.6
Average Percent Water Saturation	-	28.0
Average Oil Content, Bbls./A. Ft.	-	824.
Total Oil Content, Bbls./Acre	-	17,005.
Average Percent Oil Recovery by Laboratory Flooding Tests	-	8.1
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	-	139.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	-	2,063.
Total Calculated Oil Recovery, Bbls./Acre	-	See "Calculated Recovery" Section.
Packer Setting, Feet	-	
Viscosity, Centipoises @	-	
A. P. I. Gravity, degrees @ 60 °F	-	
Elevation, Feet	-	

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>
194.0 - 198.0	Brown sandstone.
198.0 - 198.7	Brown slightly shaly sandstone.
198.7 - 200.2	Brown sandstone.
200.2 - 200.4	Gray sandy shale.
200.4 - 212.8	Brown sandstone.
212.8 - 214.6	Light brown very shaly sandstone.
214.6 - 215.3	Gray sandy shale.
215.3 - 215.6	Brown very shaly sandstone.

LABORATORY FLOODING TESTS

The portion of the sand in this core from 194.0 feet to 209.0 feet responded to laboratory flooding tests, as a total recovery of 2,063 barrels of oil per acre was obtained from 14.8 feet of sand. The weighted average percent oil saturation was reduced from 54.6 to 46.5, or represents an average recovery of 8.1 percent. The weighted average effective permeability of the samples is 10.06 millidarcys, while the average initial fluid production pressure is 19.0 pounds per square inch (See Table V).

CALCULATED RECOVERY

The laboratory testing indicates that efficient primary and waterflooding operations in the vicinity of this well should recover approximately 5,000 barrels of oil per acre. This is an

DEVLIN #12

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-3-

average recovery of 338 barrels per acre foot from the 14.8 feet of floodable pay 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	12.0 / 8.6
Average porosity, percent	22.4 / 23.0
Oil saturation after flooding, percent	46.5 / 46.4
Performance factor, percent	✓ 50.0
Net floodable pay sand, feet	14.8 / 9.0

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Hickory Creek Oil Company Lease - Well No. HCO-59

4509.6 460.7 634 1986.48

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.		
1 193	194.5	21.5	63	14	77	1,051	150.	1.0	1.0	1,015	150.00
2 194	195.5	21.1	63	15	78	1,031	111.	1.0	2.0	1,031	111.00
3 195	196.5	23.9	59	16	75	1,094	189.	1.0	3.0	1,094	189.00
4 196	197.4	25.7	57	13	70	1,137	113.	1.0	4.0	1,137	113.00
5 197	198.4	25.2	55	17	72	1,075	203.	0.7	4.7	753	142.10
6 198	199.3	23.4	51	20	71	926	11.	1.5	6.2	1,389	16.50
7 199	200.6	19.9	52	26.5	78	803	25.	0.6	6.8	482	15.00
8 200	201.6	22.4	54	23	77	938	76.	1.0	7.8	938	76.00
9 201	202.4	23.7	48	24	72	883	149.	1.0	8.8	883	149.00
10 202	203.4	21.4	49	31	80	814	95.	1.0	9.8	814	95.00
11 203	204.5	24.0	56	21	77	1,043	68.	1.0	10.8	1,043	68.00
12 204	205.5	23.1	52	25	77	932	335.	1.0	11.8	932	335.00
13 205	206.6	21.7	46	32.5	78	774	157.	1.0	12.8	774	157.00
14 206	207.6	16.9	67	24	91	878	60.	1.0	13.8	878	60.00
15 207	208.4	19.6	48	36.5	84	730	101.	1.0	14.8	730	101.00
16 208	209.5	18.2	47	37.5	84	664	32.	1.0	15.8	664	32.00
17 209	210.6	20.9	33	26	59	535	74.	1.0	16.8	535	74.00
18 210	211.5	18.4	41	40	81	585	15.	1.0	17.8	585	15.00
19 211	212.4	19.5	41	41	82	620	22.	0.8	18.6	496	17.60
20 213	213.5	18.8	33	45	78	481	Imp.	1.0	19.6	481	0.00
21 213	214.5	8.6	23	70	93	154	Imp.	0.8	20.4	123	0.00
22 214	215.4	22.8	43	38	81	761	0.48	0.3	20.7	228	0.14

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Hickory Creek Oil Company Lease - DEVLIN 12 Well No. HCO-59

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
194.0 - 209.0	14.8	120.1	1,777.60
209.0 - 215.6	4.1	33.8	138.74
194.0 - 215.6	18.9	101.4	1,916.34

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
194.0 - 209.0	14.8	22.2	54.6	22.4	939	13,893
209.0 - 215.6	5.9	17.9	37.0	42.1	528	3,112
194.0 - 215.6	20.7	21.0	49.6	28.0	824	17,005

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Hickory Creek Oil Company	Lease	-	Well No.	HCO-59
Depth Interval, Feet	194.0 - 109.0				
Feet of Core Analyzed	14.8				
Average Percent Porosity	22.4				
Average Percent Original Oil Saturation	54.6				
Average Percent Oil Recovery	8.1				
Average Percent Residual Oil Saturation	46.5				
Average Percent Residual Water Saturation	47.9				
Average Percent Total Residual Fluid Saturation	94.4				
Average Original Oil Content, Bbls./A. Ft.	944.				
Average Oil Recovery, Bbls./A. Ft.	139.				
Average Residual Oil Content, Bbls./A. Ft.	805.				
Total Original Oil Content, Bbls./Acre	13,979.				
Total Oil Recovery, Bbls./Acre	2,063.				
Total Residual Oil Content, Bbls./Acre	11,916.				
Average Effective Permeability, Millidarcys	10.06				
Average Initial Fluid Production Pressure, p.s.i.	19.0				

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