

HICKORY CREEK OIL COMPANY

CORE ANALYSIS REPORT

WELL NO. HCO-68

W. Denlin 15

OILFIELD RESEARCH LABORATORIES

536 N. HIGHLAND

CHANUTE, KANSAS



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December 12, 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-68, and submitted to our laboratory on November 19, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman
Benjamin R. Pearman

BRP/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-68

Location —

Section — Twp — Rge — County — State —

Name of Sand	—
Top of Core	165.0
Bottom of Core	183.2
Top of Sand	165.0
Bottom of Sand	182.9
Total Feet of Permeable Sand	15.8
Total Feet of Floodable Sand	14.9

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

91 - 200	6.1	6.1
200 - 300	6.9	13.0
300 & Above	2.8	15.8
Average Permeability Millidarcys		219.5
Average Percent Porosity		23.4
Average Percent Oil Saturation		58.4
Average Percent Water Saturation		17.2
Average Oil Content, Bbls./A. Ft.		1,065.
Total Oil Content, Bbls./Acre		16,826.
Average Percent Oil Recovery by Laboratory Flooding Tests		23.8
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.		436.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre		6,501.
Total Calculated Oil Recovery, Bbls./Acre		
Packer Setting, Feet		
Viscosity, Centipoises @		
A. P. I. Gravity, degrees @ 60 °F		
Elevation, Feet		

See "Calculated
Recovery" Section.

This 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>
165.0 - 167.3	Dark brown sandstone.
167.3 - 167.6	Shale containing some coal seams.
167.6 - 169.4	Gray shale.
169.4 - 169.6	Gray laminated shaly sandstone.
169.6 - 174.5	Dark brown sandstone.
174.5 - 175.2	Gray laminated sandstone and shale.
175.2 - 182.9	Dark medium grained sandstone.
182.9 - 183.2	Gray laminated sandstone and shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests as a total recovery of 6,501 barrels of oil per acre was obtained from 14.9 feet of sand. The weighted average percent oil saturation was reduced from 60.6 to 36.8, or represents an average recovery of 23.8 percent. The weighted average effective permeability of the samples is 14.81 millidarcys, while the average initial fluid production pressure is 12.1 pounds per square inch (See Table V).

CALCULATED RECOVERY

A study of the data indicates that efficient primary and water-flooding operations in the vicinity of this well should recover approximately 6,900 barrels of oil per acre. This is an average recovery of 462 barrels per acre foot from the 14.9 feet of floodable pay sand analyzed in this core.

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

Original formation volume factor, estimated	✓ 1.03
Reservoir water saturation, percent, estimated	10.0 / 16.1 ✓
Average porosity, percent	23.6 / 23.8 ✓
Oil saturation after flooding, percent	36.8 / 36.4 ✓
Performance factor, percent, estimated	✓ 50.0
Net floodable pay sand, feet	14.9 / 15.0

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Hickory Creek Oil Company Lease - DEVLIN 15 Well No. HCO-68

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	165.9	24.5	49	27	76	931	255.	1.0	1.0	931	255.00
2	166.4	24.9	60	14	74	1159	331.	0.8	1.8	927	264.80
3	167.0	24.2	61	17	78	1145	125.	0.5	2.3	573	62.50
4	169.5	19.8	17	41	58	261	146.	0.2	2.5	52	29.20
5	170.6	25.1	61	10	71	1188	408.	1.4	3.9	1663	571.20
6	171.5	24.5	67	11	78	1274	306.	0.6	4.5	764	183.60
7	172.0	24.3	62	11	73	1169	218.	1.4	5.9	1637	305.20
8	173.5	18.8	68	24	92	992	91.	1.5	7.4	1488	136.50
9	175.1	21.8	23	34	57	389	255.	0.7	8.1	272	178.50
10	176.9	24.6	59	13	72	1126	266.	1.8	9.9	2027	478.80
11	177.3	24.2	60	13	73	1127	218.	1.0	10.9	1127	218.00
12	178.2	23.6	70	14	84	1282	226.	1.0	11.9	1282	226.00
13	179.5	24.1	50	25	75	935	146.	1.0	12.9	935	146.00
14	180.6	22.3	64	15	79	1107	149.	1.0	13.9	1107	149.00
15	181.5	24.3	61	18	79	1150	102.	1.0	14.9	1150	102.00
16	182.5	23.2	55	14	69	990	180.	0.9	15.8	891	162.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Hickory Creek Oil Company Lease _____ Well No. HCO-68

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
165.0 - 182.9	15.8	219.5	3,468.30

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
165.0 - 182.9	15.8	23.4	58.4	17.2	1,065	16,826

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Hickory Creek Oil Company	Lease	--	Well No.	HCO-68
Depth Interval, Feet	165.0 - 182.9				
Feet of Core Analyzed	14.9				
Average Percent Porosity	23.6				
Average Percent Original Oil Saturation	60.6				
Average Percent Oil Recovery	23.8				
Average Percent Residual Oil Saturation	36.8				
Average Percent Residual Water Saturation	59.8				
Average Percent Total Residual Fluid Saturation	96.6				
Average Original Oil Content, Bbls./A. Ft.	1107.				
Average Oil Recovery, Bbls./A. Ft.	436.				
Average Residual Oil Content, Bbls./A. Ft.	671.				
Total Original Oil Content, Bbls./Acre	16,501.				
Total Oil Recovery, Bbls./Acre	6,501.				
Total Residual Oil Content, Bbls./Acre	10,000.				
Average Effective Permeability, Millidarcys	14.81				
Average Initial Fluid Production Pressure, p.s.i.	12.1				

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