

HICKORY CREEK OIL COMPANY

CORE ANALYSIS REPORT


WELL NO. HCO-25

Flaherty 1

OILFIELD RESEARCH LABORATORIES

536 N. HIGHLAND

CHANUTE, KANSAS



OILFIELD RESEARCH LABORATORIES

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

August 6, 1979

Hickory Creek Oil Company
1128 Main
Parsons, Kansas 67357

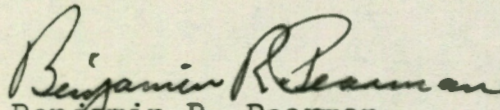
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from Well No. HCO-25, and submitted to our laboratory on August 1, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Benjamin R. Pearman

SAM:dlb

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



The core was sampled and the samples sealed in plastic bags by an agent of the client. The drilling fluid consisted of fresh water mud.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
180.0 - 181.4	Brown sandstone.
181.4 - 182.6	Light brown calcareous sandstone.
182.6 - 185.8	Brown sandstone.
185.8 - 186.4	Brown slightly carbonaceous sandstone.
186.4 - 187.7	Brown sandstone.
187.7 - 188.5	Laminated sandstone and shale, 80% sandstone and 20% shale.
188.5 - 189.5	Dark brownish black slightly carbonaceous sandstone.
189.5 - 191.8	Light brownish gray, very finely laminated sandstone and shale.
191.8 - 195.0	Light brown sandstone.
195.0 - 195.5	Laminated carbonaceous sandstone.
195.5 - 196.9	Brown sandstone.
196.9 - 197.6	Light gray laminated carbonaceous sandstone.
197.6 - 200.0	Brown sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 2,998 barrels of oil per acre was obtained from 13.6 feet of sand. The weighted average percent oil saturation was reduced from 51.0 to 35.7, or represents an average recovery of 15.3 percent. The weighted average effective permeability

FLAHARTY # 1

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of the samples is 2.90 millidarcys, while the average initial fluid production pressure is 23.9 pounds per square inch (See Table V).

CALCULATED RECOVERY

It would appear from a study of the data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 3,060 barrels of oil per acre. This is an average recovery of 225 barrels per acre foot from 13.6 feet of floodable sand analyzed in this core.

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

Original formation volume factor	1.03
Reservoir water saturation, percent	25.0 / 31.9
Average porosity, percent	17.4 / 28.2
Oil saturation after flooding, percent	35.7 / 35.0
Performance factor, percent	45.0
Net floodable pay sand, feet	13.6 / 9.0

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Hickory Creek Oil Company

Lease FLAHARTY - L

Well No. HCO-25

3800.9

328

794

658.19

Top
179'
PERF
D
ERF
9 Feet
PERF
88'

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.		
	179' 178 Top										
1	180.6	20.3	55	30	85	866	108.	1.4	1.4	1,212	151.20
2	181.6	19.6	62	26	88	943	78.	0.6	2.0	566	46.80
3	182.5	10.0	61	30	91	473	6.2	0.6	2.6	284	3.72
4	183.5	19.2	55	28	83	819	47.	1.4	4.0	1,147	65.80
5	184.5	19.4	50	29	79	753	62.	1.0	5.0	753	62.00
6	185.5	19.3	49	35	84	734	61.	0.8	5.8	587	48.80
7	186.5	18.2	51	31	82	720	103.	0.6	6.4	432	61.80
8	187.6	16.4 STALE	48	44	92	611	60.	0.7	7.1	428	42.00
9	188.6	19.0	54	34	88	796	23.	0.5	7.6	398	11.50
10	189.4	15.5	45	47	92	541	0.59	0.5	8.1	271	0.30
11	190.5	11.6	41	55	96	369	3.6	1.5	9.6	554	5.40
12	191.6	12.9	46	49	95	460	Imp.	0.8	10.4	368	0.00
13	192.7	13.3	38	57	95	392	7.5	1.2	11.6	470	9.00
14	193.7	17.1	51	35	86	677	43.	1.0	12.6	677	43.00
15	194.7	15.4	49	45	94	585	5.9	1.0	13.6	585	5.90
16	195.6	14.5	39	56	95	439	3.1	0.5	14.1	220	1.55
17	196.4	18.3	49	39	88	696	6.3	0.9	15.0	626	5.67
18	197.5	11.4	35	60	95	309	Imp.	0.7	15.7	216	0.00
19	198.3	18.4	59	30	89	842	21.	1.4	17.1	1,178	29.40
20	199.6	18.2	50	34	84	706	19.	1.0	18.1	706	19.00

NOT MOBILE

658.19

Oilfield Research Laboratories

SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Hickory Creek Oil Company Lease - Well No. HCO-25

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
180.0 - 189.5	7.6	65.0	493.62
189.5 - 200.0	9.0	13.6	121.92
180.0 - 200.0	16.6	37.1	615.54

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 Bbl./Acre
180.0 - 189.5	7.6	18.4	53.7	31.3	764	5,807
189.5 - 200.0	10.5	15.2	46.4	45.2	559	5,871
180.0 - 200.0	18.1	16.6	49.5	39.4	645	11,678

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Hickory Creek Oil Company

Lease FLAHERTY - L

Well No. HCO-25

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		770 Residual Saturation			Volume of Water Recovered cc*	41.31 Effective Permeability Millidarcys** WITH OIL IN WATER	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbbs./A. Ft.	%	Bbbs./A. Ft.	% Oil	% Water	Bbbs./A. Ft.			
1	180.6	20.7	55	883	29 ²⁷	466	26	72	417	378	6.60	20
2	181.6	19.1	62	919	28 ⁴⁵	415	34	61	504	103	2.10	20
3	182.5	10.5	61	497	15 ²⁴	122	46	50	375	0	0.01	35
4	183.5	19.6	55	836	26 ⁴⁷	395	29	68	441	245	5.25	10
5	184.5	19.9	50	772	15 ³⁰	232	35	63	540	271	5.17	10
6	185.5	19.8	49	753	19 ³⁶	292	30	68	461	279	6.60	15
7	186.5	18.7	51	740	15 ²⁹	218	36	61	522	291	8.58	15
8	187.6	16.5	48	614	9 ¹⁸	115	39	57	499	89	1.75	20
9	188.6	19.3	54	809	14	210	40	57	599	13	0.30	30
10	189.4	15.4	44	526	0	0	44	51	526	0	Imp.	-
11	190.5	12.0	41	382	5	47	36	59	335	0	0.01	10
12	191.6	12.9	46	460	0	0	46	50	460	0	Imp.	-
13	192.7	13.5	38	398	3	31	35	55	367	7	0.15	35
14	193.7	17.4	51	688	19	256	32	65	432	118	4.12	30
15	194.7	15.3	50	593	0	0	50	42	593	0	Imp.	-
16	195.6	14.5	38	427	0	0	38	57	427	0	Imp.	-
17	196.4	18.4	49	699	5	71	44	52	628	6	0.15	40
18	197.5	11.6	34	306	0	0	34	61	306	0	Imp.	-
19	198.3	18.4	59	842	13	186	46	49	656	4	0.07	45
20	199.6	18.4	50	714	0	0	50	44	714	18	0.45	40

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	Lease			Well No.
Hickory Creek Oil Company	-			HCO-25
Depth Interval, Feet	180.0 - 189.5	189.5 - 200.0	180.0 - 200.0	
Feet of Core Analyzed	7.6	6.0	13.6	
Average Percent Porosity	18.7	15.7	17.4	
Average Percent Original Oil Saturation	53.7	47.5	51.0	
Average Percent Oil Recovery	20.4	8.8	15.3	
Average Percent Residual Oil Saturation	33.3	38.7	35.7	
Average Percent Residual Water Saturation	63.8	55.8	60.3	
Average Percent Total Residual Fluid Saturation	97.1	94.5	96.0	
Average Original Oil Content, Bbls./A. Ft.	778.	591.	695.	
Average Oil Recovery, Bbls./A. Ft.	304.	115.	220.	
Average Residual Oil Content, Bbls./A. Ft.	474.	476.	475.	
Total Original Oil Content, Bbls./Acre	5,909.	3,547.	9,456.	
Total Oil Recovery, Bbls./Acre	2,310.	688.	2,998.	
Total Residual Oil Content, Bbls./Acre	3,599.	2,859.	6,458.	
Average Effective Permeability, Millidarcys	4.58	0.76	2.90	
Average Initial Fluid Production Pressure, p.s.i.	19.4	32.0	23.9	

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