



OILFIELD RESEARCH LABORATORIES

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

IS-133-21297

November 19, 1979

Hickory Creek Oil Company
1128 Main Street
Parsons, Kansas 67357

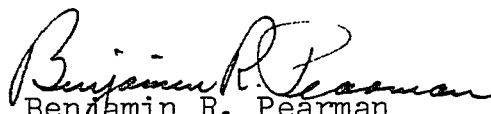
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from Well No. HCO-63, and submitted to our laboratory on November 7, 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

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GENERAL INFORMATION & SUMMARY

Company Hickory Creek Oil Company Lease - Well No. HCO-63

Location -

Section - Twp - Rge - County - State -

Name of Sand	- - - - -	-
Top of Core	- - - - -	175.0
Bottom of Core	- - - - -	199.9
Top of Sand	- - - - -	175.0
Bottom of Sand	- - - - -	199.9
Total Feet of Permeable Sand	- - - - -	24.7
Total Feet of Floodable Sand	- - - - -	18.2

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

Average Permeability Millidarcys	- - - - -	197.1
Average Percent Porosity	- - - - -	23.6
Average Percent Oil Saturation	- - - - -	46.3
Average Percent Water Saturation	- - - - -	32.8
Average Oil Content, Bbls./A. Ft.	- - - - -	847.
Total Oil Content, Bbls./Acre	- - - - -	20,914.
Average Percent Oil Recovery by Laboratory Flooding Tests	- - - - -	10.9
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	- - - - -	202.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	- - - - -	3,667.
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,</u> <u>Feet</u>	<u>Description</u>
175.0 - 181.6	Brown sandstone.
181.6 - 181.8	Light brown sandstone with micaceous partings.
181.8 - 193.0	Brown sandstone.
193.0 - 194.3	Light brown sandstone with micaceous partings.
194.3 - 196.1	Brown sandstone.
196.1 - 197.8	Light brown sandstone laminated with mica and carbon
197.8 - 199.9	Brown sandstone.

LABORATORY FLOODING TESTS

Especially the upper portion (175.0 feet to 190.0 feet) of the sand in this core responded to laboratory flooding tests. A total recovery of 3,667 barrels of oil per acre was obtained from 18.2 feet of sand. The weighted average percent oil saturation was reduced from 50.6 to 39.7, or represents an average recovery of 10.9 percent. The weighted average effective permeability of the samples is 13.78 millidarcys, while the average initial fluid production pressure is 14.7 pounds per square inch (See Table V).

CALCULATED RECOVERY

The results of the laboratory testing indicate that efficient primary and waterflooding operations in the vicinity of this well should recover approximately 7,120 barrels of oil per acre. This is an average recovery of 391 barrels per acre foot from the 18.2 feet of floodable sand analyzed in this core.

The following data and assumptions were used in calculating these recovery values.

Original formation volume factor, estimated	✓ 1.03
Reservoir water saturation, percent, estimated	15.0 / 23.2 ✓
Average porosity, percent	23.6 / 23.9 ✓
Oil saturation after flooding, percent	39.7 / 38.7 ✓
Performance factor, percent	✓ 50.0
Net floodable pay sand, feet	18.2 / 7.0 ✓

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Hickory Creek Oil Company Lease - H 10 Well No. HCO-63

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	175.5	24.9	51	19	70	985	470.	1.0	1.0	985	470.00
2	176.5	25.4	49	25	74	966	306.	1.0	2.0	966	306.00
3	177.5	23.9	47	31	78	872	180.	1.0	3.0	872	180.00
4	178.5	20.5	51	26	77	811	340.	1.0	4.0	811	340.00
5	179.5	24.7	80	18	98	1,533	235.	1.0	5.0	1,533	235.00
6	180.5	25.6	51	23	74	1,013	278.	1.0	6.0	1,013	278.00
7	181.5	25.0	61	12	73	1,183	306.	0.6	6.6	710	183.60
8	182.5	22.4	51	27	78	886	191.	1.2	7.8	1,063	229.20
9	183.5	24.0	54	26	80	1,005	180.	1.0	8.8	1,005	180.00
10	184.5	22.8	50	25	75	884	69.	1.0	9.8	884	69.00
11	185.5	23.6	44	33	77	806	90.	1.0	10.8	806	90.00
12	186.5	24.6	40	38	78	763	115.	1.0	11.8	763	115.00
13	187.5	22.6	45	31	76	789	14.	1.0	12.8	789	14.00
14	188.5	24.3	49	22	71	924	203.	1.0	13.8	924	203.00
15	189.5	24.4	51	19	70	965	306.	1.0	14.8	965	306.00
16	190.5	23.6	35	50	85	641	104.	1.0	15.8	641	104.00
17	191.5	22.2	48	37	85	827	175.	1.0	16.8	827	175.00
18	192.5	23.9	42	37	79	779	130.	1.0	17.8	779	130.00
19	193.5	20.4	51	31	82	807	120.	1.3	19.1	1,049	156.00
20	194.5	22.5	34	48	82	594	366.	0.7	19.8	415	256.20
21	195.5	25.1	42	38	80	818	139.	1.1	20.9	900	152.90
22	196.5	21.8	33	48	81	558	266.	0.9	21.8	502	239.40
23	197.5	23.5	27	51	78	492	130.	0.8	22.6	394	104.00
24	198.5	24.6	32	58	90	611	138.	1.2	23.8	734	165.60
25	199.5	24.6	34	46	80	649	208.	0.9	24.7	584	187.20
	4687.5	590.9		819.			5059				

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Hickory Creek Oil Company Lease - Well No. HCO-63

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
175.0 - 190.0	14.8	216.1	3,198.80
190.0 - 199.9	9.9	168.7	1,670.30
175.0 - 199.9	24.7	197.1	4,869.10

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
175.0 - 190.0	14.8	23.8	51.4	25.4	952	14,089
190.0 - 199.9	9.9	23.2	38.5	43.9	689	6,825
175.0 - 199.9	24.7	23.6	46.3	32.8	847	20,914

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Hickory Creek Oil Company Lease H - 10 Well No. HCO-63

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.
			%	Bbbs./A. Ft.	%	Bbbs./A. Ft.	% Oil	% Water	Bbbs./A. Ft.			
173.5												173.5
1	175.5	24.4	51	965	10	189	41	50	776	436	36.05	15
2	176.5	25.5	49	969	13	257	36	57	712	330	27.95	15
3	177.5	24.3	47	886	8	151	39	57	735	190	9.96	15
4	178.5	20.8	51	823	14	226	37	57	597	361	23.15	10
5	179.5	25.0	80	1,552	38	737	42	52	815	223	25.44	10
6	180.5	25.3	51	1,001	19	373	32	53	628	180	14.17	15
7	181.5	24.7	61	1,169	17	326	44	51	843	194	12.32	15
8	182.5	22.7	51	898	10	176	41	54	722	241	12.15	15
9	183.5	24.0	54	1,005	10	186	44	53	819	244	7.94	20
10	184.5	22.4	50	869	17	295	33	64	574	389	7.54	20
11	185.5	23.2	44	792	7	126	37	58	666	435	7.81	15
12	186.5	24.1	40	748	2	37	38	56	711	298	14.19	15
13	187.5	22.7	45	792	3	53	42	57	739	334	4.08	15
14	188.5	24.6	49	935	12	229	37	56	706	228	16.59	15
15	189.5	24.6	51	973	11	210	40	55	763	191	14.60	15
16	190.5	23.6	36	659	0	0	36	62	659	461	5.39	15
17	191.5	22.5	48	838	5	87	43	54	751	237	8.18	10
18	192.5	23.5	42	766	0	0	42	56	766	476	5.10	15
19	193.5	20.7	50	803	3	48	47	47	755	456	5.04	15
20	194.5	22.7	34	599	0	0	34	64	599	234	8.50	15
21	195.5	24.7	42	805	2	38	40	55	767	384	4.25	15
22	196.5	22.2	34	586	0	0	34	65	586	252	11.01	10
23	197.5	23.3	27	488	0	0	27	68	488	356	3.68	15
24	198.5	25.0	30	582	0	0	30	61	582	268	8.50	10
25	199.5	24.4	34	644	0	0	34	58	644	471	6.30	10
											299.89	

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.

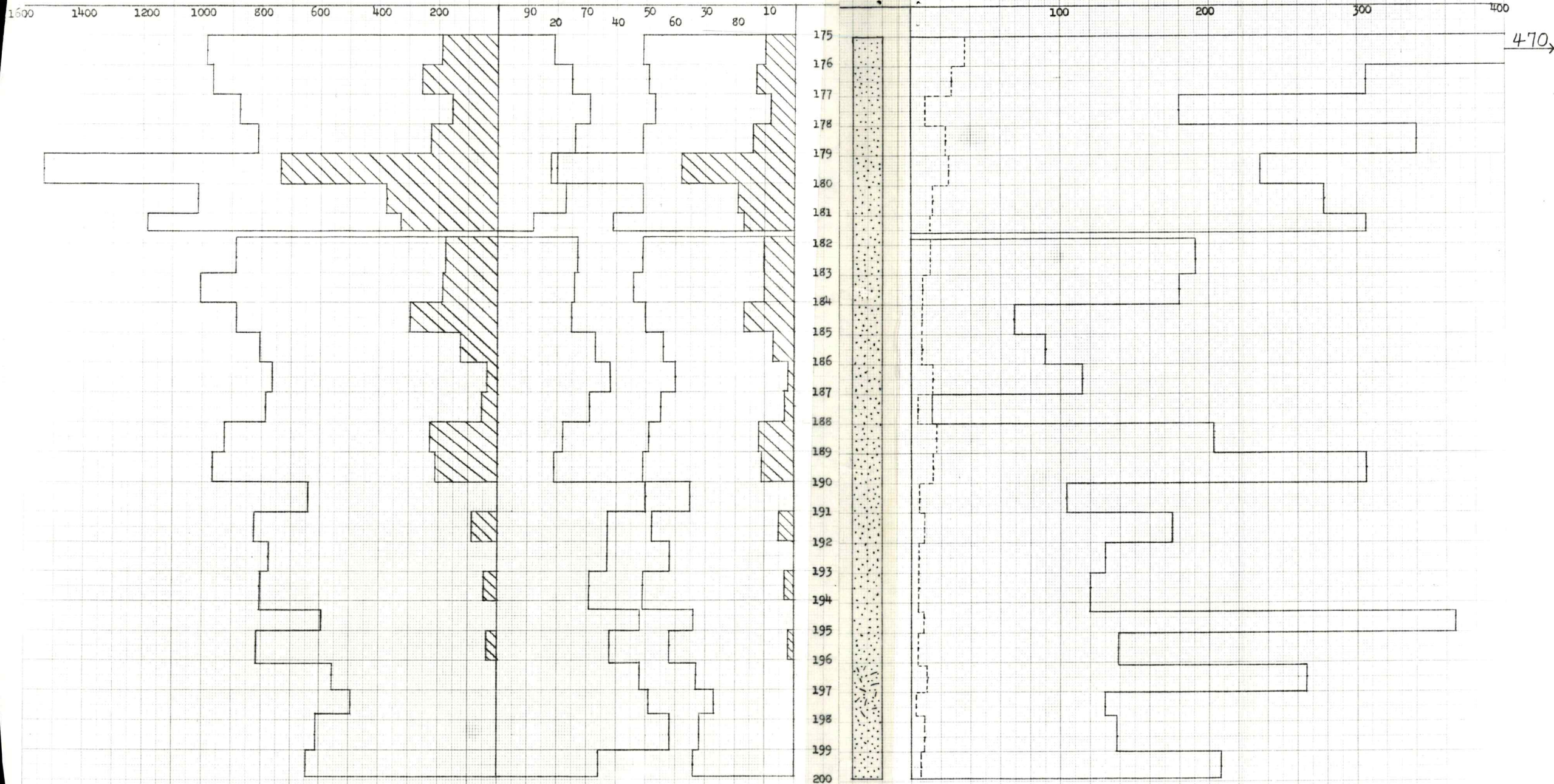
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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Hickory Creek Oil Company		Lease	-	Well No.	HCO-63
Depth Interval, Feet	175.0 - 190.0	190.0 - 199.9	175.0 - 199.9			
Feet of Core Analyzed	14.8	3.4	18.2			
Average Percent Porosity	23.8	22.6	23.6			
Average Percent Original Oil Saturation	51.3	46.9	50.6			
Average Percent Oil Recovery	12.6	3.3	10.9			
Average Percent Residual Oil Saturation	38.7	43.6	39.7			
Average Percent Residual Water Saturation	55.5	51.6	54.9			
Average Percent Total Residual Fluid Saturation	94.2	95.2	94.6			
Average Original Oil Content, Bbls./A. Ft.	952.	814.	927.			
Average Oil Recovery, Bbls./A. Ft.	234.	56.	202.			
Average Residual Oil Content, Bbls./A. Ft.	718.	758.	725.			
Total Original Oil Content, Bbls./Acre	14,089.	2,767.	16,856.			
Total Oil Recovery, Bbls./Acre	3,476.	191.	3,667.			
Total Residual Oil Content, Bbls./Acre	10,613.	2,576.	13,189.			
Average Effective Permeability, Millidarcys	15.62	5.71	13.78			
Average Initial Fluid Production Pressure, p.s.i.	15.	13.3	14.7			

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

OIL CONTENT,
BBL./A. FT.WATER SAT.,
PERCENTOIL SAT.,
PERCENTEFFECTIVE PERMEABILITY, IN MILLIDARCY
AIR PERMEABILITY, IN MILLIDARCY

KEY:

SANDSTONE

CARBONACEOUS SANDSTONE

FLOOD POT RECOVERY

HICKORY CREEK OIL COMPANY

LEASE

COUNTY

WELL NO. HCO-63

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVG. OIL CONTENT BBL./A. FT.	TOTAL OIL CONTENT BBL./ACRE	AVG. AIR PERMEABILITY, MILLIDARCY	CALCULATED OIL RECOVERY, BBL./ACRE
175.0 - 190.0	14.8	23.8	51.4	25.4	952	14,089	216.1	
190.0 - 199.9	9.9	23.2	38.5	43.9	689	6,825	168.7	
175.0 - 199.9	24.7	23.6	46.3	32.8	847	20,914	197.1	7,120 (PRIMARY & WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
NOVEMBER, 1979 JR