

OILFIELD RESEARCH LABORATORIES

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

December 15, 1982

Jackson Brothers Drilling
514 North Main
Eureka, Kansas 67045

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Honhart Lease, Well No. 12, located in Greenwood County, Kansas and submitted to our laboratory on December 9, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/rmc

5 c to Eureka

- REGISTERED ENGINEERS -

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

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GENERAL INFORMATION & SUMMARY

Company Jackson Brothers Drilling Lease Honhart Well No. 12
 Location 990' NSL & 330' EWL
 Section 7 Twp. 26S Rge. 10E County Greenwood State Kansas

Elevation, Feet

Name of <u> </u> Formation	Mississippi
Top of Core	2153.0
Bottom of Core	2170.7
Top of <u> </u> Limestone	2153.0
Bottom of <u> </u> Limestone (Tested)	2170.3
Total Feet of Permeable <u> </u> Limestone	14.0
Total Feet of Floodable <u> </u> Limestone	4.3

Distribution of Permeable Sand:
 Permeability Range
 Millidarcys

	Feet	Cum. Ft.
0 - 2	4.1	4.1
2 - 4	5.0	9.1
4 - 8	1.0	10.1
8 - 14	3.9	14.0

Average Permeability Millidarcys	4.4
Average Percent Porosity	15.3
Average Percent Oil Saturation	20.9
Average Percent Water Saturation	74.7
Average Oil Content, Bbls./A. Ft.	230.
Total Oil Content, Bbls./Acre	3,583.
Average Percent Oil Recovery by Laboratory Flooding Tests	6.8
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	65.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	281.
Total Calculated Oil Recovery, Bbls./Acre	

See "Calculated Recovery"
 Section

-2-

The core was sampled and the samples sealed in plastic bags by a representative of the client. Fresh water mud was used as a drilling fluid. The core was reported to be from a virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
2153.0 - 2154.9	Grayish brown limestone with very small vuggs containing two vertical fractures.
2154.9 - 2155.6	Grayish brown limestone containing a vertical fracture.
2155.6 - 2156.5	Light gray slightly shaly limestone containing a vertical fracture.
2156.5 - 2159.5	Light gray limestone containing two vertical fractures.
2159.5 - 2160.6	Grayish brown limestone.
2160.6 - 2164.6	Grayish brown slightly sandy limestone containing a vertical fracture.
2164.6 - 2165.6	Grayish brown slightly shaly limestone.
2165.6 - 2168.3	Light gray limestone.
2168.3 - 2168.6	Light gray very shaly limestone.
2168.6 - 2169.4	Light gray limestone containing a vertical fracture.
2169.4 - 2170.3	Light gray very shaly limestone.
2170.3 - 2170.7	Light gray limestone containing a vertical fracture.

LABORATORY FLOODING TESTS

The formation in this core responded to laboratory flooding tests, as a total recovery of 281 barrels of oil per acre was obtained from 4.3 feet of formation. The weighted average percent oil saturation was reduced from 34.7 to 27.9, or represents an average recovery of 6.8 percent. The weighted average effective permeability of the samples is 0.42 millidarcys, while the average initial fluid production pressure is 40.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 18 samples tested, 6 produced water and oil, and 7 produced water only. This indicates that approximately 33 percent of the formation represented by these samples is floodable formation.

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 690 barrels of oil per acre. This is an average recovery of 160 barrels per acre foot from 4.3 feet of floodable formation analyzed in this core.

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

Original formation volume factor, estimated	1.15
Reservoir water saturation, percent, estimated	40.0
Average porosity, percent	14.2
Oil saturation after flooding, percent	27.9
Performance factor, percent, estimated	60.0
Net floodable formation, feet	4.3

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CHANUTE, KANSAS

ACID SOLUBILITY TESTS

Company Jackson Brothers Drilling Lease Honhart
Well No. 12 County Greenwood State Kansas
Date Received 12-9-82 Section 7 T 26S R 10E

<u>SAMPLE NO.</u>	<u>DEPTH FEET</u>	<u>PERCENT SOLUBLE in HCl</u>
1	2153.6	85.0
2	2154.4	97.2
3	2155.5	90.2
4	2156.4	78.9
5	2157.6	90.1
6	2158.5	80.9
7	2159.6	93.5
8	2160.5	96.8
9	2161.4	63.4
10	2162.5	90.7
11	2163.5	94.7
12	2164.4	75.6
13	2165.4	59.4
14	2166.4	87.8
15	2167.5	89.4
16	2168.5	2.4
17	2169.5	3.3
18	2170.2	4.5

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE I-B

Company Jackson Brothers Drilling Lease Honhart Well No. 12

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			Ft.	Cum. Ft.		
1	2153.6	13.8	32	64	343	10.	1.0	1.0	343	10.00
2	2154.4	13.6	31	66	327	13.	0.9	1.9	294	11.70
3	2155.5	7.3	40	58	227	Imp.	0.7	2.6	159	0.00
4	2156.4	16.1	3	91	37	Imp.	0.9	3.5	33	0.00
5	2157.6	17.4	7	89	95	2.0	1.2	4.7	114	2.40
6	2158.5	12.1	2	95	19	0.44	0.9	5.6	17	0.40
7	2159.6	14.8	15	83	172	3.1	0.5	6.1	86	1.55
8	2160.5	9.9	65	31	499	1.2	0.6	6.7	299	0.72
9	2161.4	12.6	54	44	528	4.9	1.0	7.7	528	4.90
10	2162.5	19.7	29	63	443	8.0	1.0	8.7	443	8.00
11	2163.5	18.6	35	61	505	8.9	1.0	9.7	505	8.90
12	2164.4	18.1	16	77	225	3.3	1.0	10.7	225	3.30
13	2165.4	14.7	10	83	114	1.5	1.0	11.7	114	1.50
14	2166.4	18.7	3	93	44	2.7	1.4	13.1	62	3.78
15	2167.5	15.5	15	82	180	1.6	1.3	14.4	234	2.08
16	2168.5	14.8	16	80	184	1.0	0.3	14.7	55	0.30
17	2169.5	15.5	11	81	132	2.7	0.4	15.1	53	1.08
18	2170.2	16.0	3	92	37	2.1	0.5	15.6	19	1.05

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Well No. 12

Lease Honhart

Company Jackson Brothers Drilling

Company

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			
1	2153.6	13.9	32	345	0	0	32	67	345	1.12	40
2	2154.4	13.5	31	325	5	52	26	72	273	0.52	50
3	2155.5	7.4	40	230	0	0	40	58	230	Imp.	-
4	2156.4	16.0	3	37	0	0	3	92	37	Imp.	-
5	2157.6	17.6	7	96	0	0	7	89	96	Imp.	-
6	2158.5	12.3	2	19	0	0	2	96	19	Imp.	-
7	2159.6	14.9	15	173	2	23	13	84	150	0.23	40
8	2160.5	10.0	65	504	17	132	48	49	372	0.30	35
9	2161.4	12.6	54	528	11	108	43	55	420	0.15	40
10	2162.5	19.6	29	441	0	0	29	63	441	Imp.	-
11	2163.5	18.7	35	508	0	0	35	63	508	0.30	40
12	2164.4	18.2	16	226	2	28	14	85	198	0.67	40
13	2165.4	14.9	10	116	0	0	10	88	116	0.60	35
14	2166.4	18.9	3	44	0	0	3	95	44	0.60	35
15	2167.5	15.4	15	179	0	0	15	82	179	0.17	40
16	2168.5	14.8	16	184	2	23	14	84	161	0.67	35
17	2169.5	16.1	10	125	0	0	10	87	125	0.37	50
18	2170.2	16.2	3	38	0	0	3	94	38	0.45	50

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	Jackson Brothers Drilling	Lease	Honhart	Well No.	12
Depth Interval, Feet	2153.0 - 2160.0	2160.0 - 2164.6	2164.6 - 2170.3	2170.3 - 2174.9	2174.9 - 2180.5
Feet of Core Analyzed	1.4	2.6	0.3	4.3	
Average Percent Porosity	14.1	14.2	14.7	14.2	14.2
Average Percent Original Oil Saturation	25.3	41.9	16.0	34.7	
Average Percent Oil Recovery	3.9	8.9	2.0	6.8	
Average Percent Residual Oil Saturation	21.4	33.0	14.0	27.9	
Average Percent Residual Water Saturation	76.3	65.2	84.0	70.1	
Average Percent Total Residual Fluid Saturation	97.7	98.2	98.0	98.0	
Average Original Oil Content, Bbls./A. Ft.	271.	406.	183.	346.	
Average Oil Recovery, Bbls./A. Ft.	42.	83.	23.	65.	
Average Residual Oil Content, Bbls./A. Ft.	229.	323.	160.	281.	
Total Original Oil Content, Bbls./Acre	380.	1,056.	55.	1,491.	
Total Oil Recovery, Bbls./Acre	59.	215.	7.	281.	
Total Residual Oil Content, Bbls./Acre	321.	841.	48.	1,210.	
Average Effective Permeability, Millidarcys	0.42	0.38	0.67	0.42	
Average Initial Fluid Production Pressure, p.s.i.	45.0	38.3	35.0	40.0	

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

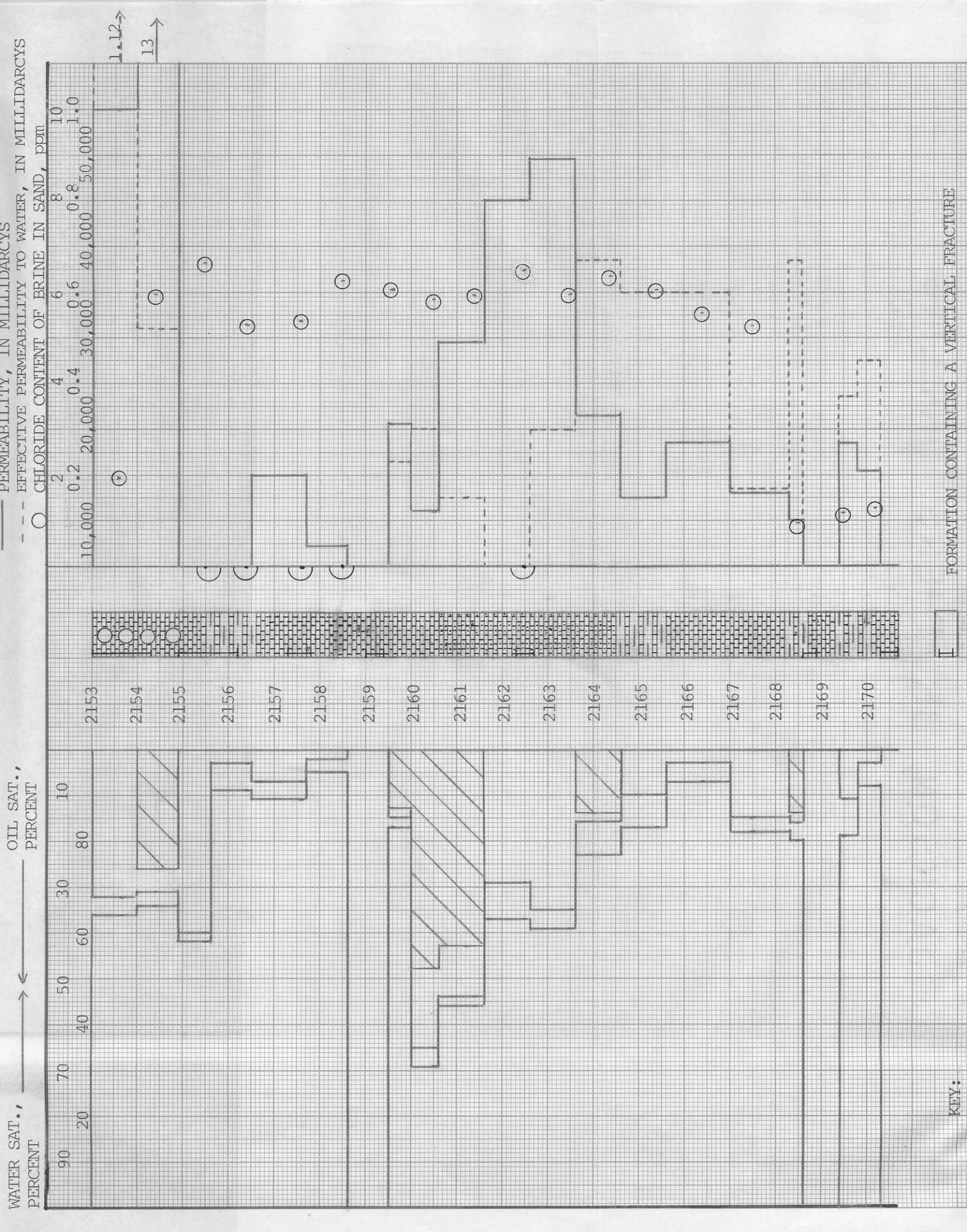
Oilfield Research Laboratories
RESULTS OF WATER DIFFERENTIATION TESTS

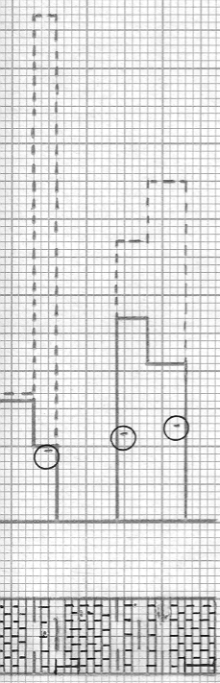
TABLE VI

Company Jackson Brothers Drilling Lease Honhart Well No. 12

Sample No.	Depth, Feet	Chloride Content of Brine in Sand ppm	Percent Connate Water Saturation Drilling & Foreign	Total
1	2153.6	14,544.		
2	2154.4	34,832.		
3	2155.5	38,034.		
4	2156.4	31,468.		
5	2157.6	31,818.		
6	2158.5	36,388.		
7	2159.6	35,319.		
8	2160.5	34,331.		
9	2161.4	34,559.		
10	2162.5	37,459.		
11	2163.5	34,749.		
12	2164.4	36,800.		
13	2165.4	35,220.		
14	2166.4	32,612.		
15	2167.5	31,319.		
16	2168.5	9,842.		
17	2169.5	10,998.		
18	2170.2	11,426.		

Note: ppm — parts per million





FORMATION CONTAINING A VERTICAL FRACTURE

KEY:



VUGGY LIMESTONE



SHALY LIMESTONE



IMPERMEABLE TO WATER



LIMESTONE



SANDY LIMESTONE



FLOODPOT RESIDUAL OIL SATURATION

JACKSON BROTHERS DRILLING

HONHART LEASE

WELL NO. 12

GREENWOOD COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY BBLs. / ACRE
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2153.0 - 2160.0	6.1	13.9	17.8	78.6	5.8	690 (PRIMARY AND WATERFLOODING)
2160.0 - 2164.6	4.6	16.3	37.6	57.3	5.6	
2164.6 - 2170.3	4.9	16.3	9.1	86.2	2.0	
2153.0 - 2170.3	15.6	15.3	20.9	74.7	4.4	

OILFIELD RESEARCH LABORATORIES
 CHANUTE, KANSAS
 DECEMBER, 1982 PDC