

OILFIELD RESEARCH LABORATORIES

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

June 3, 1980

Rantoul Energy Corporation
Box 516
Hutchinson, Kansas 67501

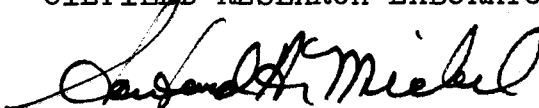
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Hahn Lease, Well No. 12, Franklin County, Kansas, and submitted to our laboratory on April 29, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Sanford A. Michel

SAM/tem

5 c to Hutchinson, Kansas

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GENERAL INFORMATION & SUMMARY

Company Rantoul Energy Corporation Lease Hahn Well No. 12

Location 440' EWL. & 220' SNL SE $\frac{1}{4}$

Section 22 Twp 18S Rge 21E County Franklin State Kansas

Elevation, Feet - - - - -

Name of Sand - - - - - Squirrel

Top of Core - - - - - 585.0

Bottom of Core - - - - - 591.0

Top of Sand - - - - - 585.0

Bottom of Sand - - - - - 591.0

Total Feet of Permeable Sand - - - - - 3.0

Total Feet of Floodable Sand - - - - - 2.0

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

0 - 5 1.0 1.0

5 - 10 2.0 3.0

Average Permeability Millidarcys - - - - - 5.4

Average Percent Porosity - - - - - 16.6

Average Percent Oil Saturation - - - - - 38.7

Average Percent Water Saturation - - - - - 51.2

Average Oil Content, Bbls./A. Ft. - - - - - 504.

Total Oil Content, Bbls./Acre - - - - - 2,720.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 4.5

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 66.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 131.

Total Calculated Oil Recovery, Bbls./Acre - - - - - See "Calculated Recovery" Section.

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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.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
585.0 - 587.0	Brown shaly slightly calcareous sandstone.
587.0 - 587.6	Hard gray limestone.
587.6 - 588.0	Brown shaly slightly calcareous sandstone.
588.0 - 589.8	Brown and gray laminated sandstone and shale.
589.8 - 591.0	Brown shaly sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 131 barrels of oil per acre was obtained from 2.0 feet of sand. The weighted average percent oil saturation was reduced from 36.5 to 32.0, or represents an average recovery of 4.5 percent. The weighted average effective permeability of the samples is 0.15 millidarcys, while the average initial fluid production pressure is 30.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 6 samples tested, 2 produced water and oil. This indicates that approximately 33 percent of the sand represented by these samples is floodable pay sand.

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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 400 barrels of oil per acre. This is an average recovery of 194 barrels per acre foot from 2.0 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.04
Reservoir water saturation, percent, estimated	40.0
Average porosity, percent	17.7
Oil saturation after flooding, percent,	32.0
Performance factor, percent, estimated	55.0
Net floodable sand, feet	2.0

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Rantoul Energy Corporation Lease Hahn 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	Total			Ft.	Cum. Ft.		
1	585.5	15.5	30	62	92	361	5.1	1.0	1.0	361	5.10
2	586.7	19.8	43	51	94	661	10.	1.0	2.0	661	10.00
3	587.8	14.7	36	16	52	411	Imp.	0.4	2.4	164	0.00
4	588.5	15.9	20	72	92	247	1.1	1.0	3.4	247	1.10
5	589.5	15.1	49	42	91	574	Imp.	0.8	4.2	459	0.00
6	590.4	17.1	52	43	95	690	Imp.	1.2	5.4	828	0.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Rantoul Energy Corporation		Lease	Hahn	Well No.		12
	Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.			
	585.0 - 591.0	3.0	5.4	16.20			
	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 Bbbl./Acre
	585.0 - 591.0	5.4	16.6	38.7	51.2	504	2,720

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company		Rantoul Energy Corporation		Lease		Hahn		Well No.		12	
Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation		Volume of Water Recovered cc ^o	Effective Permeability Millidarcys ^{oo}	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water			
1	585.5	15.8	30	368	2	25	28	67	12	0.15	30
2	586.7	19.6	43	654	7	106	36	56	12	0.15	30
3	587.8	14.7	36	411	0	0	36	60	0	Imp.	-
4	588.5	16.0	20	248	0	0	20	73	0	Imp.	-
5	589.5	15.0	49	570	0	0	49	44	0	Imp.	-
6	590.4	17.1	52	690	0	0	52	43	0	Imp.	-

Notes: cc—cubic centimeter.

^o—Volume of water recovered at the time of maximum oil recovery.

^{oo}—Determined by passing water through sample which still contains residual oil.

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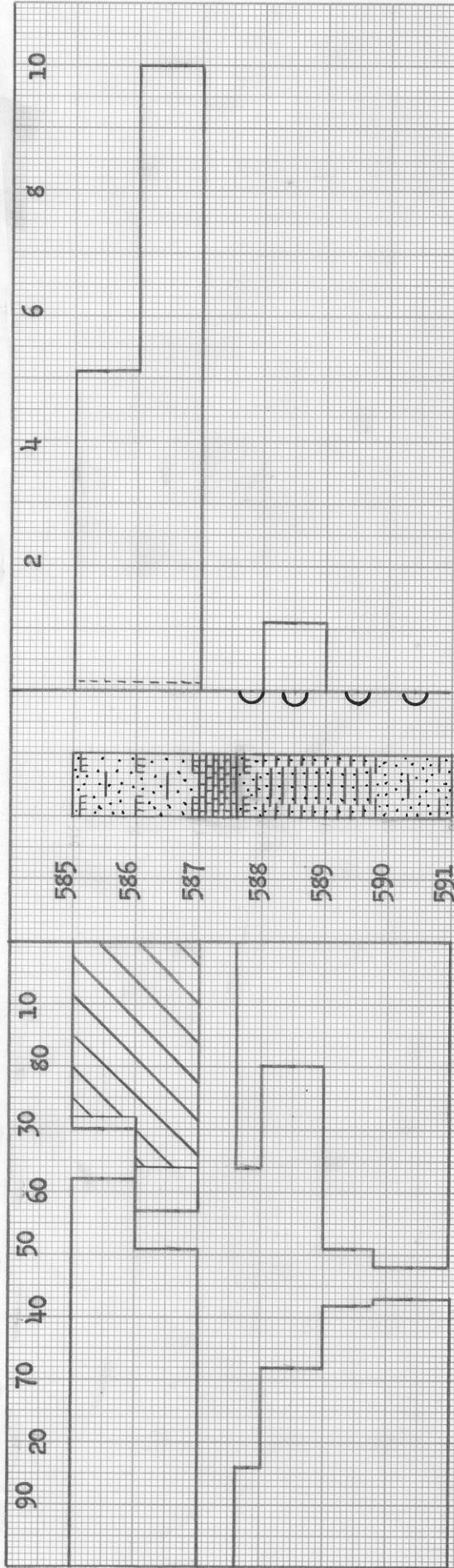
SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Rantoul Energy Corporation	Lease	Hahn	Well No.	12
Depth Interval, Feet	585.0 - 591.0				
Feet of Core Analyzed	2.0				
Average Percent Porosity	17.7				
Average Percent Original Oil Saturation	36.5				
Average Percent Oil Recovery	4.5				
Average Percent Residual Oil Saturation	32.0				
Average Percent Residual Water Saturation	61.5				
Average Percent Total Residual Fluid Saturation	93.5				
Average Original Oil Content, Bbls./A. Ft.	512.				
Average Oil Recovery, Bbls./A. Ft.	66.				
Average Residual Oil Content, Bbls./A. Ft.	446.				
Total Original Oil Content, Bbls./Acre	1,022.				
Total Oil Recovery, Bbls./Acre	131.				
Total Residual Oil Content, Bbls./Acre	891.				
Average Effective Permeability, Millidarcys	0.15				
Average Initial Fluid Production Pressure, p.s.i.	30.0				

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

WATER SAT., ——— PERMEABILITY, IN MILLIDARCS
PERCENT ← OIL SAT., PERCENT
----- EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCS



KEY:

SHALY CALCAREOUS SANDSTONE

LIMESTONE

○

LAMINATED SANDSTONE & SHALE

FLOODPOT RESIDUAL OIL SATURATION

SHALY SANDSTONE

○ IMPERMEABLE TO WATER

RANTOUL ENERGY CORP.

HAHN LEASE

WELL NO. 12

FRANKLIN COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE POROSITY PERCENT	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY MILLIDARCS	CALCULATED OIL RECOVERY BBLs./ACRE
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585.0 - 591.0	5.4	16.6	38.7	51.2	5.4	400 (PRIMARY & WATERFLOODING)
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CHANUTE, KANSAS
JUNE, 1980
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