

OILFIELD RESEARCH LABORATORIES

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

May 7, 1981

Beachner Construction
St. Paul, Kansas 66771

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Moore Lease, Well No. 4, located in Labette County, Kansas and submitted to our laboratory on April 27, 1981.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

5 c to St. Paul, Kansas

- REGISTERED ENGINEERS -

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

Oilfield Research Laboratories
GENERAL INFORMATION & SUMMARY

Company Beachner Construction Lease Moore Well No. 4
 Location _____
 Section 36 Twp. 31S Rge. 19E County Labette State Kansas

Elevation, Feet

Name of Sand.....

Bartlesville

Top of Core

436.0

Bottom of Core

445.4

Top of Sand

436.0

Bottom of Sand

444.0

Total Feet of Permeable Sand

7.0

Total Feet of Floodable Sand

3.0

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 2	4.0	4.0
35 - 60	3.0	7.0

Average Permeability Millidarcys

20.6

Average Percent Porosity

16.5

Average Percent Oil Saturation

41.6

Average Percent Water Saturation

32.3

Average Oil Content, Bbls./A. Ft.

533.

Total Oil Content, Bbls./Acre

4,263.

Average Percent Oil Recovery by Laboratory Flooding Tests

3.7

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

54.

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

162.

Total Calculated Oil Recovery, Bbls./Acre

See "Calculated Recovery"
Section

The core was sampled and the samples sealed in plastic bags by a representative of the client. 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>
436.0 - 437.0	Grayish brown slightly calcareous shaly sandstone.
437.0 - 440.0	Brown slightly calcareous sandstone.
440.0 - 444.0	Grayish brown slightly calcareous shaly sandstone.
444.0 - 445.4	Gray shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 162 barrels of oil per acre was obtained from 3.0 feet of sand. The weighted average percent oil saturation was reduced from 39.7 to 36.0, or represents an average recovery of 3.7 percent. The weighted average effective permeability of the samples is 8.32 millidarcys, while the average initial fluid production pressure is 16.7 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 8 samples tested, 3 produced water and oil. This indicates that approximately 37.5 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 1,010 barrels of oil per acre. This is an average recovery of 338 barrels per acre foot from 3.0 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.03
Reservoir water saturation, percent, estimated	20.0
Average porosity, percent	19.0
Oil saturation after flooding, percent	36.0
Performance factor, percent, estimated	55.0
Net floodable sand, feet	3.0

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Beachner Construction Lease Moore Well No. 4

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	436.5	15.7	57	32	89	694	1.4	1.0	1.0	694	1.40
2	437.6	17.8	45	24	69	621	47.	1.0	2.0	621	47.00
3	438.5	18.7	36	30	66	522	36.	1.0	3.0	522	36.00
4	439.5	20.1	40	20	60	624	58.	1.0	4.0	624	58.00
5	440.5	15.1	35	36	71	410	1.1	1.0	5.0	410	1.10
6	441.5	14.6	28	48	76	317	0.76	1.0	6.0	317	0.76
7	442.5	15.4	54	33	87	645	0.26	1.0	7.0	645	0.26
8	443.6	14.6	38	35	73	430	Imp.	1.0	8.0	430	0.00

SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Beachner Construction	Lease	Moore	Well No.	4
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
436.0 - 440.0	4.0	35.6	142.40		
440.0 - 444.0	3.0	0.7	2.12		
436.0 - 444.0	7.0	20.6	144.52		
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Total Oil Content Bbls./Acre
436.0 - 440.0	4.0	18.1	44.5	26.5	2,461
440.0 - 444.0	4.0	14.9	38.8	38.0	1,802
436.0 - 444.0	8.0	16.5	41.6	32.3	4,263

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Beachner Construction Lease Moore Well No. 4

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	436.5	15.6	57	690	0	0	57	33	0	Imp.	-
2	437.6	18.1	44	618	3	42	41	51	358	6.15	20
3	438.5	18.6	36	519	4	57	32	66	292	7.95	15
4	439.5	20.4	39	617	4	63	35	52	264	10.87	15
5	440.5	15.2	35	413	0	0	35	37	0	Imp.	-
6	441.5	14.9	27	312	0	0	27	50	0	Imp.	-
7	442.5	15.6	53	641	0	0	53	35	0	Imp.	-
8	443.6	14.8	37	425	0	0	37	37	0	Imp.	-

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 Beachner Construction Lease Moore Well No. 4

Depth Interval, Feet 436.0 - 440.0

Feet of Core Analyzed 3.0

Average Percent Porosity 19.0

Average Percent Original Oil Saturation 39.7

Average Percent Oil Recovery 3.7

Average Percent Residual Oil Saturation 36.0

Average Percent Residual Water Saturation 56.3

Average Percent Total Residual Fluid Saturation 92.3

Average Original Oil Content, Bbls./A. Ft. 585.

Average Oil Recovery, Bbls./A. Ft. 54.

Average Residual Oil Content, Bbls./A. Ft. 531.

Total Original Oil Content, Bbls./Acre 1,754.

Total Oil Recovery, Bbls./Acre 162.

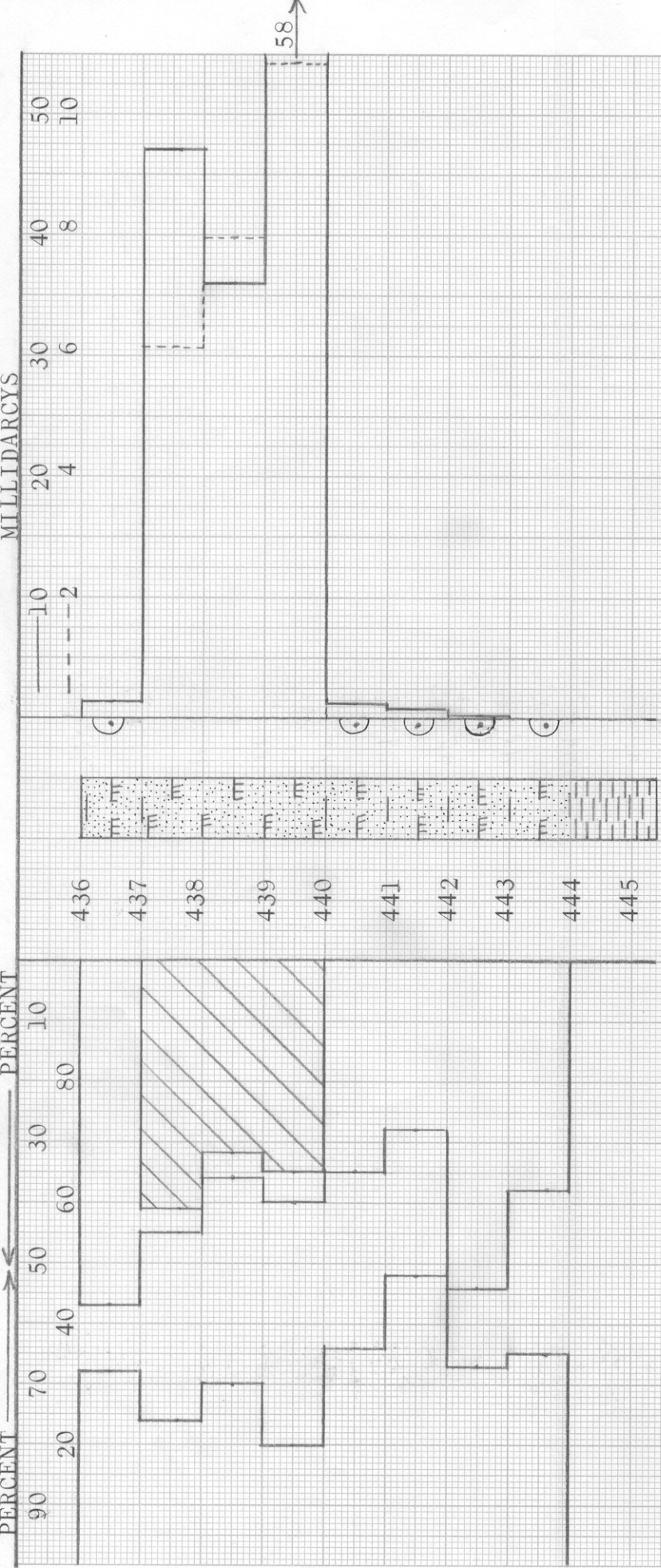
Total Residual Oil Content, Bbls./Acre 1,592.

Average Effective Permeability, Millidarcys 8.32

Average Initial Fluid Production Pressure, p.s.i. 16.7

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

WATER SAT., PERCENT → OIL SAT., PERCENT ←



KEY:

Calcareous Sandstone

Floodpot Residual Oil Saturation

Shale

Shaly Calcareous Sandstone

Impermeable to Water

BEACHNER CONSTRUCTION

MOORE LEASE

LABETTE COUNTY, KANSAS

WELL NO. 4

DEPTH INTERVAL, FEET FEET OF CORE ANALYZED AVERAGE PERCENT AVG. OIL SATURATION AVG. WATER SATURATION AVERAGE PERMEABILITY CALCULATED OIL RECOVERY

BEACHNER CONSTRUCTION

MOORE LEASE

WELL NO. 4

LABETTE 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
436.0 - 440.0	4	18.1	44.5	26.5	35.6	
440.0 - 444.0	4	14.9	38.8	38.0	0.7	
436.0 - 444.0	8	16.5	41.6	32.3	20.6	1,010 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
MAY, 1981

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