



OILFIELD RESEARCH LABORATORIES

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

August 17, 1979

Lincoln 77
8485 Kathy Lane
Lincoln, Nebraska 68526

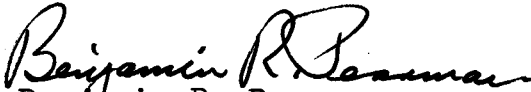
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Wright Lease, Well No. 4, Coffey County, Kansas, and submitted to our laboratory on August 14, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Benjamin R. Pearman

BRP:dlb

4 c to Lincoln, Nebraska
1 c to Topeka, Kansas

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GENERAL INFORMATION & SUMMARY

Company Lincoln 77 Lease Wright Well No. 4

Location 300' NSL & 300' WEL SE SE NE

Section 21 Twp. 22S Rge. 16E County Coffey State Kansas

Name of Sand - - - - - Lower Squirrel

Top of Core - - - - - 1010.0

Bottom of Core - - - - - 1019.0

Top of Sand - - - - - 1010.0

Bottom of Sand - - - - - 1019.0

Total Feet of Permeable Sand - - - - - 7.0

Total Feet of Floodable Sand - - - - - 3.6

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

4 - 22	1.3	1.3
56 - 84	1.4	2.7
84 & Above	4.3	7.0

Average Permeability Millidarcys - - - - - 125.2

Average Percent Porosity - - - - - 19.0

Average Percent Oil Saturation - - - - - 43.9

Average Percent Water Saturation - - - - - 29.6

Average Oil Content, Bbls./A. Ft. - - - - - 615.

Total Oil Content, Bbls./Acre - - - - - 4,302.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 6.3

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 102.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 367.

Total Calculated Oil Recovery, Bbls./Acre (Primary & Waterflooding) 1,080.

Packer Setting, Feet - - - - -

Viscosity, Centipoises @ - - - - -

A. P. I. Gravity, degrees @ 60 °F - - - - -

Elevation, Feet - - - - -

- 2 -

The core was sampled and the samples sealed in plastic bags by a representative of the client. The well was drilled in non-virgin territory. Fresh water mud was the circulating fluid while taking this core.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
1010.0 - 1012.1	Dark brown sandstone.
1012.1 - 1012.4	Brown and gray laminated sandstone and shale.
1012.4 - 1013.1	Gray limestone.
1013.1 - 1015.5	Dark brown sandstone laminated with streaks of shale, 60% sandstone.
1015.5 - 1016.3	Gray limestone.
1016.3 - 1017.5	Dark brown sandstone.
1017.5 - 1018.0	Gray and dark brown laminated shale and sandstone.
1018.0 - 1019.0	Dark brown sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 367 barrels of oil per acre was obtained from 3.6 feet of sand. The weighted average percent oil saturation was reduced from 45.9 to 39.6, or represents an average recovery of 6.3 percent. The weighted average effective permeability of the samples is 7.98 millidarcys, while the average initial fluid production pressure is 20.0 pounds per square inch (See Table V).

CALCULATED RECOVERY

The results of the laboratory tests indicate that efficient primary and waterflooding operations in the vicinity of this well should recover approximately 1,080 barrels of oil per acre. This is an average recovery of 300 barrels per acre foot from the 3.6 feet of floodable sand analyzed in this core.

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

Original formation volume factor	1.05
Reservoir water saturation, percent	15.0
Average porosity, percent	20.8
Oil saturation after flooding, percent	39.6
Performance factor, percent	45.0
Net floodable pay sand, feet	3.6

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Lincoln 77Lease WrightWell 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	1010.5	20.1	41	33	74	639	84.	1.0	1.0	639	84.00
2	1011.2	19.1	32	42	74	474	256.	1.1	2.1	521	281.60
3	1012.3	14.6	27	51	78	306	22.	0.3	2.4	92	6.60
4	1013.3	21.1	47	15	62	769	56.	0.4	2.8	308	22.40
5	1014.2	21.3	44	31	75	561	116.	1.0	3.8	561	116.00
6	1015.4	11.6	57	30	87	514	4.4	1.0	4.8	514	4.40
7	1017.2	20.5	54	17	71	859	203.	1.2	6.0	1,030	243.60
8	1018.3	21.6	38	26	64	637	118.	1.0	7.0	637	118.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Lease	Well No.	
Lincoln 77	Wright	4	
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
1010.0 - 1019.0	7.0	125.2	876.60
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation
1010.0 - 1019.0	7.0	19.0	43.9
		Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.
		29.6	615
			Total Oil Content Bbls./Acre
			4,302

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company			Lease			Well No.			4			
Lincoln 77			Wright									
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				Bbls./A. Ft.
1	1010.5	20.2	41	643	2	31	39	61	612	171	5.70	20
2	1011.2	18.8	32	467	0	0	32	64	467	116	4.33	25
3	1012.3	14.7	28	319	0	0	28	67	319	34	0.75	25
4	1013.3	21.4	47	780	10	166	37	58	614	190	5.40	20
5	1014.2	21.0	44	717	7	114	38	57	603	55	1.27	20
6	1015.4	12.0	55	512	0	0	55	35	512	13	0.22	30
7	1017.2	21.0	54	880	8	130	42	56	750	181	16.36	20
8	1018.3	21.5	38	634	0	0	38	62	634	333	9.37	20

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.

Company Lincoln 77

Lease Wright

Well No. 4

Oilfield Research Laboratories

SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Lincoln 77	Lease	Wright	Well No.	4
Depth Interval, Feet	1010.0 - 1019.0				
Feet of Core Analyzed	3.6				
Average Percent Porosity	20.8				
Average Percent Original Oil Saturation	45.9				
Average Percent Oil Recovery	6.3				
Average Percent Residual Oil Saturation	39.6				
Average Percent Residual Water Saturation	58.0				
Average Percent Total Residual Fluid Saturation	97.6				
Average Original Oil Content, Bbls./A. Ft.	75.8				
Average Oil Recovery, Bbls./A. Ft.	102.				
Average Residual Oil Content, Bbls./A. Ft.	656.				
Total Original Oil Content, Bbls./Acre	2,728.				
Total Oil Recovery, Bbls./Acre	367.				
Total Residual Oil Content, Bbls./Acre	2,361.				
Average Effective Permeability, Millidarcys	7.98				
Average Initial Fluid Production Pressure, p.s.i.	20.0				

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