OILFIELD RESEARCH LABORATORIES

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

November 28, 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 Remer Lease, Well No. 3, Coffey County, Kansas, and submitted to our laboratory on November 9, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman

Benjamin R. Pearman

BRP/tem
4 c to Lincoln, Nebraska
1 c to Topeka, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Lincoln 77 Lease Remer Well No. 3

Location NE SE

Section 28 Twp. 22S Rge. 16E County Coffey State Kansas

Name of Sand	Squirrel
Top of Core	1001.0
Bottom of Core	1012.0
Top of Sand	1001.0
Bottom of Sand	1012.0
Total Feet of Permeable Sand	11.0
Total Feet of Floodable Sand	5.4

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 10	3.7	3.7
10 - 100	6.7	10.4
100 & Above	0.6	11.0

Average Permeability Millidarcys	43.5
Average Percent Porosity	17.9
Average Percent Oil Saturation	42.6
Average Percent Water Saturation	32.0
Average Oil Content, Bbls./A. Ft.	599.
Total Oil Content, Bbls./Acre	6,595.
Average Percent Oil Recovery by Laboratory Flooding Tests	6.8
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	105.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	567.
Total Calculated Oil Recovery, Bbls./Acre	See "Calculated Recovery" Section.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

Fresh water mud was used as the circulating fluid while taking this core. The well was reportedly drilled in virgin territory. The core was sampled by a representative of the client.

FORMATION CORED

Depth Interval, Feet	Description
1001.0 - 1003.4	Dark very shaly sandstone.
1003.4 - 1007.0	Dark fine grained shaly sandstone.
1007.0 - 1007.9	Grayish brown very shaly sandstone.
1007.9 - 1009.7	Dark fine grained sandstone.
1009.7 - 1012.0	Gray shaly sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 567 barrels of oil per acre was obtained from 5.4 feet of sand. The weighted average percent oil saturation was reduced from 49.6 to 42.8, or represents an average recovery of 6.8 percent. The weighted average effective permeability of the samples is 3.02 millidarcys, while the average initial fluid production pressure is 21.7 pounds per square inch (See Table V).

CALCULATED RECOVERY

A study of the results of the laboratory testing indicates that efficient primary and waterflooding operations in the vicinity of this well should recover approximately 1,640 barrels of oil per acre. This is an average recovery of 304 barrels per acre foot from the 5.4 feet of floodable pay sand analyzed in this core.

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

Original formation volume factor, estimated	1.06
Reservoir water saturation, percent, estimated	12.0
Average porosity, percent	19.5
Oil saturation after flooding, percent	42.8
Performance factor, percent, estimated	50.0
Net floodable pay sand, feet	5.4

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Lincoln 77 Lease Remer Well No. 3

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	1001.5	15.0	47	48	95	547	12.	1.0	1.0	547	12.00
2	1002.5	18.6	25	35	60	361	10.	1.4	2.4	505	14.00
3	1003.5	20.9	52	13	65	843	169.	0.6	3.0	506	101.40
4	1004.5	20.6	54	17	71	863	78.	1.0	4.0	863	78.00
5	1005.5	18.1	45	35	80	632	72.	1.0	5.0	632	72.00
6	1006.5	17.9	46	27	73	639	72.	1.0	6.0	639	72.00
7	1007.5	16.9	43	43	86	564	20.	0.9	6.9	507	18.00
8	1008.5	20.5	54	13	67	859	84.	1.1	8.0	945	92.40
9	1009.5	19.9	46	21	67	710	26.	0.7	8.7	497	18.20
10	1010.5	15.7	32	45	77	390	0.70	1.3	10.0	506	0.91
11	1011.5	14.8	39	43	82	448	0.17	1.0	11.0	448	0.17

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Lincoln 77 Lease Remer Well No. 3

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
1001.0 - 1012.0	11.0	43.5	479.08

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
1001.0 - 1012.0	11.0	17.9	42.6	32.0	599	6,595

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Lincoln 77 Lease Remer Well No. 3

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	1001.5	15.2	46	542	0	0	46	50	542	0	Imp.	-
2	1002.5	18.3	27	383	0	0	27	38	383	0	Imp.	-
3	1003.5	20.5	52	827	12	191	40	56	636	154	3.38	20
4	1004.5	20.3	54	850	9	142	45	49	708	25	0.60	25
5	1005.5	18.5	45	646	2	29	43	55	617	391	9.00	20
6	1006.5	18.2	46	649	4	56	42	55	593	61	1.42	20
7	1007.5	16.5	44	563	0	0	44	44	563	0	Imp.	-
8	1008.5	20.0	54	838	12	186	42	55	652	103	2.78	20
9	1009.5	19.6	46	699	2	30	44	49	669	12	0.30	25
10	1010.5	15.7	32	390	0	0	32	48	390	0	Imp.	-
11	1011.5	15.0	37	431	0	0	37	47	431	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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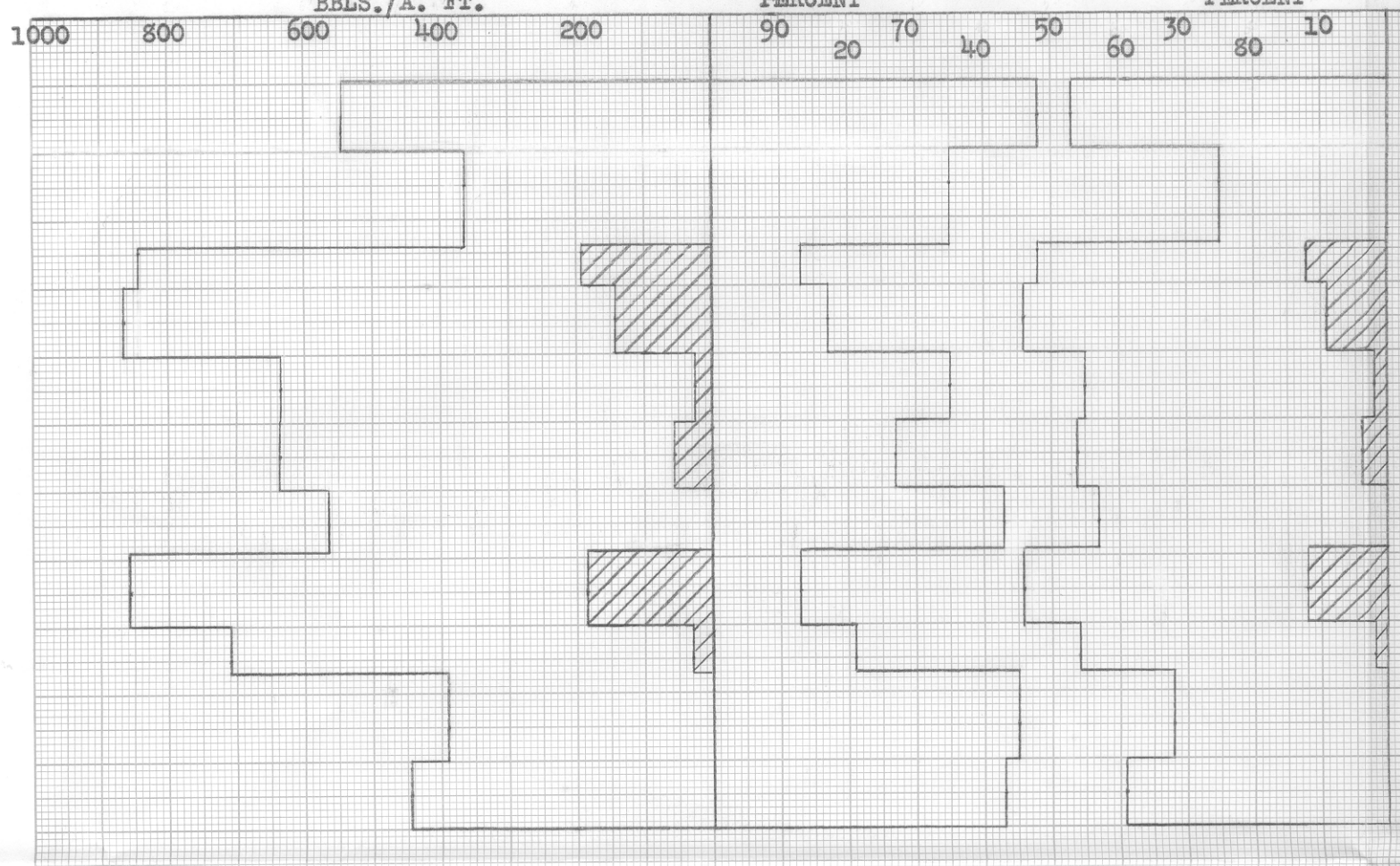
SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company Lincoln 77 Lease Remer Well No. 3

Depth Interval, Feet	1001.0 - 1012.0
Feet of Core Analyzed	5.4
Average Percent Porosity	19.5
Average Percent Original Oil Saturation	49.6
Average Percent Oil Recovery	6.8
Average Percent Residual Oil Saturation	42.8
Average Percent Residual Water Saturation	53.2
Average Percent Total Residual Fluid Saturation	96.0
Average Original Oil Content, Bbls./A. Ft.	751.
Average Oil Recovery, Bbls./A. Ft.	105.
Average Residual Oil Content, Bbls./A. Ft.	646.
Total Original Oil Content, Bbls./Acre	4,054.
Total Oil Recovery, Bbls./Acre	567.
Total Residual Oil Content, Bbls./Acre	3,487.
Average Effective Permeability, Millidarcys	3.02
Average Initial Fluid Production Pressure, p.s.i.	21.7

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



KEY:

SANDSTONE

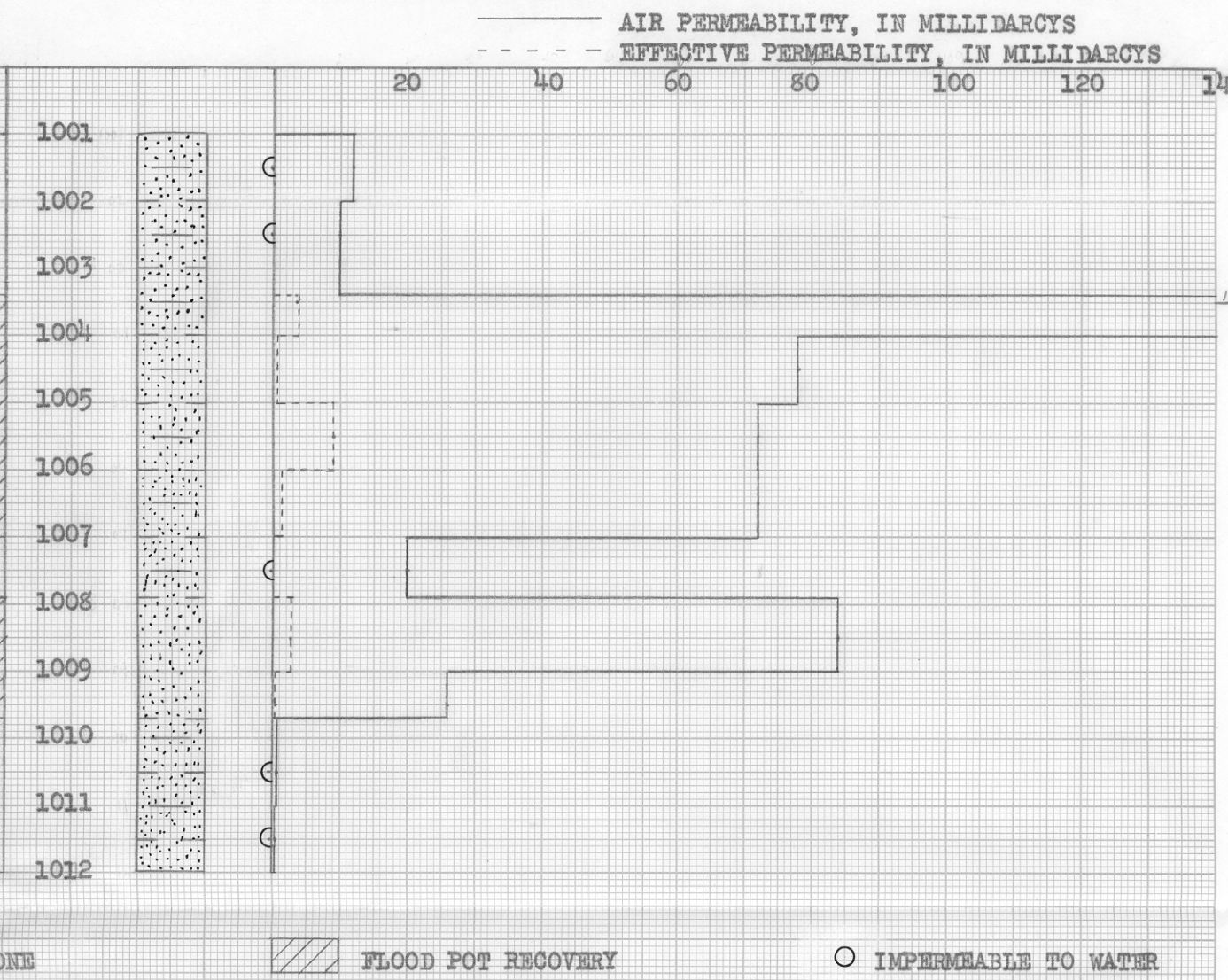
SHALY SANDSTON

LINCOLN

REMER LEASE

COFFEY COUNTY, KAN

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AV SA
1001.0 - 1012.0	11.0	17.9	42.6	



ONE

FLOOD POT RECOVERY

IMPERMEABLE TO WATER

77

WELL NO. 3

ANSAS

AVG. WATER SATURATION PERCENT	AVG. OIL CONTENT BBLS./A.FT.	TOTAL OIL CONTENT BBLS./ACRE	AVG. AIR PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY, BBLS./ACRE
32.0	599	6,595	43.5	1,640 (PRIMARY & WATER-FLOODING)

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CHANUTE, KANSAS
NOVEMBER, 1979 HR

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