OILFIELD RESEARCH LABORATORIES

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

November 7, 1980

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 Laase, Well No. 4, located in Coffey County, Kansas and submitted to our laboratory on August 15, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/ mkf

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

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GENERAL INFORMATION & SUMMARY

Company Lincoln 77 Lease Remer Well No. 4

Location SW— NE — SE¼

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

Elevation, Feet	—
Name of Sand	Squirrel
Top of Core	1010.0
Bottom of Core	1030.0
Top of Sand	1011.0
Bottom of Sand (Tested)	1018.8
Total Feet of Permeable Sand	7.2
Total Feet of Floodable Sand	0.0

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 — 10	1.7	1.7
10 — 50	1.4	3.1
50 — 100	1.0	4.1
100 — 150	2.1	6.2
250 — 300	1.0	7.2

Average Permeability Millidarcys	87.8
Average Percent Porosity	18.0
Average Percent Oil Saturation	51.0
Average Percent Water Saturation	23.2
Average Oil Content, Bbls./A. Ft.	721.
Total Oil Content, Bbls./Acre	5,193.
Average Percent Oil Recovery by Laboratory Flooding Tests	0.0
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	0.0
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	0.0
Total Calculated Oil Recovery, Bbls./Acre	0.0

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.

Since the core did not respond to flooding susceptability tests, no calculated recovery is given.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
1010.0 - 1011.0	Hard grayish light brown very calcareous sandy shale.
1011.0 - 1011.5	Dark brown slightly calcareous sandstone.
1011.5 - 1012.1	Brown and gray laminated sandstone and shale.
1012.1 - 1013.0	Dark brown slightly calcareous sandstone.
1013.0 - 1014.7	Brown slightly calcareous shaly sandstone.
1014.7 - 1018.8	Dark brown slightly calcareous sandstone.
1018.8 - 1021.0	Gray sandy shale.
1021.0 - 1022.4	Brown shaly sandstone.
1022.4 - 1030.0	Gray shale.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Lincoln 77 Lease Remer 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	1011.3	17.9	58	17	75	805	16.	0.5	0.5	403	8.00
2	1012.3	16.7	51	30	81	661	25.	0.9	1.4	595	22.50
3	1013.3	15.9	47	33	80	580	3.0	1.0	2.4	580	3.00
4	1014.4	17.3	53	21	74	711	6.4	0.7	3.1	498	4.48
5	1015.4	21.7	51	15	66	859	133.	1.1	4.2	945	146.30
6	1016.4	20.9	56	14	70	908	110.	1.0	5.2	908	110.00
7	1017.5	14.0	40	40	80	434	266.	1.0	6.2	434	266.00
8	1018.3	19.1	56	13	69	830	72.	1.0	7.2	830	72.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Lincoln 77 Lease Remer Well No. 4

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
1011.0 - 1018.8	7.2	87.8	632.28

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
1011.0 - 1018.8	7.2	18.0	51.0	23.2	721	5,193

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Lincoln 77 Lease Remer 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	Bbls./A. Ft.			
1	1011.3	18.0	58	810	0	0	58	40	810	220	10.92	20
2	1012.3	16.9	51	669	0	0	51	40	669	54	0.90	35
3	1013.3	15.5	48	577	0	0	48	38	577	0	Imp.	-
4	1014.4	17.4	53	715	0	0	53	43	715	42	0.75	30
5	1015.4	21.7	51	859	0	0	51	45	859	162	11.43	15
6	1016.4	21.0	56	912	0	0	56	39	912	402	25.70	10
7	1017.5	14.5	39	439	0	0	39	60	439	99	1.80	25
8	1018.3	19.4	55	828	0	0	55	41	828	246	4.35	20

Notes: cc—cubic centimeter.

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

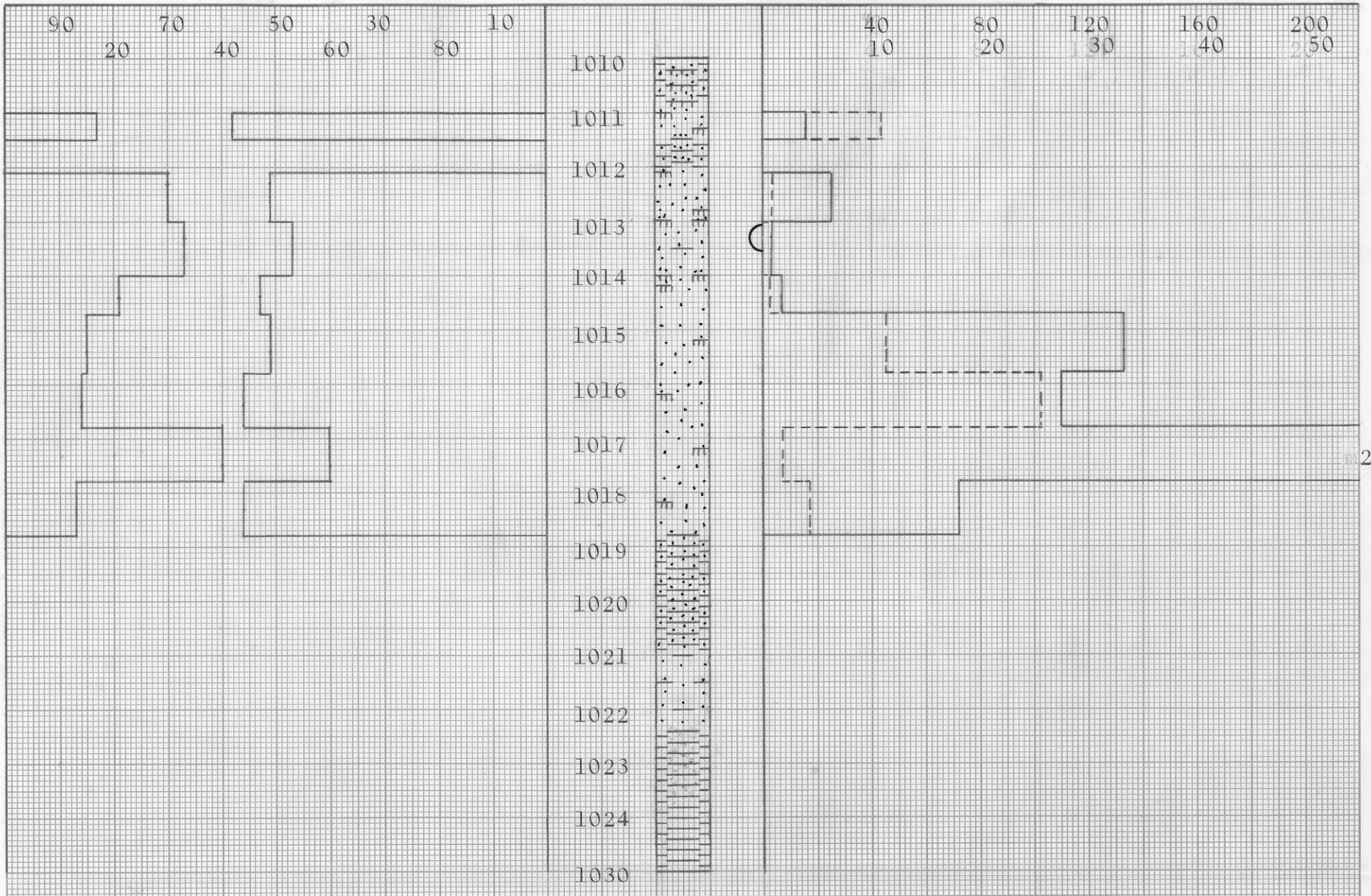
**—Determined by passing water through sample which still contains residual oil.

WATER SAT., PERCENT →

← OIL SAT., PERCENT

——PERMEABILITY, IN MILLIDARCYS

- - - -EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYS



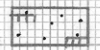
KEY:

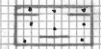
 CALCAREOUS SANDY SHALE

 SANDY SHALE

 SHALE

 IMPERMEABLE TO WATER

 CALCAREOUS SANDSTONE

 SHALY SANDSTONE

FLOODPOT RESIDUAL OIL SATURATION

LINCOLN 77

REMER LEASE WELL NO. 4

COFFEY COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE POROSITY PERCENT	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY MILLIDARCYS	CALCULATED OIL RECOVERY BBLS./ACRE
1011.0 - 1018.8	7.2	18.0	51.0	23.2	87.8	- - -

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
NOVEMBER, 1980 SO