KLI PETROLEUM CORPORATION

CORE ANALYSIS REPORT

NELSON LEASE WELL NO. 33

ALLEN COUNTY, KANSAS

OILFIELD RESEARCH LABORATORIES

536 N. HIGHLAND CHANUTE, KANSAS

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

January 11, 1980

KLI Petroleum Corporation
808 Southeast 6th Street
Evansville, Indiana 47708

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Nelson Lease, Well No. 33, Allen County, Kansas, and submitted to our laboratory on December 18, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

Sanford A. Michel

SAM:vm
5 c to Evansville, Indiana

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company KLI Petroleum, Corporation Lease Nelson Well No. 33

Location 1010' SNL & 165' WEL NE¼

Section 21 Twp. 26S Rge. 21E County Allen State Kansas

Name of Sand	Bartlesville
Top of Core	632.0
Bottom of Core	649.3
Top of Sand	632.0
Bottom of Sand	638.2
Total Feet of Permeable Sand	5.7
Total Feet of Floodable Sand	3.4

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 5	2.9	2.9
10 - 20	0.8	3.7
20 - 30	2.0	5.7

Average Permeability Millidarcys	13.5
Average Percent Porosity	17.9
Average Percent Oil Saturation	50.9
Average Percent Water Saturation	28.0
Average Oil Content, Bbls./A. Ft.	705.
Total Oil Content, Bbls./Acre	4016.
Average Percent Oil Recovery by Laboratory Flooding Tests	13.4
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	191.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	649.
Total Calculated Oil Recovery, Bbls./Acre	See "Calculated Recovery" Section
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

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:

Depth Interval, Feet	Description
632.0 - 632.8	Light brown sandstone.
632.8 - 635.1	Brown shaly sandstone.
635.1 - 636.3	Dark brown sandstone.
636.3 - 636.9	Brown shaly sandstone.
636.9 - 637.7	Brown sandstone.
637.7 - 638.2	Brown shaly sandstone.
638.2 - 649.3	Gray sandy shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 649 barrels of oil per acre was obtained from 3.4 feet of sand. The weighted average percent oil saturation was reduced from 54.1 to 40.7, or represents an average recovery of 13.4 percent. The weighted average effective permeability of the samples is 0.69 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, 4 produced water and oil. This indicates

that approximately 67 percent of the sand represented by these samples is floodable pay sand. The tests also show that the sand has a relatively low, uniform permeability profile.

Please note that the coregraph presents residual oil saturation instead of recovery as in the past.

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 1020 barrels of oil per acre. This is an average recovery of 301 barrels per acre foot from 3.4 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	15.0
Average porosity, percent	18.9
Oil saturation after flooding, percent	40.7
Performance factor, percent, estimated	50.0
Net floodable sand, feet	3.4

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company KLI Petroleum Corporation Lease Nelson Well No. 33

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	632.5	21.1	43	29	72	704	12.	0.8	0.8	563	9.60
2	633.5	17.0	39	32	71	514	4.4	1.2	2.0	619	5.28
3	634.5	15.8	54	36	90	662	4.5	1.1	3.1	728	4.95
4	635.5	18.4	57	15	72	814	30.	1.2	4.3	977	36.00
5	636.5	18.9	51	21	72	748	4.1	0.6	4.9	449	2.46
6	637.5	17.4	63	35	98	850	23.	0.8	5.7	680	18.40

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company KLI Petroleum Corporation Lease Nelson Well No. 33

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
632.0 - 637.7	5.7	13.5	76.69

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
632.0 - 637.7	5.7	17.9	50.9	28.0	705	4,016

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company KLI Petroleum Corporation Lease Nelson Well No. 33

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	632.5	20.8	43	694	4	65	39	44	629	16	0.83	35
2	633.5	17.0	39	575	0	0	39	47	575	0	Imp.	-
3	634.5	16.0	53	658	0	0	53	38	658	0	Imp.	-
4	635.5	18.4	57	814	13	186	44	38	628	15	0.67	10
5	636.5	18.9	51	748	14	205	37	42	543	10	0.60	30
6	637.5	17.6	63	860	23	314	40	55	546	13	0.67	45

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 KLI Petroleum Corporation Lease Nelson Well No. 33

Depth Interval, Feet	632.0 - 637.7
Feet of Core Analyzed	3.4
Average Percent Porosity	18.9
Average Percent Original Oil Saturation	54.1
Average Percent Oil Recovery	13.4
Average Percent Residual Oil Saturation	40.7
Average Percent Residual Water Saturation	44.1
Average Percent Total Residual Fluid Saturation	84.8
Average Original Oil Content, Bbls./A. Ft.	785.
Average Oil Recovery, Bbls./A. Ft.	191.
Average Residual Oil Content, Bbls./A. Ft.	594.
Total Original Oil Content, Bbls./Acre	2,668.
Total Oil Recovery, Bbls./Acre	649.
Total Residual Oil Content, Bbls./Acre	2,019.
Average Effective Permeability, Millidarcys	0.69
Average Initial Fluid Production Pressure, p.s.i.	30.0

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