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

July 10, 1979

James E. Russell Petroleum, Inc.
P.O. Box 2618
Abilene, Texas 79604

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Alexander Lease, Well No. O-19, Woodson County, Kansas, and submitted to our laboratory on July 3, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman

Benjamin R. Pearman

SAM:km
3 c to Abilene, Texas
2 c to Chanute, Kansas

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GENERAL INFORMATION & SUMMARY

Company James E. Russell Petroleum, Inc. Lease Alexander Well No. 0-19

Location 2,310' EWL & 330' NSL SW¼

Section 2 Twp. 24S Rge. 16E County Woodson State Kansas

Name of Sand	Squirrel
Top of Core	1027.0
Bottom of Core	1040.5
Top of Sand	1030.4
Bottom of Sand	1037.2
Total Feet of Permeable Sand	2.3
Total Feet of Floodable Sand	0.8

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 1	1.5	1.5
8 - 10	0.8	2.3

Average Permeability Millidarcys	3.4
Average Percent Porosity	14.8
Average Percent Oil Saturation	47.2
Average Percent Water Saturation	28.3
Average Oil Content, Bbls./A. Ft.	546.
Total Oil Content, Bbls./Acre	1,256.
Average Percent Oil Recovery by Laboratory Flooding Tests	11.0
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	134.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	107.
Total Calculated Oil Recovery, Bbls./Acre (Primary & Waterflooding)	188.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet (Ground Level)	1,071.4

The core was sampled by a representative of Oilfield Research Laboratories. The drilling fluid consisted of fresh water mud. The core was from a non-virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
1027.0 - 1029.7	Gray sandy shale.
1029.7 - 1030.4	Hard gray fossilferous limestone.
1030.4 - 1030.8	Hard brown calcareous sandstone.
1030.8 - 1031.6	Dark brown sandstone.
1031.6 - 1036.1	Gray sandy shale.
1036.1 - 1037.2	Brown and gray laminated sandstone and shale.
1037.2 - 1040.5	Gray sandy shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 107 barrels of oil per acre was obtained from 0.8 feet of sand. The weighted average percent oil saturation was reduced from 60.0 to 49.0, or represents an average recovery of 11.0 percent. The weighted average effective permeability of the samples is 0.01 millidarcys, while the average initial fluid production pressure is 50.0 pounds per square inch (See Table V).

CALCULATED RECOVERY

It would appear from a study of the data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 188 barrels of oil per acre.

This is an average recovery of 235 barrels per acre foot from 0.8 feet of floodable sand analyzed in this core.

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

Original formation volume factor	1.07
Reservoir water saturation, percent	10.0
Average porosity, percent	15.7
Oil saturation after flooding, percent	49.0
Performance factor, percent	55.0
Net floodable pay sand, feet	0.8

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. **Lease** Alexander **Well No.** 0-19

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	1030.7	13.1	47	12	59	478	0.20	0.4	0.4	191	0.08
2	1031.5	15.9	60	8	68	740	8.7	0.8	1.2	592	6.96
3	1036.6	14.6	38	49	87	430	0.63	1.1	2.3	473	0.69

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Inc. Lease Alexander Well No. 0-19

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
1030.4 - 1037.2	2.3	3.4	7.73

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
1030.4 - 1037.2	2.3	14.8	47.2	28.3	546	1,256

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Inc. Lease Alexander Well No. O-19

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	1030.7	13.2	46	471	0	0	46	22	471	0	Imp.	-
2	1031.5	15.7	60	731	11	134	49	40	597	0	0.01	50
3	1036.6	14.6	39	441	0	0	39	49	441	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 James E. Russell Petroleum, Inc. Lease Alexander Well No. 0-19

Depth Interval, Feet	1030.4 - 1037.2
Feet of Core Analyzed	0.8
Average Percent Porosity	15.7
Average Percent Original Oil Saturation	60.0
Average Percent Oil Recovery	11.0
Average Percent Residual Oil Saturation	49.0
Average Percent Residual Water Saturation	40.0
Average Percent Total Residual Fluid Saturation	89.0
Average Original Oil Content, Bbls./A. Ft.	731.
Average Oil Recovery, Bbls./A. Ft.	134.
Average Residual Oil Content, Bbls./A. Ft.	597.
Total Original Oil Content, Bbls./Acre	585.
Total Oil Recovery, Bbls./Acre	107.
Total Residual Oil Content, Bbls./Acre	478.
Average Effective Permeability, Millidarcys	0.01
Average Initial Fluid Production Pressure, p.s.i.	50.0

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