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

November 27, 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. W-47, Woodson County, Kansas, and submitted to our laboratory on November 6, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman

Benjamin R. Pearman

BRP: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. W-47

Location 1315' EWL & 30' SNL NW

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

Name of Sand	Lower Squirrel
Top of Core	996.0
Bottom of Core	1015.0
Top of Sand	1006.0
Bottom of Sand	1015.0
Total Feet of Permeable Sand	5.7
Total Feet of Floodable Sand	1.6

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
1 - 10	2.6	2.6
10 - 20	1.5	4.1
20 & Above	1.6	5.7

Average Permeability Millidarcys	20.5
Average Percent Porosity	15.9
Average Percent Oil Saturation	45.5
Average Percent Water Saturation	29.2
Average Oil Content, Bbls./A. Ft.	556.
Total Oil Content, Bbls./Acre	3,173.
Average Percent Oil Recovery by Laboratory Flooding Tests	9.3
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	163.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	261.
Total Calculated Oil Recovery, Bbls./Acre	See "Calculated Recovery" Section
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet (Ground Level)	1051.8

Fresh water mud was used as the circulating fluid while taking this core. The well was drilled in non-virgin territory. The core was sampled by a representative of Oilfield Research Laboratories.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
996.0 - 997.2	Limestone, light gray.
997.2 - 1002.8	Shale, dark.
1002.8 - 1003.8	Limestone, dark.
1003.8 - 1005.8	Shale, dark.
1005.8 - 1006.0	Shale, laminated, sandy, light brown. First oil stain.
1006.0 - 1007.5	Sandstone, brown, laminated, shaly; 80% sandstone.
1007.5 - 1008.8	Shale, gray.
1008.8 - 1010.0	Sandstone, brown, laminated, shaly; 60% sandstone.
1010.0 - 1012.0	Shale, gray, containing a vertical fracture.
1012.0 - 1013.6	Sandstone, dark brown, laminated, shaly, 80% sandstone.
1013.6 - 1015.0	Sandstone, brown, laminated, shaly; 70% sandstone.

LABORATORY FLOODING TESTS

A portion of the sand in this core responded to laboratory flooding tests, as a total recovery of 261 barrels of oil per acre was obtained from 1.6 feet of sand. The weighted average percent oil saturation was reduced from 50.0 to 40.5, or represents an average recovery of 9.5 percent. The weighted average effective permeability of the

samples is 4.45 millidarcys, while the average initial fluid production pressure is 25.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 5 samples tested, 2 produced water and oil.

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 520 barrels of oil per acre. This is an average recovery of 326 barrels per acre foot from the 1.6 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.07
Reservoir water saturation, percent, estimated	15.0
Average porosity, percent	21.6
Oil saturation after flooding, percent	40.5
Performance factor, percent, estimated	50.0
Net floodable pay sand, feet	1.6

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. **Lease** Alexander **Well No.** W-47

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	1007.0	10.8	55	23	78	461	13.	1.5	1.5	693	19.50
2	1009.1	15.8	25	52	77	306	1.6	1.2	2.7	367	1.92
3	1012.2	19.7	52	16	68	795	39.	0.5	3.2	398	19.50
4	1013.0	22.6	49	16	65	859	58.	1.1	4.3	945	63.80
5	1014.0	14.8	48	32	80	551	8.7	1.4	5.7	770	12.18

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Inc. Lease Alexander Well No. W-47

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
1006.0 - 1015.0	5.7	20.5	116.90

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
1006.0 - 1015.0	5.7	15.9	45.5	29.2	556	3,173

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Inc. Lease Alexander Well No. W-47

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	1007.0	11.3	55	482	0	0	55	26	482	0	Imp.	-
2	1009.1	15.7	28	341	0	0	28	56	341	0	Imp.	-
3	1012.2	19.8	52	799	4	61	48	41	738	25	0.68	30
4	1013.0	22.4	49	852	12	209	37	58	643	208	6.15	20
5	1014.0	14.9	49	566	0	0	49	35	566	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. W-47

Depth Interval, Feet	1006.0 - 1015.0
Feet of Core Analyzed	1.6
Average Percent Porosity	21.6
Average Percent Original Oil Saturation	50.0
Average Percent Oil Recovery	9.5
Average Percent Residual Oil Saturation	40.5
Average Percent Residual Water Saturation	52.6
Average Percent Total Residual Fluid Saturation	93.1
Average Original Oil Content, Bbls./A. Ft.	836.
Average Oil Recovery, Bbls./A. Ft.	163.
Average Residual Oil Content, Bbls./A. Ft.	673.
Total Original Oil Content, Bbls./Acre	1,336.
Total Oil Recovery, Bbls./Acre	261.
Total Residual Oil Content, Bbls./Acre	1,075.
Average Effective Permeability, Millidarcys	4.45
Average Initial Fluid Production Pressure, p.s.i.	25.0

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