OILFIELD RESEARCH LABORATORIES

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June 2, 1980

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-68, Woodson County, Kansas, and submitted to our laboratory on April 25, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/tem

3 c to Abilene, Texas
2 c to Chanute, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company James E. Russell Petroleum, Incorporated Lease Alexander Well No. W-68

Location 2635' SNL & 1320' EWL SW¼

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

Elevation, Feet Datum: Mean Sea Level (G.L.) . . . 1062.6

Name of Sand	Squirrel
Top of Core	1014.0
Bottom of Core	1033.4
Top of Sand	1027.2
Bottom of Sand	1033.2
Total Feet of Permeable Sand	3.8
Total Feet of Floodable Sand	3.4

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 10	1.2	1.2
20 - 30	0.9	2.1
50 - 60	1.0	3.1
60 - 70	0.7	3.8

Average Permeability Millidarcys	33.2
Average Percent Porosity	17.3
Average Percent Oil Saturation	50.1
Average Percent Water Saturation	22.9
Average Oil Content, Bbls./A. Ft.	689.
Total Oil Content, Bbls./Acre	3,168.
Average Percent Oil Recovery by Laboratory Flooding Tests	274.
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	933.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	19.9
Total Calculated Oil Recovery, Bbls./Acre	See "Calculated Recovery" Section.

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

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
1014.0 - 1023.7	Shale, gray, sandy.
1023.7 - 1024.8	Shale, gray, calcareous, fossiliferous, sandy.
1024.8 - 1027.2	Shale, gray, sandy.
1027.2 - 1028.0	First oil show. Sandstone, brown, shaly, slightly calcareous.
1028.0 - 1028.4	Shale, gray, sandy.
1028.4 - 1030.1	Sandstone, brown, slightly calcareous.
1030.1 - 1030.7	Sandstone and shale, laminated, brown and gray.
1030.7 - 1031.1	Sandstone, brown, slightly shaly.
1031.1 - 1032.0	Sandstone, brown, slightly calcareous.
1032.0 - 1032.4	Shale, gray, sandy.
1032.4 - 1033.2	Sandstone, brown, shaly.
1033.2 - 1033.4	Shale, gray, sandy.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 933 barrels of oil per acre was obtained from 3.4 feet of sand. The weighted average percent oil saturation was reduced from 57.0 to 37.1, or represents an average recovery of 19.9 percent. The weighted average effective permeability of the samples is 0.72 millidarcys, while the

average initial fluid production pressure is 27.5 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.

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 1,100 barrels of oil per acre. This is an average recovery of 322 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	1.07
Reservoir water saturation, percent, estimated	15.0
Average porosity, percent	17.8
Oil saturation after flooding, percent	37.1
Performance factor, percent, estimated	55.0
Net floodable sand, feet	3.4

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease Alexander Well No. W-68

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	1027.6	15.9	52	23	75	641	4.2	0.8	0.8	513	3.36
2	1028.5	19.3	57	17	74	854	62.	0.7	1.5	598	43.40
3	1029.5	15.9	62	23	85	765	58.	1.0	2.5	765	58.00
4	1030.8	20.0	61	23	84	947	6.4	0.4	2.9	379	2.56
5	1031.6	20.0	56	18	74	869	21.	0.9	3.8	782	18.90
6	1032.5	14.1	15	33	48	164	Imp.	0.8	4.6	131	0.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Incorporated Lease Alexander Well No. W-68

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
1027.2 - 1033.2	3.8	33.2	126.22

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
1027.2 - 1033.2	4.6	17.3	50.1	22.9	689	3,168

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Jame E. Russell Petroleum, Incorporated Lease Alexander Well No. W-68

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	1027.6	16.2	52	654	18	226	34	56	428	60	0.90	20
2	1028.5	19.5	57	862	19	287	38	53	575	59	0.90	25
3	1029.5	16.1	62	774	22	275	40	51	499	55	0.82	30
4	1030.8	19.5	61	923	0	0	61	29	923	0	Imp.	-
5	1031.6	19.8	56	860	20	307	36	49	553	20	0.30	35
6	1032.5	14.2	15	165	0	0	15	41	165	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, Incorporated Lease Alexander Well No. W-68

Depth Interval, Feet	1027.2 - 1033.2
Feet of Core Analyzed	3.4
Average Percent Porosity	17.8
Average Percent Original Oil Saturation	57.0
Average Percent Oil Recovery	19.9
Average Percent Residual Oil Saturation	37.1
Average Percent Residual Water Saturation	52.1
Average Percent Total Residual Fluid Saturation	89.2
Average Original Oil Content, Bbls./A. Ft.	786.
Average Oil Recovery, Bbls./A. Ft.	274.
Average Residual Oil Content, Bbls./A. Ft.	512.
Total Original Oil Content, Bbls./Acre	2,675.
Total Oil Recovery, Bbls./Acre	933.
Total Residual Oil Content, Bbls./Acre	1,742.
Average Effective Permeability, Millidarcys	0.72
Average Initial Fluid Production Pressure, p.s.i.	27.5

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