

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

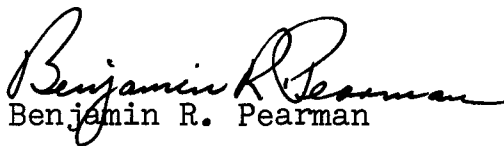
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Alexander Lease, Well No. 0-18, Woodson County, Kansas, and submitted to our laboratory on June 29, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Benjamin R. Pearman

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

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GENERAL INFORMATION & SUMMARY

Company	<u>James E. Russell Petroleum, Inc.</u>	Lease	<u>Alexander</u>	Well No.	<u>0-18</u>
Location	<u>1,650' EWL & 330' NSL</u>				
Section	<u>2</u>	Twp.	<u>24S</u>	Rge.	<u>16E</u>
		County	<u>Woodson</u>		State <u>Kansas</u>
Name of Sand	-				Squirrel
Top of Core	-				1021.0
Bottom of Core	-				1036.0
Top of Sand	-				1024.2
Bottom of Sand	(Tested)				1030.0
Total Feet of Permeable Sand	-				5.3
Total Feet of Floodable Sand	-				2.8
Distribution of Permeable Sand:					
Permeability Range	Feet		Cum. Ft.		
Millidarcys					
0 - 5	2.5		2.5		
5 - 10	2.0		4.5		
20 - 30	0.8		5.3		
Average Permeability Millidarcys	-				8.2
Average Percent Porosity	-				16.3
Average Percent Oil Saturation	-				42.1
Average Percent Water Saturation	-				32.6
Average Oil Content, Bbls./A. Ft.	-				551.
Total Oil Content, Bbls./Acre	-				2,920.
Average Percent Oil Recovery by Laboratory Flooding Tests	-				6.1
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	-				86.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	-				240.
Total Calculated Oil Recovery, Bbls./Acre	(Primary & Waterflooding)				680.
Packer Setting, Feet	-				
Viscosity, Centipoises @	-				
A. P. I. Gravity, degrees @ 60 °F	-				
Elevation, Feet	(Ground Level)				1,063.2

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:

<u>Depth Interval, Feet</u>	<u>Description</u>
1021.0 - 1023.8	Gray sandy shale.
1023.8 - 1024.2	Hard gray fossiliferous calcareous shaly limestone.
1024.2 - 1025.0	Dark brown sandstone - First oil show at 1024.2.
1025.0 - 1027.0	Grayish brown slightly shaly sandstone.
1027.0 - 1028.4	Gray and brown laminated sandstone and shale.
1028.4 - 1028.9	Gray sandy shale.
1028.9 - 1030.0	Dark brown slightly shaly sandstone.
1030.0 - 1031.7	Gray sandy shale.
1031.7 - 1032.1	Dark brown shaly sandstone.
1032.1 - 1036.0	Gray sandy shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 240 barrels of oil per acre was obtained from 2.8 feet of sand. The weighted average percent oil saturation was reduced from 52.2 to 46.1, or represents an average recovery of 6.1 percent. The weighted average effective permeability of the samples is 0.31 millidarcys, while the average initial fluid production

pressure is 50.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 4 samples tested, 3 produced water and 2 oil. This indicates that approximately 50 percent of the sand represented by these samples is floodable pay sand.

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 680 barrels of oil per acre. This is an average recovery of 244 barrels per acre foot from 2.8 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	17.0
Average porosity, percent	18.2
Oil saturation after flooding, percent	46.1
Performance factor, percent	55.0
Net floodable pay sand, feet	2.8

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease Alexander Well No. 0-18

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	1024.5	17.4	58	21	79	783	22.	0.8	0.8	626	17.60
2	1026.0	18.7	50	19	69	725	9.1	2.0	2.8	1450	18.20
3	1027.5	14.4	36	48	84	402	1.4	1.4	4.2	563	1.96
4	1029.0	13.7	24	46	70	255	5.0	1.1	5.3	281	5.50

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		James E. Russell Petroleum, Inc.	Lease	Alexander	Well No.	0-18
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.			
1024.2 - 1030.0	5.3	8.2	43.26			
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
1024.2 - 1030.0	5.3	16.3	42.1	32.6	551	2,920

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Inc. Lease Alexander Well No. 0-18

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation		Volume of Water Recovered cc ^a	Effective Permeability Millidarcys ^{ee}	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water			
1	1024.5	17.6	58	792	9	123	49	49	10	0.15	50
2	1026.0	18.4	50	714	5	71	45	47	5	0.37	50
3	1027.5	14.6	35	396	0	0	35	60	0	Imp.	-
4	1029.0	14.2	23	254	0	0	23	74	16	0.30	50

Note: cc—cubic centimeter.

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

^{ee}—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.	0-18
Depth Interval, Feet	1024.2 - 1030.0				
Feet of Core Analyzed	2.8				
Average Percent Porosity	18.2				
Average Percent Original Oil Saturation	52.2				
Average Percent Oil Recovery	6.1				
Average Percent Residual Oil Saturation	46.1				
Average Percent Residual Water Saturation	47.6				
Average Percent Total Residual Fluid Saturation	93.7				
Average Original Oil Content, Bbls./A. Ft.	736.				
Average Oil Recovery, Bbls./A. Ft.	86.				
Average Residual Oil Content, Bbls./A. Ft.	650.				
Total Original Oil Content, Bbls./Acre	2,061.				
Total Oil Recovery, Bbls./Acre	240.				
Total Residual Oil Content, Bbls./Acre	1,821.				
Average Effective Permeability, Millidarcys	0.31				
Average Initial Fluid Production Pressure, p.s.i.	50.0				

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