

OILFIELD RESEARCH LABORATORIES

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August 4, 1980

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

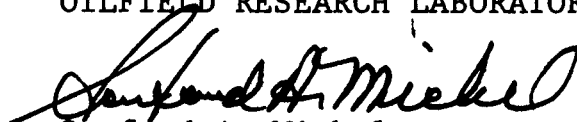
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Minckley "B" Sec. 3 Lease, Well No. 37, Anderson County, Kansas, and submitted to our laboratory on May 22, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Sanford A. Michel

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	Minckley "B" Sec. 3	Well No.	37
Location	220' EWL & 1540' SNL SE $\frac{1}{4}$						
Section	3	Twp	23S	Rge	19E	County	Anderson
						State	Kansas
Elevation, Feet	DATUM: MEAN SEA LEVEL (G.L.)						1072.0
Name of Sand	-						Squirrel
Top of Core	-						704.0
Bottom of Core	-						724.0
Top of Sand	-						709.9
Bottom of Sand	-						719.0
Total Feet of Permeable Sand	-						8.6
Total Feet of Floodable Sand	-						4.3
Distribution of Permeable Sand:							
Permeability Range		Feet		Cum. Ft.			
Millidarcys							
0	- 1	4.9	4.9				
1	- 5	0.9	5.8				
10	- 20	1.3	7.1				
20	- 30	0.7	7.8				
30	- 40	0.8	8.6				
Average Permeability Millidarcys	-						7.9
Average Percent Porosity	-						14.0
Average Percent Oil Saturation	-						37.7
Average Percent Water Saturation	-						43.7
Average Oil Content, Bbls./A. Ft.	-						415.
Total Oil Content, Bbls./Acre	-						3,573.
Average Percent Oil Recovery by Laboratory Flooding Tests	-						4.8
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	-						64.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	-						275.
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:

<u>Depth Interval, Feet</u>	<u>Description</u>
704.0 - 705.0	Shale, black.
705.0 - 705.6	Coal.
705.6 - 709.9	Shale, gray, sandy. First oil show, 709.9.
709.9 - 712.3	Sandstone, brown, very shaly.
712.3 - 713.8	Sandstone, brown, slightly calcareous.
713.8 - 714.3	Shale, gray, sandy.
714.3 - 715.0	Sandstone, brown, slightly calcareous.
715.0 - 716.5	Sandstone, brown, very shaly.
716.5 - 717.1	Sandstone, brown.
717.1 - 719.0	Sandstone, brown, shaly.
719.0 - 724.0	Shale, gray, sandy.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 275 barrels of oil per acre was obtained from 4.3 feet of sand. The weighted average percent oil saturation was reduced from 38.5 to 33.7, or represents an average recovery of 4.8 percent. The weighted average effective permeability of the samples is 0.97 millidarcys, while the average initial fluid production pressure is 36.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 9 samples tested, 5 produced water and oil. This indicates that approximately 56 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 970 barrels of oil per acre. This is an average recovery of 225 barrels per acre foot from 4.3 feet of floodable sand analyzed in this core.

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

Original formation volume factor (estimated)	1.05
Reservoir water saturation, percent (estimated)	30.0
Average porosity, percent	17.6
Oil saturation after flooding, percent	33.7
Performance factor, percent (estimated)	50.0
Net floodable sand, feet	4.3

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease Minckley "B" Sec. 3 Well No. 37

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	710.5	9.0	31	66	97	216	0.35	1.0	1.0	216	0.35
2	711.5	10.2	32	66	98	253	0.60	1.4	2.4	354	0.84
3	712.5	12.6	42	36	78	411	11.	0.7	3.1	288	7.70
4	713.5	17.9	34	42	76	472	36.	0.8	3.9	378	28.80
5	714.8	20.8	34	34	68	549	24.	0.7	4.6	384	16.80
6	715.6	18.5	39	30	69	560	0.69	1.5	6.1	840	1.04
7	716.8	16.7	45	32	77	583	15.	0.6	6.7	350	9.00
8	717.6	10.9	52	32	84	440	3.1	0.9	7.6	356	2.51
9	718.5	13.1	40	45	85	407	0.57	1.0	8.6	407	0.57

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		James E. Russell Petroleum, Inc.		Lease	Minckley "B" Sec. 9		Well No.	37
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		
709.9 - 719.0	8.6	14.0	37.7	43.7	415	3,573		

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Inc. Lease Minckley "B" Sec. 3 Well No. 37

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.
			%	Bbbls./A. Ft.	%	Bbbls./A. Ft.	% Oil	% Water	Bbbls./A. Ft.			
1	710.5	9.1	31	219	0	0	31	66	219	0	Imp.	-
2	711.5	10.4	32	258	0	0	33	66	258	0	Imp.	-
3	712.5	12.7	42	414	6	59	36	54	355	14	0.22	50
4	713.5	17.9	34	472	2	28	32	65	444	76	1.95	30
5	714.8	20.8	34	549	3	48	31	61	501	85	1.95	30
6	715.6	18.5	39	560	5	72	34	61	488	13	0.15	40
7	716.8	16.6	45	580	9	116	36	60	464	63	1.42	30
8	717.6	11.3	51	447	0	0	51	34	447	0	Imp.	-
9	718.5	13.0	40	403	0	0	40	46	403	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 Minckley "B" Sec. 3 Well No. 37

Depth Interval, Feet	709.9 - 719.0
Feet of Core Analyzed	4.3
Average Percent Porosity	17.6
Average Percent Original Oil Saturation	38.5
Average Percent Oil Recovery	4.8
Average Percent Residual Oil Saturation	33.7
Average Percent Residual Water Saturation	60.5
Average Percent Total Residual Fluid Saturation	94.2
Average Original Oil Content, Bbls./A. Ft.	521.
Average Oil Recovery, Bbls./A. Ft.	64.
Average Residual Oil Content, Bbls./A. Ft.	457.
Total Original Oil Content, Bbls./Acre	2,240.
Total Oil Recovery, Bbls./Acre	275.
Total Residual Oil Content, Bbls./Acre	1,965.
Average Effective Permeability, Millidarcys	0.97
Average Initial Fluid Production Pressure, p.s.i.	36.0

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