



OILFIELD RESEARCH LABORATORIES

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November 7, 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, Section 3 Lease, Well No. W-3, located in Anderson County, Kansas and submitted to our laboratory on August 11, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

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

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GENERAL INFORMATION & SUMMARY

Minckley B,

Company James E. Russell Petroleum, Inc. Lease Section 3 Well No. W-3

Location 1320' SNL & 1320' EWL - SW $\frac{1}{4}$

Section 3 Twp. 23S Rge. 19E County Anderson State Kansas

Elevation, Feet Datum: - Mean Sea Level (Ground Level) 1048.0 ^{1057.7}
CARR. 11/20/50

Name of Sand - - - - - Squirrel

Top of Core - - - - - 698.0

Bottom of Core - - - - - 718.6

Top of Sand - - - - - 702.4

Bottom of Sand - - - - - 710.5

Total Feet of Permeable Sand - - - - - 7.3

Total Feet of Floodable Sand - - - - - 6.5

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

0 - 10 3.6 3.6

10 - 20 1.0 4.6

30 - 40 1.7 6.3

50 - 60 1.0 7.3

Average Permeability Millidarcys - - - - - 18.9

Average Percent Porosity - - - - - 15.1

Average Percent Oil Saturation - - - - - 56.5

Average Percent Water Saturation - - - - - 35.5

Average Oil Content, Bbls./A. Ft. - - - - - 668.

Total Oil Content, Bbls./Acre - - - - - 5,412.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 15.5

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 187.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 1,217.

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>
698.0 - 699.1	Shale, gray.
699.1 - 701.0	Shale, gray, sandy, calcareous.
701.0 - 702.4	Shale, gray, sandy, first oil show at 701.5.
702.4 - 703.2	Sandstone, brown, very shaly.
703.2 - 704.3	Sandstone, brown shaly.
704.3 - 706.3	Sandstone, dark brown, slightly calcareous.
706.3 - 706.9	Sandstone and shale, brown and gray laminated..
706.9 - 708.6	Sandstone, dark brown, slightly calcareous.
708.6 - 709.7	Sandstone and shale, brown and gray laminated.
709.7 - 710.5	Sandstone, grayish brown, very shaly.
710.5 - 718.6	Shale, gray sandy.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 1217 barrels of oil per acre was obtained from 6.5 feet of sand. The weighted average percent oil saturation was reduced from 60.7 to 45.2, or represents an average recovery of 15.5 percent. The weighted average effective permeability of the samples is 1.68 millidarcys, while the average initial fluid production pressure is 28.6 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 9 samples tested, 7 produced water and oil. This indicates that

approximately 78 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 1310 barrels of oil per acre. This is an average recovery of 202 barrels per acre foot from 6.5 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	20.0
Average porosity, percent	15.3
Oil saturation after flooding, percent	45.2
Performance factor, percent, estimated	55.0
Net floodable sand, feet	6.5

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease Minckley B, Section 3 Well No. W-3

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	702.5	13.9	38	47	85	410	0.30	0.8	0.8	328	0.24
2	703.7	14.5	62	36	98	697	5.7	1.1	1.9	767	6.27
3	704.5	15.2	65	33	98	767	11.	1.0	2.9	767	11.00
4	705.5	16.6	63	31	94	811	52.	1.0	3.9	811	52.00
5	706.8	18.5	65	27	92	933	4.0	0.6	4.5	560	2.40
6	707.5	15.5	66	27	93	794	31.	1.0	5.5	794	31.00
7	708.5	11.9	40	53	93	369	37.	0.7	6.2	258	25.90
8	709.5	14.8	59	38	97	677	8.2	1.1	7.3	745	9.02
9	710.4	15.0	41	30	71	477	Imp.	0.8	8.1	382	0.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	James E. Russell Petroleum, Inc.	Lease	Minckley B, Section 3	Well No.	W-3
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
702.4 - 710.5	7.3	18.9	137.83		
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Total Oil Content Bbls./Acre
702.4 - 710.5	8.1	15.1	56.5	35.5	5,412
				668	

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company			James E. Russell Petroleum, Inc.			Lease Minckley B, Section 3			Well No.		W-3	
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				
1	702.5	14.0	38	413	0	0	38	49	413	Imp.	-	
2	703.7	14.6	62	702	17	193	45	43	509	0.38	50	
3	704.5	15.2	65	766	19	224	46	52	542	0.50	30	
4	705.5	16.5	63	806	17	218	46	49	588	5.25	20	
5	706.8	18.7	65	943	16	232	49	47	711	4.20	25	
6	707.5	15.5	66	794	16	192	50	44	602	1.50	20	
7	708.5	12.1	40	375	2	19	38	56	356	0.75	30	
8	709.5	15.0	59	687	17	198	42	55	489	0.15	25	
9	710.4	14.5	42	472	0	0	42	32	472	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, Section 3	Well No.	W-3
Depth Interval, Feet	702.4 - 710.5				
Feet of Core Analyzed	6.5				
Average Percent Porosity	15.3				
Average Percent Original Oil Saturation	60.7				
Average Percent Oil Recovery	15.5				
Average Percent Residual Oil Saturation	45.2				
Average Percent Residual Water Saturation	49.3				
Average Percent Total Residual Fluid Saturation	94.5				
Average Original Oil Content, Bbls./A. Ft.	726.				
Average Oil Recovery, Bbls./A. Ft.	187.				
Average Residual Oil Content, Bbls./A. Ft.	539.				
Total Original Oil Content, Bbls./Acre	4,723.				
Total Oil Recovery, Bbls./Acre	1,217.				
Total Residual Oil Content, Bbls./Acre	3,506.				
Average Effective Permeability, Millidarcys	1.68				
Average Initial Fluid Production Pressure, p.s.i.	28.6				

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