

OILFIELD RESEARCH LABORATORIES

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October 17, 1980

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

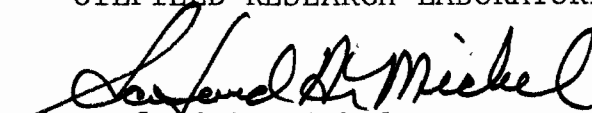
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Minckley "B" Lease, Well No. W-1, Anderson County, Kansas, and submitted to our laboratory on August 1, 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

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company James E. Russell Petroleum, Inc. Lease Minckley "B" Well No. W-1

Location 880' SNL & 50' EWL SE $\frac{1}{4}$

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

Elevation, Feet DATUM: Mean Sea Level (G.L.) 1080.0

Name of Sand Upper Squirrel

Top of Core 718.0

Bottom of Core 738.2

Top of Sand 720.1

Bottom of Sand 729.7

Total Feet of Permeable Sand 7.7

Total Feet of Floodable Sand 2.4

Distribution of Permeable Sand:
Permeability Range
Millidarcys

	Feet	Cum. Ft.
0 - 10	2.7	2.7
10 - 20	1.6	4.3
30 - 40	3.4	7.7

Average Permeability Millidarcys 16.6

Average Percent Porosity 14.2

Average Percent Oil Saturation 53.3

Average Percent Water Saturation 36.4

Average Oil Content, Bbls./A. Ft. 599.

Total Oil Content, Bbls./Acre 4,610.

Average Percent Oil Recovery by Laboratory Flooding Tests 9.3

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. 111.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre 267.

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>
718.0 - 720.1	Shale, gray, sandy, calcareous. 1st oil show at 720.1.
720.1 - 720.5	Sandstone, light brown, calcareous, shaly.
720.5 - 721.2	Shale, gray, sandy, calcareous.
721.2 - 722.8	Sandstone, brown, shaly, slightly calcareous.
722.8 - 724.0	Sandstone, brown, slightly calcareous.
724.0 - 724.4	Sandstone and shale, brown and gray, laminated.
724.4 - 726.6	Sandstone, brown, slightly calcareous.
726.6 - 727.4	Slightly calcareous sandstone and shale, slightly calcareous, brown and gray, laminated.
727.4 - 729.0	Sandstone, brown, slightly calcareous.
729.0 - 729.7	Sandstone and shale, brown and gray, laminated.
729.7 - 738.2	Shale, gray, sandy.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 267 barrels of oil per acre was obtained from 2.4 feet of sand. The weighted average percent oil saturation was reduced from 54.1 to 44.8, or represents an average recovery of 9.3 percent. The weighted average effective permeability of the samples is 0.94 millidarcys, while the average initial fluid production pressure is 31.7 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 10 samples tested, 3 produced water and oil, and 2 samples produced water only. This indicates that approximately 30 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 430 barrels of oil per acre. This is an average recovery of 178 barrels per acre foot from 2.4 feet of floodable sand analyzed in this core.

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

Original formation volume factor (estimated)	1.05
Reservoir water saturation, percent, (estimated)	25.0
Average porosity, percent	15.7
Oil saturation after flooding, percent	44.8
Performance factor, percent (estimated)	55.0
Net floodable sand, feet	2.4

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc.

Lease

Minckley "B"

Well No.

W-1

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	720.3	11.1	15	82	97	129	0.18	0.4	0.4	52	0.07
2	721.5	7.9	48	47	95	294	5.9	1.0	1.4	294	5.90
3	722.5	13.8	49	36	85	525	8.2	0.6	2.0	315	4.92
4	723.5	16.7	50	42	92	648	34.	1.2	3.2	778	40.80
5	724.5	12.7	62	36	98	611	13.	0.6	3.8	367	7.80
6	725.6	16.4	66	28	94	840	34.	1.0	4.8	840	13.00
7	726.5	13.3	56	41	97	578	31.	0.6	5.4	347	18.60
8	727.5	16.5	60	29	89	768	30.	0.6	6.0	461	18.00
9	728.5	16.3	56	18	74	708	13.	1.0	7.0	708	13.00
10	729.5	15.0	55	27	82	640	7.8	0.7	7.7	448	5.46

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Inc. Lease Minckley "B" Well No. W-1

Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.	Total Oil Content Bbls./Acre
720.1 - 722.8	2.0	10.3	41.7	50.7	5.5	10.89	661
722.8 - 729.7	5.7	15.7	57.4	31.4	20.5	116.66	3,949
720.1 - 729.7	7.7	14.2	53.3	36.4	16.6	127.55	4,610

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation		Volume of Water Recovered cc ^a	Effective Permeability Millidarcys ^{b,c}	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water			
1	720.3	11.2	15	130	0	0	15	82	0	Imp.	-
2	721.5	8.1	48	302	0	0	48	48	35	0.60	35
3	722.5	13.9	49	528	0	0	49	46	93	1.80	35
4	723.5	16.5	50	640	5	64	45	47	84	1.47	30
5	724.5	13.1	61	620	0	0	61	32	0	Imp.	-
6	725.6	16.5	66	845	0	0	66	30	0	Imp.	-
7	726.5	13.5	56	587	12	126	44	49	34	0.52	35
8	727.5	16.4	60	763	15	191	45	46	19	0.30	30
9	728.5	16.0	57	708	0	0	57	20	0	Imp.	-
10	729.5	15.4	54	645	0	0	54	29	0	Imp.	-

Company James E. Russell Petroleum, Inc. Lease Minckley "B" Well No. W-1

Notes: cc—cubic centimeter.

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

^{b,c}—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"	Well No.	W-1
Depth Interval, Feet	722.8 - 729.7				
Feet of Core Analyzed	2.4				
Average Percent Porosity	15.7				
Average Percent Original Oil Saturation	54.1				
Average Percent Oil Recovery	9.3				
Average Percent Residual Oil Saturation	44.8				
Average Percent Residual Water Saturation	47.3				
Average Percent Total Residual Fluid Saturation	92.1				
Average Original Oil Content, Bbls./A. Ft.	657.				
Average Oil Recovery, Bbls./A. Ft.	111.				
Average Residual Oil Content, Bbls./A. Ft.	546.				
Total Original Oil Content, Bbls./Acre	1,578.				
Total Oil Recovery, Bbls./Acre	267.				
Total Residual Oil Content, Bbls./Acre	1,311.				
Average Effective Permeability, Millidarcys	0.94				
Average Initial Fluid Production Pressure, p.s.i.	31.7				

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