OILFIELD RESEARCH LABORATORIES

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November 5, 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-4, located in Anderson County, Kansas and submitted to our laboratory on August 14, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/ks

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.** W-4

Location 1320' SNL & 1760' EWL - SW¼

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

Elevation, Feet Datum: Mean Sea Level (Ground Level)	1058.0 1057.7 Corrected 11-25-80
Name of Sand	Squirrel
Top of Core	707.0
Bottom of Core	727.1
Top of Sand	708.8
Bottom of Sand	718.8
Total Feet of Permeable Sand	7.3
Total Feet of Floodable Sand	3.4

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 5	2.4	2.4
5 - 10	0.9	3.3
10 - 30	2.7	6.0
30 - 60	1.3	7.3

Average Permeability Millidarcys	16.0
Average Percent Porosity	14.2
Average Percent Oil Saturation	38.1
Average Percent Water Saturation	51.5
Average Oil Content, Bbls./A. Ft.	458.
Total Oil Content, Bbls./Acre	4,352.
Average Percent Oil Recovery by Laboratory Flooding Tests	24.2
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	301.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	1,024.
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
707.0 - 708.8	Shale, gray,sandy slightly calcareous.
708.8 - 712.2	Sandstone and shale, brown and gray laminated. First oil show at 708.8.
712.2 - 714.9	Sandstone, brown, slightly calcareous.
714.9 - 715.4	Sandstone and shale, brown and gray laminated.
715.4 - 716.7	Sandstone, brown.
716.7 - 717.6	Sandstone and shale, brown and gray laminated.
717.6 - 718.8	Sandstone, grayish brown very shaly.
718.8 - 727.1	Shale, gray, sandy.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 1024 barrels of oil per acre was obtained from 3.4 feet of sand. The weighted average percent oil saturation was reduced from 61.6 to 37.4, or represents an average recovery of 24.2 percent. The weighted average effective permeability of the samples is 2.33 millidarcys, while the average initial fluid production pressure is 16.3 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 10 samples tested, 4 produced water and oil. This indicates that approximately 40 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 890 barrels of oil per acre. This is an average recovery of 262 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	1.05
Reservoir water saturation, percent, estimated	20.0
Average porosity, percent	15.8
Oil saturation after flooding, percent	37.4
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 Minckley B, Sec. 3 Well No. W-4

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	709.5	8.8	3	91	94	20	0.39	1.0	1.0	20	0.39
2	710.5	12.7	29	63	92	286	Imp.	1.0	2.0	286	0.00
3	711.5	14.2	27	58	85	297	1.2	1.4	3.4	416	1.68
4	712.5	13.6	59	38	97	623	24.	1.0	4.4	623	24.00
5	713.5	15.1	55	25	80	644	19.	1.0	5.4	644	19.00
6	714.5	18.9	71	23	94	1041	37.	0.7	6.1	729	25.90
7	715.5	20.0	62	22	84	962	52.	0.6	6.7	577	31.20
8	716.5	16.5	65	24	89	832	14.	0.7	7.4	582	9.80
9	717.5	13.7	29	63	92	308	5.7	0.9	8.3	277	5.13
10	718.5	13.3	16	73	89	165	Imp.	1.2	9.5	198	0.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Inc. Lease Minckley B, Sec. 3 Well No. W-4

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
708.8 - 718.8	7.3	16.0	117.10

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
708.8 - 718.8	9.5	14.2	38.1	51.5	458	4,352

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Inc. Lease Minckley B, Sec. 3 Well No. W-4

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	709.5	8.9	3	21	0	0	3	91	21	0	Imp.	-
2	710.5	13.2	28	287	0	0	28	65	287	0	Imp.	-
3	711.5	13.8	28	300	0	0	28	58	300	0	Imp.	-
4	712.5	13.7	59	627	24	255	35	62	372	10	0.45	20
5	713.5	15.1	55	644	19	223	36	60	421	94	2.10	15
6	714.5	18.7	71	1030	36	522	35	61	508	308	6.30	15
7	715.5	20.0	62	962	0	0	62	24	962	0	Imp.	-
8	716.5	16.6	65	837	20	258	45	51	579	58	1.35	15
9	717.5	14.1	28	306	0	0	28	65	306	0	Imp.	-
10	718.5	12.8	17	169	0	0	17	74	169	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. W-4

Depth Interval, Feet	708.8 - 718.8
Feet of Core Analyzed	3.4
Average Percent Porosity	15.8
Average Percent Original Oil Saturation	61.6
Average Percent Oil Recovery	24.2
Average Percent Residual Oil Saturation	37.4
Average Percent Residual Water Saturation	58.9
Average Percent Total Residual Fluid Saturation	96.3
Average Original Oil Content, Bbls./A. Ft.	758.
Average Oil Recovery, Bbls./A. Ft.	301.
Average Residual Oil Content, Bbls./A. Ft.	457.
Total Original Oil Content, Bbls./Acre	2,578.
Total Oil Recovery, Bbls./Acre	1,024.
Total Residual Oil Content, Bbls./Acre	1,554.
Average Effective Permeability, Millidarcys	2.33
Average Initial Fluid Production Pressure, p.s.i.	16.3

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