



OILFIELD RESEARCH LABORATORIES

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June 21, 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 Minckley B, Section 10 Lease, Well No. 115, Anderson County, Kansas, and submitted to our laboratory on June 7, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman
Benjamin R. Pearman

BRP:km

3 c to Abilene

2 c to Chanute

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GENERAL INFORMATION & SUMMARY

Inc.

Company James E. Russell Petroleum, Inc. Lease Minckley B, Sec. 10 Well No. 115

Location 440' EWL & 1,100' SNL NW $\frac{1}{4}$

Section 14 Twp. 23S Rge. 19E County Anderson State Kansas

Name of Sand	- - - - -	Squirrel
Top of Core	- - - - -	710.0
Bottom of Core	- - - - -	750.0
Top of Sand	- - - - -	710.0
Bottom of Sand	- - - - -	746.2
Total Feet of Permeable Sand	- - - - -	18.1
Total Feet of Floodable Sand	- - - - -	2.8

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

0 - 1	9.3	9.3
1 - 5	6.8	16.1
5 & Above	2.0	18.1

Average Permeability Millidarcys	- - - - -	1.9
Average Percent Porosity	- - - - -	14.0
Average Percent Oil Saturation	- - - - -	29.1
Average Percent Water Saturation	- - - - -	50.0
Average Oil Content, Bbls./A. Ft.	- - - - -	319.
Total Oil Content, Bbls./Acre	- - - - -	7,050.
Average Percent Oil Recovery by Laboratory Flooding Tests	- - - - -	6.7
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	- - - - -	84.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	- - - - -	234.
Total Calculated Oil Recovery, Bbls./Acre	(Primary & Waterflooding)	600.
Packer Setting, Feet	- - - - -	
Viscosity, Centipoises @	- - - - -	
A. P. I. Gravity, degrees @ 60 °F	- - - - -	
Elevation, Feet	- - - - -	

Fresh water mud was used as the circulating fluid while taking this core. The core was sampled by a representative of Oilfield Research Laboratories. The well was drilled in virgin territory.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
710.0 - 711.1	Light brown slightly shaly sandstone.
711.1 - 714.9	Gray sandy shale containing thin widely scattered streaks of oil saturated sandstone; 20% sandstone.
714.9 - 716.1	Light brown shaly sandstone.
716.1 - 717.7	Gray sandy shale containing thin widely scattered streaks of oil saturated sandstone; 10% sandstone.
717.7 - 718.3	Light brown shaly sandstone.
718.3 - 719.8	Gray and light brown laminated sandstone and shale; 40% sandstone.
719.8 - 729.9	Light brown shaly sandstone.
729.9 - 734.4	Gray shale.
734.4 - 734.7	Light brown shaly sandstone.
734.7 - 735.5	Gray sandy shale.
735.5 - 738.2	Light brown shaly sandstone.
738.2 - 739.4	Brown and gray laminated sandstone and shale.
739.4 - 743.9	Brown shaly sandstone.
743.9 - 745.8	Gray and light brown laminated shale and sandstone; 10% sandstone.
745.8 - 746.2	Brown shaly sandstone.
746.2 - 750.0	Gray shale.

LABORATORY FLOODING TESTS

The sand in the lower portion of this core responded to laboratory flooding tests, as a total recovery of 234 barrels of oil per acre was obtained from 2.8 feet of sand. The weighted average percent oil saturation was reduced from 39.8 to 33.1, or represents an average recovery of 6.7 percent. The weighted average effective permeability of the samples is 0.012 millidarcys, while the average initial fluid production pressure is 43.4 pounds per square inch (See Table V).

CALCULATED RECOVERY

The laboratory data indicates that efficient primary and waterflooding operations in the vicinity of this well should recover approximately 600 barrels of oil per acre. This is an average recovery of 215 barrels per acre foot from the 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	1.05
Reservoir water saturation, percent	25.0
Average porosity, percent	16.1
Oil saturation after flooding, percent	33.1
Performance factor, percent	45.0
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 Minckley B, Section 10 Well No. 115

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			Ft.	Cum. Ft.		
1	710.5	14.4	25	38	279	2.3	1.1	1.1	307	2.53
2	715.7	13.0	23	69	232	Imp.	1.2	2.3	278	0.00
3	717.9	14.7	31	48	354	0.26	0.6	2.9	212	0.16
4	720.5	13.5	10	68	105	0.89	1.2	4.1	126	1.07
5	721.6	13.8	25	54	268	0.41	1.0	5.1	268	0.41
6	722.5	14.8	20	51	230	5.8	1.0	6.1	230	5.80
7	723.5	13.1	14	68	142	0.32	1.5	7.6	213	0.48
8	725.5	15.6	37	42	448	3.0	1.5	9.1	672	4.50
9	726.7	13.5	24	54	251	0.20	1.0	10.1	251	0.20
10	727.5	13.7	27	47	287	Imp.	1.0	11.1	287	0.00
11	728.5	13.9	33	41	356	0.95	1.0	12.1	356	0.95
12	729.4	13.6	32	49	338	0.92	0.9	13.0	304	0.83
13	734.5	14.7	26	55	297	Imp.	0.3	13.3	89	0.00
14	735.7	13.3	27	64	279	Imp.	0.5	13.8	135	0.00
15	736.7	13.8	27	64	289	Imp.	1.0	14.8	289	0.00
16	737.5	13.5	24	63	251	2.3	1.2	16.0	301	2.76
17	738.5	16.7	39	37	505	0.27	1.2	17.2	606	0.32
18	739.5	15.9	43	45	530	3.0	0.6	17.8	318	1.80
19	740.5	14.5	41	32	461	1.9	1.0	18.8	461	1.90
20	741.4	15.0	39	38	454	6.1	1.0	19.8	454	6.10
21	742.5	12.2	47	35	445	2.1	1.0	20.8	445	2.10
22	743.5	13.9	30	39	324	0.43	0.9	21.7	292	0.39
23	746.0	13.6	37	40	390	3.5	0.4	22.1	156	1.40

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Inc. Lease Minckley B, Section 10 Well No. 115

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
710.0 - 738.2	12.0	1.6	19.69
738.2 - 746.2	6.1	2.3	14.01
710.0 - 746.2	18.1	1.9	33.70

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
710.0 - 738.2	16.0	13.9	25.2	55.0	270	4,318
738.2 - 746.2	6.1	14.6	39.6	37.3	448	2,732
710.0 - 746.2	22.1	14.0	29.1	50.0	319	7,050

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Inc. Lease Minckley B, Section 10 Well No. 115

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation		Volume of Water Recovered cc ^e	Effective Permeability Millidarcys ^{ee}	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbbls./A. Ft.	%	Bbbls./A. Ft.	% Oil	% Water			
1	710.5	14.5	25	281	0	0	25	61	0	Imp.	50
2	715.7	12.7	24	236	0	0	24	71	0	Imp.	-
3	717.9	14.7	31	354	0	0	31	52	0	Imp.	-
4	720.5	13.5	12	126	0	0	12	70	0	Imp.	-
5	721.6	13.5	24	251	0	0	24	58	0	Imp.	-
6	722.5	14.9	21	242	0	0	21	53	0	Imp.	-
7	723.5	13.0	14	141	0	0	14	71	0	Imp.	-
8	725.5	16.0	34	422	0	0	34	46	0	Imp.	-
9	726.7	13.5	24	251	0	0	24	57	0	Imp.	-
10	727.5	13.6	27	285	0	0	27	50	0	Imp.	-
11	728.5	13.6	33	348	0	0	33	44	0	Imp.	-
12	729.4	13.6	32	338	0	0	32	51	0	Imp.	-
13	734.5	14.9	27	312	0	0	27	56	0	Imp.	-
14	735.7	13.6	26	274	0	0	26	67	0	Imp.	-
15	736.7	13.8	27	289	0	0	27	65	0	Imp.	-
16	737.5	13.2	25	256	0	0	25	65	0	Imp.	-
17	738.5	16.4	39	496	5	64	34	56	0	0.010	40
18	739.5	16.4	43	546	8	102	35	64	0	0.010	50
19	740.5	14.7	42	479	0	0	42	35	0	Imp.	-
20	741.4	15.5	39	469	8	96	31	63	0	0.014	40
21	742.5	12.1	47	441	0	0	47	36	0	Imp.	-
22	743.5	14.0	32	347	0	0	32	40	0	Imp.	-
23	746.0	13.6	36	380	0	0	36	43	0	Imp.	-

Notes: cc—cubic centimeter.

^e—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 Minckley B, Section 10

Well No. 115

Depth Interval, Feet 710.0 - 746.2

Feet of Core Analyzed 2.8

Average Percent Porosity 16.1

Average Percent Original Oil Saturation 39.8

Average Percent Oil Recovery 6.7

Average Percent Residual Oil Saturation 33.1

Average Percent Residual Water Saturation 60.2

Average Percent Total Residual Fluid Saturation 93.3

Average Original Oil Content, Bbls./A. Ft. 498.

Average Oil Recovery, Bbls./A. Ft. 84.

Average Residual Oil Content, Bbls./A. Ft. 414.

Total Original Oil Content, Bbls./Acre 1,392.

Total Oil Recovery, Bbls./Acre 234.

Total Residual Oil Content, Bbls./Acre 1,158.

Average Effective Permeability, Millidarcys 0.012

Average Initial Fluid Production Pressure, p.s.i. 43.4

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