OILFIELD RESEARCH LABORATORIES
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July 26, 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 Eastwood Lease, Well No. 32-A, Allen County, Kansas, and submitted to our laboratory on July 19, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman

SAM:dlb

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

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GENERAL INFORMATION & SUMMARY

Company James E. Russell Petroleum, Inc. Lease Eastwood Well No. 32-A

Location 165' SNL & 1320' WEL, NW¼

Section 31 Twp. 23S Rge. 19E County Allen State Kansas

Name of Sand	Bartlesville
Top of Core	906.0
Bottom of Core	936.7
Top of Sand	906.0
Bottom of Sand	929.3
Total Feet of Permeable Sand	20.1
Total Feet of Floodable Sand	16.9

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 – 10	4.4	4.4
10 – 50	9.0	13.4
50 – 100	3.7	17.1
100 – 200	1.9	19.0
200 & Above	1.1	20.1

Average Permeability Millidarcys	73.5
Average Percent Porosity	18.8
Average Percent Oil Saturation	35.9
Average Percent Water Saturation	45.0
Average Oil Content, Bbls./A. Ft.	537.
Total Oil Content, Bbls./Acre	10,803.
Average Percent Oil Recovery by Laboratory Flooding Tests	9.8
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	148.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	2,495.
Total Calculated Oil Recovery, Bbls./Acre (Primary & waterflooding)	4,580.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet (Ground Level)	1,024.6

The core was sampled by a representative of Oilfield Research Laboratories. The drilling fluid consisted of fresh water mud. The core was from a virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
906.0 - 908.4	Finely laminated sandstone and gray shale.
908.4 - 909.2	Brown sandstone.
909.2 - 910.9	Widely scattered laminated sandstone and shale.
910.9 - 912.0	Brown sandstone.
912.0 - 912.4	Sandy shale.
912.4 - 917.8	Brown sandstone.
917.8 - 918.1	Sandy shale.
918.1 - 919.3	Brown sandstone.
919.3 - 919.7	Laminated sandstone and shale.
919.7 - 920.8	Brown sandstone.
920.8 - 921.5	Sandy shale.
921.5 - 926.8	Brown sandstone.
926.8 - 927.2	Laminated sandstone and shale.
927.2 - 929.3	Dark brown sandstone.
929.3 - 930.0	Black coal.
930.0 - 933.8	Gray shale.
933.8 - 936.7	Gray slightly calcareous shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 2,495 barrels of oil per acre was obtained from 16.9 feet of sand. The weighted average percent oil saturation was reduced from 38.8 to 29.0, or represents an average recovery of 9.8 percent. The weighted average effective permeability of the samples is 3.22 millidarcys, while the average initial fluid production pressure is 17.5 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 22 samples tested, 19 produced water and 18 oil. This indicates that approximately 82. percent of the sand represented by these samples is floodable pay sand.

CALCULATED RECOVERY

It would appear from a study of the data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 4,580 barrels of oil per acre. This is an average recovery of 271 barrels per acre foot from 16.9 feet of floodable sand analyzed in this core.

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

Original formation volume factor	1.07
Reservoir water saturation, percent	30.0
Average porosity, percent	19.2
Oil saturation after flooding, percent	29.0
Performance factor, percent	50.0
Net floodable pay sand, feet	16.9

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease Eastwood Well No. 32-A

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	906.6	10.4	2	94	96	16	0.43	1.0	1.0	16	0.43
2	908.5	17.9	32	55	87	444	28.	0.8	1.8	355	22.40
3	909.4	12.0	27	65	92	251	19.	0.7	2.5	176	13.30
4	910.2	20.4	37	35	72	586	2.9	1.0	3.5	586	2.90
5	911.5	19.9	40	42	82	618	44.	1.1	4.6	680	48.40
6	912.6	19.9	43	37	80	664	61.	0.6	5.2	398	36.60
7	913.5	19.1	40	38	78	593	43.	0.8	6.0	474	34.40
8	914.5	20.3	49	35	84	772	55.	1.0	7.0	772	55.00
9	915.5	18.3	48	37	85	681	7.7	1.0	8.0	681	7.70
10	916.5	19.1	35	50	85	519	13.	1.0	9.0	519	13.00
11	917.5	19.4	31	54	85	467	9.4	1.0	10.0	467	9.40
12	918.6	19.0	37	39	76	545	44.	1.2	11.2	654	52.80
13	919.6	18.7	35	43	78	508	5.2	0.4	11.6	203	2.08
14	920.5	20.9	40	32	72	649	72.	1.1	12.7	714	79.20
15	921.6	12.0	36	60	96	335	42.	0.6	13.3	201	25.20
16	922.6	19.8	34	43	77	522	23.	1.0	14.3	522	23.00
17	923.6	20.0	44	33	77	683	60.	1.0	15.3	683	60.00
18	924.5	18.5	41	39	80	588	37.	1.0	16.3	588	37.00
19	925.5	21.4	45	29	74	747	188.	0.9	17.2	672	169.20
20	926.6	19.6	23	57	80	350	11.	0.8	18.0	280	8.80
21	927.5	19.1	37	43	80	548	118.	1.0	19.0	548	118.00
22	928.5	23.2	31	42	73	558	599.	1.1	20.1	614	658.90
						VERTICAL PERMEABILITY					
1	927.0						0.74				
2	928.0						247.				
3	928.9						78.				

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Inc. Lease Eastwood Well No. 32-A

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
906.0 - 915.8	8.0	27.6	221.13
915.8 - 929.3	12.1	103.9	1,256.58
906.0 - 929.3	20.1	73.5	1,477.71

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
906.0 - 915.8	8.0	17.7	35.3	48.7	517	4,138
915.8 - 929.3	12.1	19.6	36.3	42.6	551	6,665
906.0 - 929.3	20.1	18.8	35.9	45.0	537.	10,803

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Inc. Lease Eastwood Well No. 32-A

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	906.6	10.2	5	40	0	0	5	91	40	0	Imp.	-
2	908.5	17.9	32	444	5	69	27	71	375	41	0.90	20
3	909.4	12.5	27	262	4	39	23	72	223	49	1.05	15
4	910.2	20.0	37	574	8	124	29	69	450	55	1.27	15
5	911.5	19.5	40	605	10	151	30	68	454	134	2.70	20
6	912.6	19.9	43	664	14	216	29	68	448	131	2.85	15
7	913.5	18.8	40	583	12	175	28	70	408	90	2.02	20
8	914.5	19.9	49	756	20	309	29	67	447	125	2.62	10
9	915.5	18.3	48	681	18	256	30	65	425	55	1.12	20
10	916.5	19.1	35	519	8	119	27	71	400	61	1.20	20
11	917.5	19.2	30	447	0	0	30	60	447	0	Imp.	-
12	918.6	18.6	37	534	6	87	31	66	447	15	0.33	35
13	919.6	18.8	33	481	0	0	33	55	481	0	Imp.	-
14	920.5	20.7	40	642	10	161	30	65	481	116	2.40	15
15	921.6	12.5	36	349	6	58	30	66	291	55	1.12	20
16	922.6	19.8	34	522	4	61	30	63	461	19	0.35	20
17	923.6	20.2	44	690	16	251	28	70	439	202	4.05	15
18	924.5	19.0	41	604	10	147	31	67	457	149	2.85	15
19	925.5	21.2	45	740	17	280	28	70	460	287	6.08	15
20	926.6	19.6	22	335	0	0	22	74	335	16	0.33	30
21	927.5	19.4	37	557	3	45	34	63	512	115	2.25	15
22	928.5	22.8	31	548	5	88	26	62	460	328	19.80	10

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 Eastwood Well No. 32-A

Depth Interval, Feet	906.0 - 915.8	915.8 - 929.3	906.0 - 929.3
Feet of Core Analyzed	7.0	9.9	16.9
Average Percent Porosity	18.5	19.6	19.2
Average Percent Original Oil Saturation	40.1	37.9	38.8
Average Percent Oil Recovery	11.7	8.4	9.8
Average Percent Residual Oil Saturation	28.4	29.5	29.0
Average Percent Residual Water Saturation	68.5	66.2	67.2
Average Percent Total Residual Fluid Saturation	96.9	95.7	96.2
Average Original Oil Content, Bbls./A. Ft.	583.	579.	581.
Average Oil Recovery, Bbls./A. Ft.	173.	130.	148.
Average Residual Oil Content, Bbls./A. Ft.	410.	449.	433.
Total Original Oil Content, Bbls./Acre	4,080.	5,728.	9,808.
Total Oil Recovery, Bbls./Acre	1,207.	1,288.	2,495.
Total Residual Oil Content, Bbls./Acre	2,873.	4,440.	7,313.
Average Effective Permeability, Millidarcys	1.82	4.21	3.22
Average Initial Fluid Production Pressure, p.s.i.	16.9	18.0	17.5

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