



OILFIELD RESEARCH LABORATORIES

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December 7, 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 Alexander Lease, Well No. W-46, Woodson County, Kansas and submitted to our laboratory on November 12, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Benjamin R. Pearman

SAM/tem
3 c to Abilene, Texas
2 c to Chanute, Kansas

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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>
1004.0 - 1008.4	Dark gray shale.
1008.4 - 1008.6	Very shaly sandstone.
1008.6 - 1009.8	Hard dark limestone.
1009.8 - 1010.8	Sandy shale.
1010.8 - 1013.1	Dark shaly sandstone.
1013.1 - 1013.7	Alternate thin layers of sandstone and shale.
1013.7 - 1015.2	Gray shale.
1015.2 - 1015.7	Dark shaly sandstone.
1015.7 - 1016.3	Gray shale.
1016.3 - 1018.3	Dark shaly sandstone.
1018.3 - 1021.0	Gray shaly sandstone.
1021.0 - 1022.0	Gray sandy shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 179 barrels of oil per acre was obtained from 3.1 feet of sand. The weighted average percent oil saturation was reduced from 46.0 to 42.1, or represents an average recovery of 3.9 percent. The weighted average effective permeability of the samples is 3.77 millidarcys, while the average initial fluid production pressure is 25.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 12 samples tested, 3 produced water and oil, and 1 sample produced water only, This indicates that approximately 25 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 810 barrels of oil per acre. This is an average recovery of 262 barrels per acre foot from 3.1 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.07
Reservoir water saturation, percent, estimated	15.0
Average porosity, percent,	18.1
Oil saturation after flooding, percent	42.1
Performance factor, percent, estimated	50.0
Net floodable pay sand, feet	3.1

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Incorporated Lease Alexander

Well No. W-46

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbbs. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water	Total			Ft.	Cum. Ft.		
1	1008.5	5.6	30	65	95	130	Imp.	0.2	0.2	26	0.00
2	1009.5	7.2	72	24	96	402	Imp.	1.2	1.4	482	0.00
3	1010.6	12.8	23	64	87	228	0.22	1.0	2.4	228	0.22
4	1011.6	16.6	41	35	76	528	0.60	1.2	3.6	634	0.72
5	1012.3	17.2	48	15	63	641	26.	1.1	4.7	705	28.60
6	1013.3	15.1	37	49	86	433	0.68	0.2	4.9	87	0.14
7	1015.5	14.4	34	55	89	380	94.	0.3	5.2	114	28.20
8	1016.7	20.5	51	18	69	811	43.	0.8	6.0	649	34.40
9	1017.5	16.3	61	26	87	771	78.	1.2	7.2	925	93.60
10	1018.5	13.6	31	49	80	327	7.1	0.8	8.0	262	5.68
11	1019.7	16.8	38	44	82	495	0.27	1.1	9.1	544	0.30
12	1020.7	12.4	8	82	90	77	0.56	0.8	9.9	62	0.45

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Incorporated Lease Alexander Well No. W-46

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Fl. x Md.
1008.4 - 1021.0	8.5	22.6	192.31

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
1008.4 - 1021.0	9.9	14.5	42.6	39.3	476	4,716

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Incorporated Lease Alexander Well No. W-46

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	1008.5	5.8	30	135	0	0	30	65	0	Imp.	-
2	1009.5	7.1	70	386	0	0	70	26	0	Imp.	-
3	1010.6	12.9	23	230	0	0	23	70	0	Imp.	-
4	1011.6	17.1	41	544	40	40	38	55	7	0.22	30
5	1012.3	17.2	48	641	27	27	46	50	35	1.04	35
6	1013.3	15.0	37	431	0	0	37	53	0	Imp.	-
7	1015.5	14.9	33	381	0	0	33	60	277	5.47	20
8	1016.7	20.7	51	819	126	126	43	54	171	12.87	10
9	1017.5	16.5	60	768	0	0	60	30	0	Imp.	-
10	1018.5	13.6	32	338	0	0	32	54	0	Imp.	-
11	1019.7	16.7	38	492	0	0	38	47	0	Imp.	-
12	1020.7	12.6	7	68	0	0	7	80	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, Incorporated Lease Alexander Well No. W-46

Depth Interval, Feet 1008.4 - 1021.0

Feet of Core Analyzed 3.1

Average Percent Porosity 18.1

Average Percent Original Oil Saturation 46.0

Average Percent Oil Recovery 3.9

Average Percent Residual Oil Saturation 42.1

Average Percent Residual Water Saturation 53.0

Average Percent Total Residual Fluid Saturation 95.1

Average Original Oil Content, Bbls./A. Ft. 649.

Average Oil Recovery, Bbls./A. Ft. 58.

Average Residual Oil Content, Bbls./A. Ft. 591.

Total Original Oil Content, Bbls./Acre 2,012.

Total Oil Recovery, Bbls./Acre 179.

Total Residual Oil Content, Bbls./Acre 1,833.

Average Effective Permeability, Millidarcys 3.77

Average Initial Fluid Production Pressure, p.s.i. 25.0

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