

JAMES E. RUSSELL PETROLEUM, INC.

CORE ANALYSIS REPORT

NELSON LEASE

WELL NO. RW-13

ALLEN COUNTY, KANSAS

OILFIELD RESEARCH LABORATORIES

536 N. HIGHLAND

CHANUTE, KANSAS



OILFIELD RESEARCH LABORATORIES

536 NORTH HIGHLAND - CHANUTE, KANSAS 66720 - PHONE (316) 431-2650

July 21, 1983

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

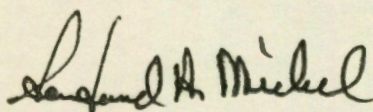
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Nelson Lease, Well No. RW-13, located in Allen County, Kansas and submitted to our laboratory on July 13, 1983.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Sanford A. Michel

SAM/rmc

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

Oilfield Research Laboratories
GENERAL INFORMATION & SUMMARY

Company James E. Russell Petroleum, Inc. Lease Nelson Well No. RW-13
Location 690' WEL & 620' SNL, NW $\frac{1}{4}$
Section 28 Twp. 26S Rge. 21E County Allen State Kansas

Elevation, Feet DATUM: MEAN SEA LEVEL (GROUND LEVEL) 1077.3

Name of Sand..... Bartlesville
Top of Core 663.0
Bottom of Core 701.2
Top of Sand 663.0
Bottom of Sand 697.6
Total Feet of Permeable Sand 26.3
Total Feet of Productive Sand 14.8

Distribution of Permeable Sand: Permeability Range Millidarcys			Feet	Cum. Ft.
0	-	0.50	4.5	4.5
0.50	-	1.0	4.8	9.3
1.0	-	2.0	2.0	11.3
2.0	-	4.0	5.0	16.3
4.0	-	12.0	1.0	17.3
12.0	-	33.0	6.0	23.3
40.0	-	74.0	2.3	25.6
117.0	-	119.0	0.7	26.3

	Laboratory	Net
Average Permeability Millidarcys	13.5	26.5
Average Percent Porosity	19.8	20.9
Average Percent Oil Saturation	39.9	41.9
Average Percent Water Saturation	30.6	26.9
Average Oil Content, Bbls./A. Ft.	618.	680.
Total Oil Content, Bbls./Acre	16,241.	10,065.
Average Percent Oil Recovery by Laboratory Flooding Tests	11.8	-
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	193.	-

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The core was sampled by a representative of Oilfield Research Laboratories. Salt water mud and KCl were used as a drilling fluid.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
663.0 - 664.0	Sandstone, brown, with scattered gray shale and mica partings.
664.0 - 665.2	Sandstone, very shaly, grayish brown.
665.2 - 665.8	Shale, gray.
665.8 - 667.0	Sandstone, brown, with scattered gray shale and mica partings.
667.0 - 668.2	Shale, gray.
668.2 - 669.3	Sandstone, very shaly, grayish brown.
669.3 - 670.5	Sandstone, brown.
670.5 - 671.4	Shale, gray.
671.4 - 672.2	Sandstone, brown.
672.2 - 672.6	Sandstone, slightly carbonaceous, brownish black.
672.6 - 676.2	Shale, sandstone, and mica, laminated, gray and brown.
676.2 - 677.0	Sandstone, brown, with scattered gray shale and mica partings.
677.0 - 678.0	Sandstone, shaly, brown, with scattered gray shale and mica partings.
678.0 - 678.6	Sandstone, very shaly, grayish brown.
678.6 X 682.0	Shale, gray.
682.0 - 683.0	Sandstone, shaly, brown, (core broken up).
683.0 - 686.0	Sandstone, very shaly, slightly carbonaceous, blackish brown.

<u>Depth Interval, Feet</u>	<u>Description</u>
686.0 - 688.0	Sandstone, carbonaceous, shaly, black.
688.0 - 689.0	Sandstone, slightly carbonaceous, blackish brown.
689.0 - 691.0	Sandstone, shaly, slightly carbonaceous, blackish brown.
691.0 - 692.0	Sandstone, very shaly, slightly carbonaceous, brownish black.
692.0 - 694.0	Sandstone, shaly, slightly carbonaceous, grayish black.
694.0 - 695.0	Sandstone, slightly shaly, slightly carbonaceous, blackish brown.
695.0 - 697.6	Sandstone, slightly carbonaceous, brownish black.
697.6 - 701.2	Shale, gray.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 735 barrels of oil per acre was obtained from 3.8 feet of sand. The weighted average percent oil saturation was reduced from 39.2 to 27.4, or represents an average recovery of 11.8 percent. The weighted average effective permeability of the samples is 2.35 millidarcys, while the average initial fluid production pressure is 28.0 pounds per square inch.

PRIMARY RECOVERY

A detailed analysis of the core data would indicate that the pay sand section is from 669.3 feet to 697.6 feet. A well in this area should produce approximately 62 barrels of oil per acre foot by primary methods. These recovery estimates assume a pressured, virgin reservoir.

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Any oil previously produced from the area represented by this core should be deducted from the above estimate.

WATERFLOOD RECOVERY

The estimated additional oil recovery from a well in this vicinity by waterflood is approximately 323 barrels per acre foot.

Oil Recovery Barrels Stock Tank	PRIMARY AND SECONDARY		
	Solution Gas Energy	Increase By Waterflood After Primary	Total
Barrels per Acre Foot	62	323	385

RESULTS OF SATURATION & PERMEABILITY TESTS

Company James E. Russell Petroleum, Inc. Lease Nelson Well No. RW-13

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RESULTS OF SATURATION & PERMEABILITY TESTS

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Company James E. Russell Petroleum, Inc. Lease Nelson Well No. RW-13

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.		
25	694.4	21.4	45	26	71	747	7.1	1.0	23.7	747	7.10
26	695.5	20.2	35	29	64	549	14.	1.0	24.7	549	14.00
27	696.5	21.6	44	25	69	737	25.	1.0	25.7	737	25.00
28	697.5	21.1	46	25	71	753	15.	0.6	26.3	452	9.00
			<u>AVERAGES</u>								
	663.0 - 669.3	18.8	18.1	46.0			15.6		3.3	918	51.59
	669.3 - 678.6	19.2	39.4	31.5			22.7		8.4	4,945	191.09
	683.0 - 697.6	20.4	45.1	26.6			7.7		14.6	10,378	112.90
	663.0 - 697.6	19.8	39.9	30.6			13.5		26.3	16,241	355.58
						<u>TOTALS</u>					

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

Company James E. Russell Petroleum, Inc. Lease Nelson Well No. RW-13

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	663.5	20.8	26	420	0	0	26	32	420	0	Imp.	-
2	666.5	20.9	19	308	0	0	19	69	308	26	0.37	35
3	668.4	14.4	11	123	0	0	11	65	123	0	Imp.	-
4	669.5	21.3	34	562	4	66	30	55	496	342	4.05	20
5	670.4	22.0	36	614	9	154	27	64	460	374	8.10	20
6	671.6	22.3	45	779	19	329	26	70	450	54	0.82	30
7	672.5	21.8	45	461	0	0	45	27	461	0	Imp.	-
8	673.4	19.0	41	604	0	0	41	31	604	0	Imp.	-
9	674.3	16.1	49	612	0	0	49	23	612	0	Imp.	-
10	675.3	16.8	33	430	0	0	33	44	430	0	Imp.	-
11	676.5	21.2	44	724	18	296	26	64	428	72	1.35	25
12	677.5	18.0	36	503	8	112	28	54	391	4	0.30	45
13	678.5	16.2	28	352	0	0	28	48	352	0	Imp.	-
14	683.6	19.0	44	649	0	0	44	31	649	0	Imp.	-
15	684.5	19.7	57	871	0	0	57	26	871	0	Imp.	-
16	685.6	20.3	56	882	0	0	56	24	882	0	Imp.	-
17	686.6	21.0	38	619	0	0	38	32	619	0	Imp.	-
18	687.4	19.7	50	764	0	0	50	25	764	0	Imp.	-
19	688.4	22.1	39	669	0	0	39	27	669	0	Imp.	-
20	689.4	22.0	42	717	0	0	42	26	717	0	Imp.	-
21	690.5	20.8	37	597	0	0	37	25	597	0	Imp.	-
22	691.6	18.4	48	685	0	0	48	31	685	0	Imp.	-
23	692.5	19.4	40	602	0	0	40	30	602	0	Imp.	-
24	693.5	20.8	53	855	0	0	53	21	855	0	Imp.	-
Continued												

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.

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

Page 2

Company James E. Russell Petroleum, Inc. Lease Nelson Well No. RW-13

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.			
25	694.4	21.0	46	749	0	0	46	25	749	0	Imp.	-
26	695.5	20.2	35	548	0	0	35	31	548	0	Imp.	-
27	696.5	21.4	44	730	0	0	44	26	730	0	Imp.	-
28	697.5	21.0	46	749	0	0	46	27	749	0	Imp.	-
						AVERAGES						
	669.3 - 678.6	20.7			11.8	193	27.4	61.0	439		2.35	28.0

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.

PERCENT

PERCENT

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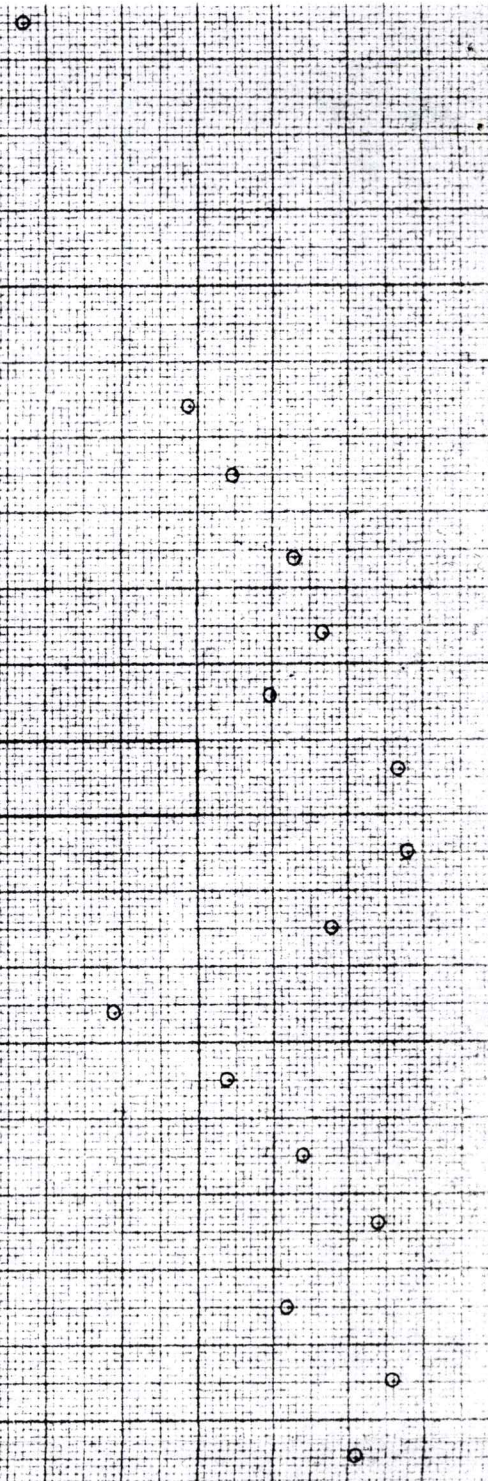
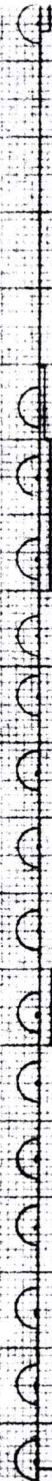
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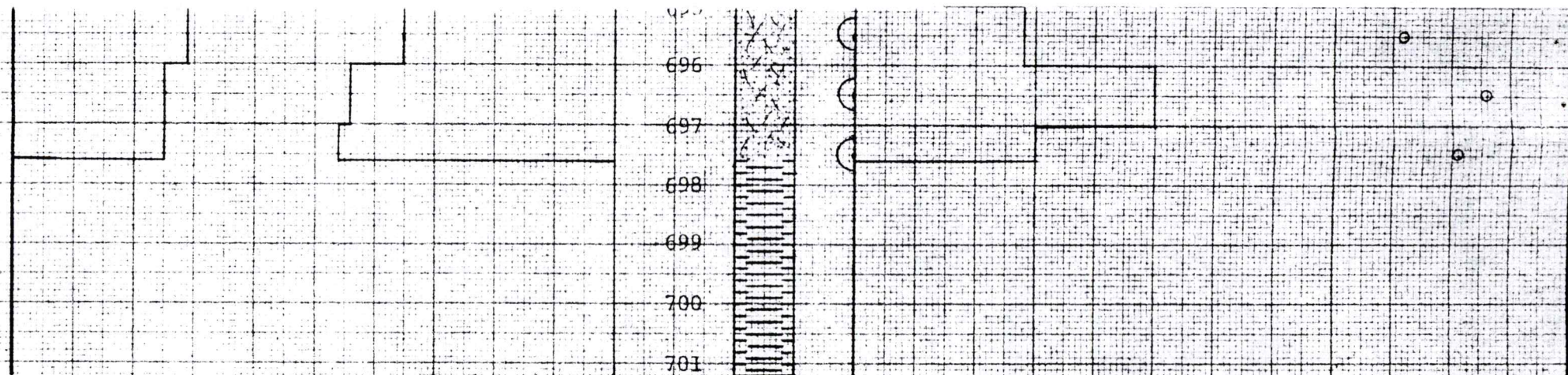
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KEY:



SHALE



SANDSTONE



CARBONACEOUS SANDSTONE



SHALY SANDSTONE



IMPERMEABLE TO WATER



SANDSTONE WITH SHALE AND MICA PARTINGS



LAMINATED SHALE, SANDSTONE, AND MICA PARTINGS



SHALY SANDSTONE WITH SHALE AND MICA PARTINGS



SHALY CARBONACEOUS SANDSTONE



SHALY SANDSTONE (CORE BROKEN UP)



FLOODPOT RESIDUAL OIL SATURATION

JAMES E. RUSSELL PETROLEUM, INC.

NELSON LEASE

ALLEN COUNTY, KANSAS

WELL NO. RW-13

DEPTH INTERVAL, FEET	AVERAGE PERCENT POROSITY	AVERAGE OIL SATURATION PERCENT	AVERAGE WATER SATURATION PERCENT	AVERAGE PERMEABILITY MILLIDARCYs
663.0 - 669.3	18.8	18.1	46.0	15.6
669.3 - 678.6	19.2	39.4	31.5	22.7



IMPERMEABLE TO WATER



FLOODPOT RESIDUAL OIL SATURATION

JAMES E. RUSSELL PETROLEUM, INC.

NELSON LEASE

ALLEN COUNTY, KANSAS

WELL NO. RW-13

DEPTH INTERVAL, FEET	AVERAGE PERCENT POROSITY	AVERAGE OIL SATURATION PERCENT	AVERAGE WATER SATURATION PERCENT	AVERAGE PERMEABILITY MILLIDARCYs
663.0 - 669.3	18.8	18.1	46.0	15.6
669.3 - 678.6	19.2	39.4	31.5	22.7
683.0 - 697.6	20.4	45.1	26.6	7.7
663.0 - 697.6	19.8	39.9	30.6	13.5

NOTE: ELEVATION, FEET - DATUM: MEAN SEA LEVEL (GROUND LEVEL) 1077.3

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
JULY, 1983 RAL