JAMES E. RUSSELL PETROLEUM, INC.

CORE ANALYSIS REPORT

NELSON (LOWE) LEASE WELL NO. O-4

ALLEN COUNTY, KANSAS

OILFIELD RESEARCH LABORATORIES

536 N. HIGHLAND CHANUTE, KANSAS

— COREGRAPH —

OILFIELD RESEARCH LABORATORIES

JAMES E. RUSSELL PETROLEUM, INC.

LEASE Nelson (Lowe) WELL NO. O-4

FIELD Savonburg Northeast

COUNTY Allen STATE Kansas

LOCATION 3190' WEL & 3970' NSL

Sec. 28, T-26S, R-21E

INTERVAL CORED 661.0' - 700.0'

DATE RECEIVED July 25, 1985

ELEVATION 1085.5' MSL - GL

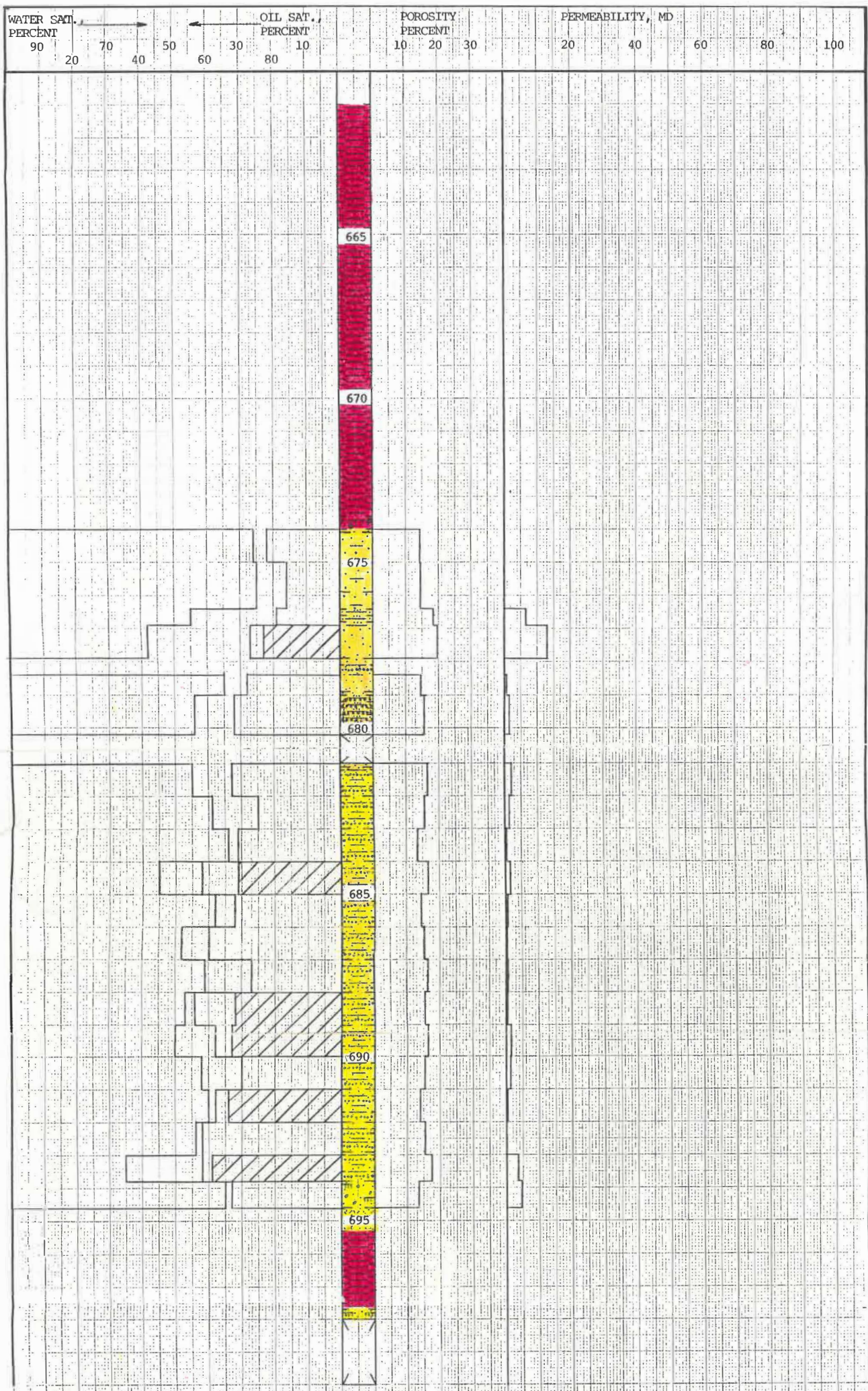
FORMATION Bartlesville

DRILLING FLUID Fresh Water Mud

TYPE OF CORE Rotary

INTERVAL RECEIVED 661.0' - 680.2'; 681.0' - 698.0'

NSCO-19890



KEY:

- SHALE
- SHALE, SANDY, CALCAREOUS, CONGLOMERATIC
- SANDSTONE, SHALY
- SANDSTONE AND SHALE, LAMINATED
- SANDSTONE
- FLOODPOT RESIDUAL OIL SATURATION
- SANDSTONE, SHALY, WITH SHALE AND MICA PARTINGS
- SANDSTONE, SHALE, AND MICA, LAMINATED
- LOSS
- SANDSTONE, CALCAREOUS, CONGLOMERATIC
- SANDSTONE, SHALY, WITH CARBONACEOUS PARTINGS AND INCLUSIONS
- SANDSTONE, SHALY, CALCAREOUS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE POROSITY PERCENT	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS
674.0 - 676.9	2.9	15.0	18.6	71.2	1.1
676.9 - 694.6	16.4	15.6	34.4	55.2	2.0

CHANUTE, KANSAS
AUGUST, 1985 RAL

OILFIELD RESEARCH LABORATORIES
P. O. BOX 647 - CHANUTE, KANSAS 66720 - PHONE (316) 431-2650

August 8, 1985

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 (Lowe) Lease, Well No. O-4, located in Allen County, Kansas and submitted to our laboratory on July 25, 1985.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Alan M. Dunning

AMD/rmc

8 copies

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company James E. Russell Petroleum, Inc. Lease Nelson (Lowe) Well No. O-4

Location 3190' WEL & 3970' NSL

Section 28 Twp. 26S Rge. 21E County Allen State Kansas

Elevation, Feet Datum: Mean Sea Level (Ground Level)	1085.5
Name of Sand	Bartlesville
Top of Core	661.0
Bottom of Core (Received)	698.0
Top of Pay Sand	676.9
Bottom of Pay Sand	694.6
Total Feet of Permeable Sand	15.9
Total Feet of Productive Oil Sand	9.8

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 1	6.6	6.6
1 - 2	5.2	11.8
2 - 4	1.8	13.6
4 - 8	1.3	14.9
8 - 14	1.0	15.9

	Productive Sand
Average Permeability Millidarcys	2.9
Average Percent Porosity	16.1
Average Percent Oil Saturation	35.8
Average Percent Water Saturation	52.1
Average Oil Content, Bbls./A. Ft.	445.
Total Oil Content, Bbls./Acre	4,358.
Average Percent Oil Recovery by Laboratory Flooding Tests	3.9
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	50.

The core was sampled by a representative of Oilfield Research Laboratories. Fresh water base mud was the drilling fluid used during the coring operation. The core was reported to be from a non-virgin area. A core loss occurred from 680.2 to 681.0 feet and from 698.0 to 700.0 feet.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
661.0 - 673.7	Shale, gray.
673.7 - 674.0	Shale, gray, slightly sandy, conglomeratic, slightly calcareous.
674.0 - 676.4	Sandstone, grayish brown, very shaly.
676.4 - 676.9	Sandstone and shale, light brown and gray, laminated.
676.9 - 677.9	Sandstone, light brown.
677.9 - 678.4	Sandstone, brown, very shaly, with shale and mica partings.
678.4 - 679.0	Sandstone, brown, very shaly.
679.0 - 680.2	Sandstone, shale, and mica, brown and gray, laminated.
680.2 - 681.0	Loss.
681.0 - 693.8	Sandstone, brown, shaly, with shale and mica partings.
693.8 - 694.6	Sandstone, brown, conglomeratic, slightly calcareous.
694.6 - 695.3	Sandstone, brown, shaly, with carbonaceous partings and inclusions.
695.3 - 697.7	Shale, gray.

Depth Interval, Feet	Description
697.7 - 698.0	Sandstone, gray, shaly, calcareous.
698.0 - 700.0	Loss.

DISCUSSION

Coring was commenced at 661.0 feet in gray shale. Bottom of pay sand section is 694.6 feet. Analysis indicates that 15.9 feet of core between 661.0 and 676.9 feet is gray shale containing an interval of very shaly sandstone from 674.0 to 676.9 feet. The main pay zone extends from 676.9 to 694.6 and contains 9.8 net effective feet of probable oil sand scattered through this interval. The lower 3.1 feet of section received is predominantly gray shale.

The oil sand has an average porosity of 16.1 percent, 35.8 percent oil saturation, 52.1 water saturation, and permeability of 2.9 millidarcys. Permeability in the pay zone ranges between impermeable and 13. millidarcys.

This sand responded to waterflood susceptibility tests in the laboratory. Residual oil saturation for the oil zone at "flood-out" was 31.9 percent. Core oil saturation was reduced by 2.3 percent of pore volume or 30 barrels per acre foot. Effective water permeability at residual oil saturation was 0.05 millidarcys or 2.5 percent of air permeability.

Estimated primary oil recovery by solution gas energy from the area represented by this core is 57 barrels per acre foot under original reservoir conditions to depletion. Additional oil recovery by efficient water injection is estimated at 117 barrels per acre foot. These recovery estimates do not take into account any previous production or drainage to other areas. Additional study will be necessary to relate these recovery estimates to field conditions.

	PRIMARY AND SECONDARY		
Oil Recovery Barrels Stock Tank	Solution Gas Energy	Increase By Waterflood After Primary	Total
Barrels per Acre Foot	57	117	174

The results expressed herein are the best professional opinion of the personnel of Oilfield Research Laboratories based on the rock properties determined from this core by generally accepted laboratory practices. We assume no responsibility or liability for the use of these data for purposes other than intended by the analysis of this core or circumstances over which we have no control. This report has been prepared for the exclusive use of our client.

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RESULTS OF SATURATION & PERMEABILITY TESTS

Company James E. Russell Petroleum, Inc. Lease Nelson (Lowe) Well No. O-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	674.5	14.2	22	74	96	242	Imp.	1.0	1.0	242	0.00
2	675.4	14.4	16	75	91	179	Imp.	1.4	2.4	251	0.00
3	676.5	18.3	19	55	74	270	6.3	0.5	2.9	135	3.15
4	677.5	19.8	27	42	69	415	13.	1.0	3.9	415	13.00
5	678.6	14.6	28	65	93	317	0.76	0.6	4.5	190	0.46
6	679.5	15.6	32	56	88	387	1.5	1.2	5.7	464	1.80
7	681.6	16.7	33	55	88	428	2.0	1.0	6.7	428	2.00
8	682.7	15.2	25	61	86	295	1.1	1.0	7.7	295	1.10
9	683.5	13.6	31	66	97	327	0.80	1.0	8.7	327	0.80
10	684.6	16.8	42	45	87	547	1.7	1.0	9.7	547	1.70
11	685.5	14.6	32	62	94	363	0.56	1.0	10.7	363	0.56
12	686.5	15.1	40	52	92	469	0.37	1.0	11.7	469	0.37
13	687.3	16.4	27	59	86	344	0.69	1.0	12.7	344	0.69
14	688.3	15.4	44	53	97	526	0.52	1.0	13.7	526	0.52
15	689.3	16.6	38	50	88	489	1.5	1.0	14.7	489	1.50
16	690.5	15.1	30	58	88	351	1.2	1.0	15.7	351	1.20
17	691.6	14.0	38	60	98	413	0.27	1.0	16.7	413	0.27
18	692.5	15.4	42	56	98	502	Imp.	1.0	17.7	502	0.00
19	693.4	17.3	42	35	77	564	3.4	0.8	18.5	451	2.72
20	694.5	13.4	33	65	98	343	4.5	0.8	19.3	274	3.60
			AVERAGES							TOTALS	
	674.0-676.9	15.0	18.6	71.2			1.1		2.9	628	3.15
	676.9-694.6	15.6	34.4	55.2			2.0		16.4	6848	32.29

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RESULTS OF LABORATORY FLOODING TESTS

Company James E. Russell Petroleum, Inc. Lease Nelson (Lowe) Well No. O-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.			
3	676.5	18.3	19	270	0	0	19	55	270	0	Imp.	-
4	677.5	19.3	27	404	4	60	23	62	344	12	0.30	45
5	678.6	14.9	28	324	0	0	28	66	324	0	Imp.	-
6	679.5	15.7	31	378	0	0	31	56	378	0	Imp.	-
7	681.6	16.5	33	422	0	0	33	55	422	0	Imp.	-
8	682.7	15.2	25	295	0	0	25	62	295	0	Imp.	-
9	683.5	13.9	30	324	0	0	30	67	324	0	Imp.	-
10	684.6	16.6	42	541	11	142	31	61	399	0	0.01	50
11	685.5	14.5	32	360	0	0	32	63	360	0	Imp.	-
12	686.5	14.8	40	459	0	0	40	52	459	0	Imp.	-
13	687.3	16.5	26	333	0	0	26	60	333	0	Imp.	-
14	688.3	15.9	44	543	12	148	32	66	395	8	0.30	35
15	689.3	16.6	38	489	5	64	33	59	425	1	0.08	50
16	690.5	15.3	30	356	0	0	30	58	356	0	Imp.	-
17	691.6	14.4	38	425	4	45	34	64	380	2	0.15	45
18	692.5	15.1	42	492	0	0	42	56	492	0	Imp.	-
19	693.4	16.9	42	551	3	39	39	44	512	0	0.01	30
20	694.5	13.9	33	356	0	0	33	65	356	0	Imp.	-
						AVERAGES						
	676.9-694.6	15.7			2.3	30	31.9	59.7	386		0.05	

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.