JAMES E. RUSSELL PETROLEUM, INC.

CORE ANALYSIS REPORT

NELSON (LOWE) LEASE WELL NO. O-3

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. 0-3

FIELD Savonburg Northeast

COUNTY Allen STATE Kansas

LOCATION 5215' WEL & 3835' NSL

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

INTERVAL CORED 660.0' - 697.5'

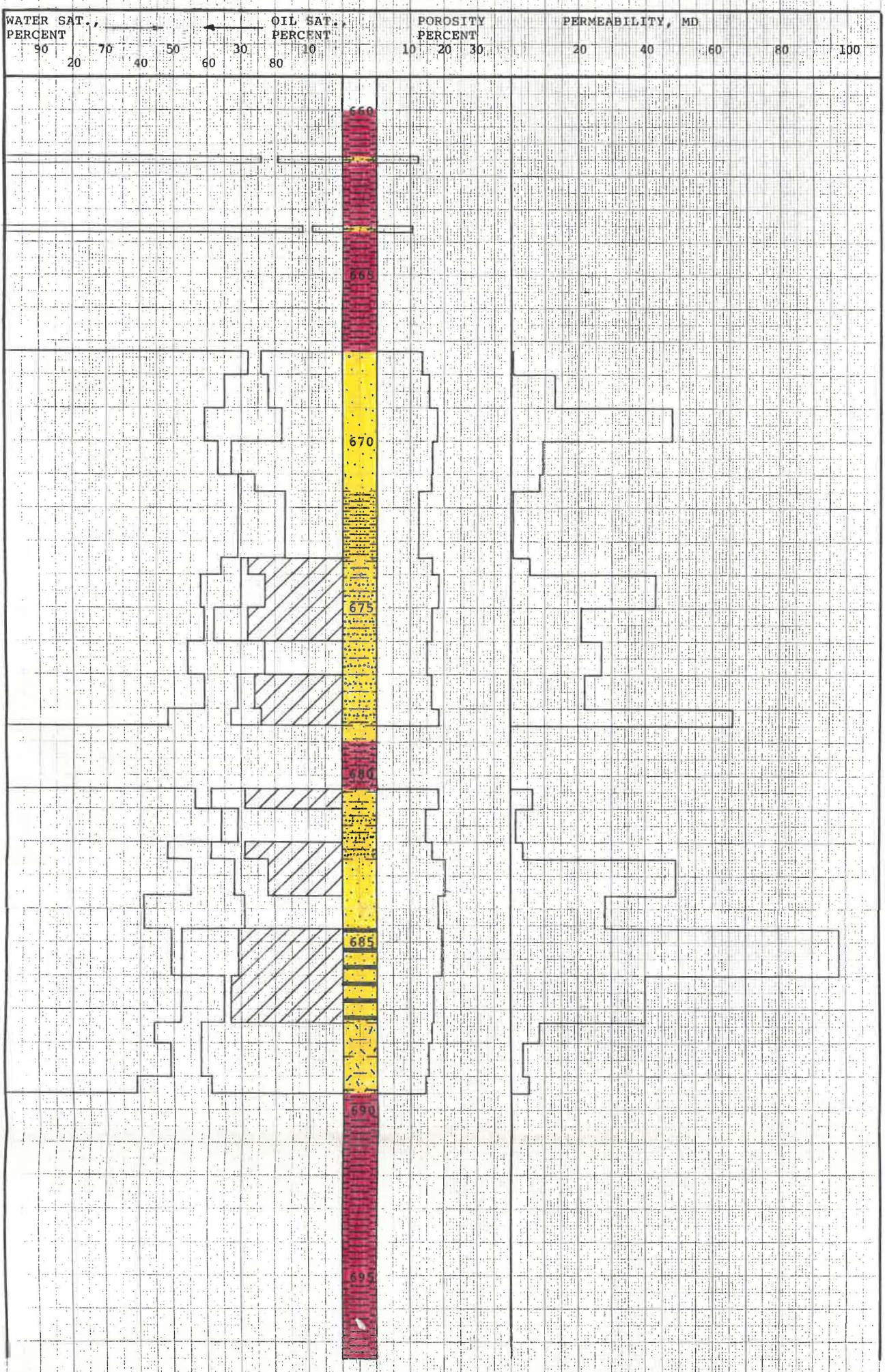
DATE RECEIVED April 25, 1985

ELEVATION 1072.0 MSL - GL

FORMATION Bartlesville

DRILLING FLUID Salt Water Mud

TYPE OF CORE Rotary



KEY:

- SHALE
- SANDSTONE, SHALY
- SANDSTONE
- SANDSTONE AND SHALE, LAMINATED
- SANDSTONE, SHALY, WITH SHALE PARTINGS
- SANDSTONE WITH SHALE AND MICA PARTINGS
- SHALE, SANDY
- SANDSTONE, SHALY, WITH SHALE AND MICA PARTINGS
- SANDSTONE WITH COAL PARTINGS
- SANDSTONE, SHALY, CARBONACEOUS
- FLOODPOT RESIDUAL OIL SATURATION

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE POROSITY PERCENT	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS
661.4 - 670.0	3.1	15.5	20.1	66.8	22.6
670.0 - 687.4	15.5	16.7	31.5	57.2	28.8
687.4 - 689.5	2.1	15.5	41.3	45.2	5.3

CHANUTE, KANSAS
MAY, 1985 RAL

OILFIELD RESEARCH LABORATORIES

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

May 6, 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. 0-3, located in Allen County, Kansas and submitted to our laboratory on April 25, 1985.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Alan M. Dunning by B.L.J.

Alan M. Dunning

AMD/rmc

8 copies

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company James E. Russell Petroleum, Inc. Lease Nelson (Lowe) Well No. 0-3

Location 5215' WEL & 3835' NSL

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

Elevation, Feet ..... Datum: Mean Sea Level (Ground Level)	1072.
Name of Sand	Bartlesville
Top of Core	660.0
Bottom of Core	697.5
Top of Pay Sand	670.0
Bottom of Pay Sand	687.4
Total Feet of Permeable Sand	20.3

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 1	2.7	2.7
1 - 2	1.0	3.7
2 - 4	1.5	5.2
4 - 8	1.6	6.8
8 - 14	3.1	9.9
20 - 30	4.0	13.9
40 - 50	4.5	18.4
65 - 100	1.9	20.3

	Productive Sand
Average Permeability Millidarcys	28.8
Average Percent Porosity	16.7
Average Percent Oil Saturation	31.5
Average Percent Water Saturation	57.2
Average Oil Content, Bbls./A. Ft.	418.
Total Oil Content, Bbls./Acre	6,486.
Average Percent Oil Recovery by Laboratory Flooding Tests	4.9
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	71.

The core was sampled by a representative of Oilfield Research Laboratories. Salt water base mud was the drilling fluid used during the coring operation.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
660.0 - 661.4	Shale, gray.
661.4 - 661.6	Sandstone, grayish brown, very shaly.
661.6 - 663.5	Shale, gray.
663.5 - 663.7	Sandstone, grayish light brown, very shaly.
663.7 - 667.3	Shale, gray.
667.3 - 668.0	Sandstone, grayish light brown.
668.0 - 671.5	Sandstone, light brown.
671.5 - 673.5	Sandstone and shale, light brown and gray, laminated.
673.5 - 674.0	Sandstone, light brown, shaly, with gray shale partings.
674.0 - 678.5	Sandstone, brown, with scattered gray shale and mica partings.
678.5 - 679.0	Sandstone, grayish brown, very shaly.
679.0 - 680.4	Shale, gray, slightly sandy.
680.4 - 681.0	Sandstone, light brown, slightly shaly, with scattered gray shale partings.
681.0 - 682.5	Sandstone, light brown, shaly, with gray shale and mica partings.
682.5 - 684.6	Sandstone, brown.
684.6 - 687.4	Sandstone, brown, with scattered coal partings.

Depth Interval, Feet	Description
687.4 - 688.0	Sandstone, brownish black, slightly shaly, slightly carbonaceous.
688.0 - 689.5	Sandstone, brownish black, shaly, slightly carbonaceous.
689.5 - 693.0	Shale, dark gray.
693.0 - 697.5	Shale, gray.

DISCUSSION

Coring was commenced at 660.0 feet in shale. Bottom of pay sand section is 687.4 feet. Analysis indicates that the 10.0 feet between 660.0 and 670.0 feet is predominantly gray shale with widely scattered streaks of very shaly sandstone. The main pay zone consists of 12.5 net effective feet of probable oil sand between 670.0 and 687.4. The lower 8.0 feet of section is gray shale.

The oil sand has an average porosity of 16.7 percent, 31.5 percent oil saturation, 57.2 water saturation, and permeability of 28.8 millidarcys. Permeability in the pay zone ranges between 0.92 and 98. millidarcys.

This sand responded to waterflood susceptibility tests in the laboratory. Residual oil saturation for the oil zone at "flood-out" was 26.6 percent. Core oil saturation was reduced by 4.9 percent of pore volume or 71 barrels per acre-foot. Effective water permeability at residual oil saturation was 3.67 millidarcys or 13. percent of air permeability.

Estimated primary oil recovery by solution gas energy from the area represented by this core is 59 barrels per acre-foot under original reservoir conditions to depletion. Additional oil recovery by efficient water injection is estimated at 150 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	59	150	209

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.

Oilfield Research Laboratories

RESULTS OF SATURATION & PERMEABILITY TESTS

Company James E. Russell Petroleum, Inc. Lease Nelson (Lowe) Well No. O-3

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	661.5	12.5	19	76	95	184	Imp.	0.2	0.2	37	0.00
2	663.6	10.6	9	88	97	74	Imp.	0.2	0.4	15	0.00
3	667.4	13.5	24	72	96	251	0.22	0.7	1.1	176	0.15
4	668.6	15.8	22	65	87	270	13.	1.0	2.1	270	13.00
5	669.5	18.0	18	59	77	251	48.	1.0	3.1	251	48.00
6	670.5	16.9	33	63	96	433	9.3	1.0	4.1	433	9.30
7	671.4	16.4	26	69	95	331	8.3	0.5	4.6	166	4.15
8	672.7	12.4	17	69	86	164	0.92	2.0	6.6	328	1.84
9	673.6	16.3	30	64	94	379	5.6	0.5	7.1	190	2.80
10	674.5	18.2	30	58	88	424	43.	1.0	8.1	424	43.00
11	675.7	16.5	38	59	97	486	21.	1.0	9.1	486	21.00
12	676.6	15.0	23	54	77	268	27.	1.0	10.1	268	27.00
13	677.4	16.3	31	59	90	392	22.	1.0	11.1	392	22.00
14	678.4	18.5	33	48	81	474	66.	0.5	11.6	237	33.00
15	680.6	18.1	39	56	95	548	6.8	0.6	12.2	329	4.08
16	681.4	14.9	31	64	95	358	1.4	1.0	13.2	358	1.40
17	682.4	16.9	39	48	87	511	3.4	0.5	13.7	256	1.70
18	683.5	20.3	32	55	87	504	49.	1.1	14.8	554	53.90
19	684.4	18.8	29	41	70	423	28.	1.0	15.8	423	28.00
20	685.8	19.1	48	49	97	711	98.	1.4	17.2	995	137.20
21	686.6	17.0	35	52	87	462	40.	1.4	18.6	647	56.00
22	687.7	16.4	42	44	86	534	8.3	0.6	19.2	320	4.98
23	688.6	15.3	42	49	91	499	3.7	1.0	20.2	499	3.70
24	689.3	14.8	39	39	78	448	5.1	0.5	20.7	224	2.55

Oilfield Research Laboratories

RESULTS OF SATURATION & PERMEABILITY TESTS

Company James E. Russell Petroleum, Inc. Lease Nelson (Lowe) Well No. O-3

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.		
			AVERAGES							TOTALS	
	661.4 - 670.0	15.5	20.1	66.8			22.6		3.1	749	61.15
	670.0 - 687.4	16.7	31.5	57.2			28.8		15.5	6,486	446.37
	687.4 - 689.5	15.5	41.3	45.2			5.3		2.1	1,043	11.23

RESULTS OF LABORATORY FLOODING TESTS

Company James E. Russell Petroleum, Inc. Lease Nelson (Lowe) Well No. O-3

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.			
6	670.5	16.7	33	428	0	0	33	64	428	362	6.45	10
7	671.4	16.9	26	341	0	0	26	72	341	48	0.82	30
8	672.7	12.2	17	161	0	0	17	70	161	0	Imp.	-
9	673.6	15.9	30	370	2	25	28	70	345	4	0.30	50
10	674.5	18.7	30	435	7	102	23	75	333	388	7.57	10
11	675.7	16.7	38	492	10	130	28	69	362	62	1.20	25
12	676.6	15.2	23	271	0	0	23	71	271	4	0.30	50
13	677.4	16.3	31	392	5	63	26	71	329	48	0.90	20
14	678.4	18.5	33	474	9	129	24	73	345	58	1.12	25
15	680.6	18.4	39	557	10	143	29	67	414	206	4.40	10
16	681.4	15.1	31	363	0	0	31	68	363	20	0.45	35
17	682.4	17.4	39	526	10	135	29	68	391	218	2.22	10
18	683.5	20.5	32	509	10	159	22	71	350	256	7.95	10
19	684.4	18.9	29	425	0	0	29	64	425	50	1.05	35
20	685.8	19.4	48	722	17	256	31	67	466	330	8.70	10
21	686.6	17.0	35	462	2	26	33	66	436	203	9.45	10
22	687.7	16.8	42	547	0	0	42	56	547	42	0.90	40
23	688.6	15.4	41	490	0	0	41	53	490	4	0.30	50
24	689.3	14.8	39	448	0	0	39	40	448	0	Imp.	-
						AVERAGES						
	670.0 - 687.4	16.8			4.9	71	26.6	68.9	351		3.67	21.3

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.