

JAMES E. RUSSELL PETROLEUM, INC.

CORE ANALYSIS REPORT

NELSON (LOWE) LEASE WELL NO. RW-18

ALLEN COUNTY, KANSAS

OILFIELD RESEARCH LABORATORIES

536 N. HIGHLAND

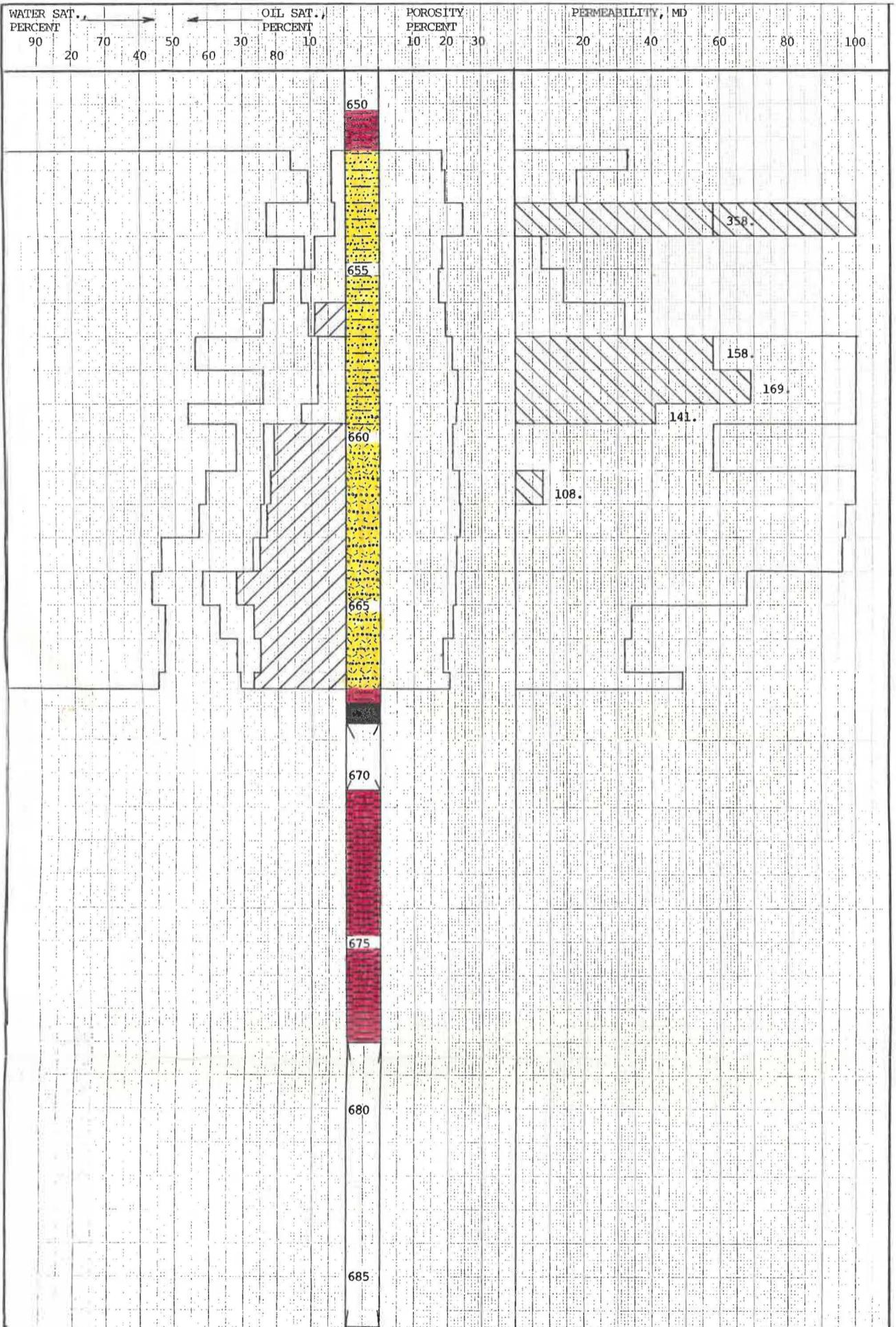
CHANUTE, KANSAS

OILFIELD RESEARCH LABORATORIES

JAMES E. RUSSELL PETROLEUM, INC.

LEASE <u>Nelson (Lowe)</u>	WELL NO. <u>RW-18</u>	DATE RECEIVED <u>July 30, 1985</u>
FIELD <u>Savonburg Northeast</u>		ELEVATION <u>1062.4' MSL - GL</u>
COUNTY <u>Allen</u>	STATE <u>Kansas</u>	FORMATION <u>Bartlesville</u>
LOCATION <u>4400' WEL & 4210' NSL</u>		DRILLING FLUID <u>Fresh Water Mud</u>
<u>Sec. 28, T-26S, R-21E</u>		TYPE OF CORE <u>Rotary</u>
INTERVAL CORED <u>650.0' - 686.5'</u>		INTERVAL RECEIVED <u>650.0' - 668.5'; 670.5' - 678.0'</u>

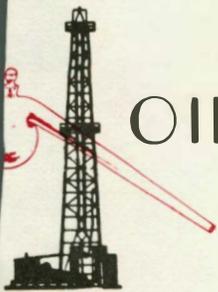
NSCO-19890



KEY: COAL SHALE SHALE, SANDY FLOODPOT RESIDUAL OIL SATURATION	SHALE WITH SANDSTONE PARTINGS SANDSTONE WITH SHALE AND MICA PARTINGS SANDSTONE WITH MICA AND CARBONACEOUS PARTINGS LOSS
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DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE POROSITY PERCENT	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS
651.4 - 659.6	8.2	20.6	8.1	76.1	105.0
659.6 - 667.5	7.9	21.9	29.9	52.7	68.4

CHANUTE, KANSAS
AUGUST, 1985 RAL



OILFIELD RESEARCH LABORATORIES

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

August 9, 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. RW-18, located in Allen County, Kansas and submitted to our laboratory on July 30, 1985.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Alan M. Dunning

AMD/rmc

8 copies

- REGISTERED ENGINEERS -

CORE ANALYSIS - WATER ANALYSIS - REPRESSURING ENGINEERING - SURVEYING & MAPPING - PROPERTY EVALUATION & OPERATION

Oilfield Research Laboratories
GENERAL INFORMATION & SUMMARY

Company James E. Russell Petroleum, Inc. Lease Nelson (Lowe) Well No. RW-18
 Location 4400' WEL & 4210' NSL
 Section 28 Twp. 26S Rge. 21E County Allen State Kansas

Elevation, Feet Datum: Mean Sea Level (Ground Level) 1062.4
 Name of Sand Bartlesville
 Top of Core 650.0
 Bottom of Core (Received) 678.0
 Top of Pay Sand 659.6
 Bottom of Pay Sand 667.5
 Total Feet of Permeable Sand 16.1
 Total Feet of Productive Oil Sand 7.9

Distribution of Permeable Sand:
Permeability Range
Millidarcys

	Feet	Cum. Ft.
0 - 1	0.0	0.0
5 - 10	1.0	1.0
10 - 20	2.0	3.0
20 - 40	3.6	6.6
40 - 100	4.9	11.5
100 - 170	3.6	15.1
350 - 360	1.0	16.1

**Productive
Sand**

Average Permeability Millidarcys 68.4
 Average Percent Porosity 21.9
 Average Percent Oil Saturation 29.9
 Average Percent Water Saturation 52.7
 Average Oil Content, Bbls./A. Ft. 506.
 Total Oil Content, Bbls./Acre 3,994.
 Average Percent Oil Recovery by Laboratory Flooding Tests 5.0
 Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. 82.

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 668.5 to 670.5 feet and from 678.0 to 686.5 feet.

During the sampling process, it was noted that the interval of core from 658.0 to 663.0 feet was bleeding water.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
650.0 - 651.4	Shale, gray, with scattered gray sandstone partings.
651.4 - 659.6	Sandstone, light brown, with scattered gray shale and mica partings.
659.6 - 667.5	Sandstone, brown, with scattered carbonaceous and mica partings.
667.5 - 667.9	Shale, gray.
667.9 - 668.5	Coal.
668.5 - 670.5	Loss.
670.5 - 671.5	Shale, gray.
671.5 - 676.5	Shale, gray, slightly sandy.
676.5 - 678.0	Shale, gray.
678.0 - 686.5	Loss.

DISCUSSION

Coring was commenced at 650.0 feet in gray shale. Bottom of pay sand section is 667.5 feet. Analysis indicates that 9.6 feet of core between 650.0 and 659.6 feet is mostly light brown sandstone with scattered shale and mica partings. The main pay zone extends from 659.6 to 667.5 feet and contains 7.9 net effective feet of probable oil sand. The lower 8.5 feet of section received is mostly gray shale containing an interval of coal from 667.9 to 668.5 feet.

The oil sand has an average porosity of 21.9 percent, 29.9 percent oil saturation, 52.7 water saturation, and permeability of 68.4 millidarcys. Permeability in the pay zone ranges between 32. and 108. millidarcys.

This sand responded to waterflood susceptibility tests in the laboratory. Residual oil saturation for the oil zone at "flood-out" was 24.9 percent. Core oil saturation was reduced by 5.0 percent of pore volume or 82 barrels per acre foot. Effective water permeability at residual oil saturation was 12.58 millidarcys or 18.4 percent of air permeability.

Estimated primary oil recovery by solution gas energy from the area represented by this core is 78 barrels per acre foot under original reservoir conditions to depletion. Additional oil recovery by efficient water injection is estimated at 235 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	78	235	313

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. RW-18

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	651.7	18.8	4	84	88	58	33.	0.6	0.6	35	19.80
2	652.6	19.2	4	89	93	60	18.	1.0	1.6	60	18.00
3	653.6	24.9	3	77	80	58	358.	1.0	2.6	58	358.00
4	654.7	18.3	9	88	97	128	7.7	1.0	3.6	128	7.70
5	655.6	17.7	13	79	92	179	14.	1.0	4.6	179	14.00
6	656.5	19.5	11	76	87	166	32.	1.0	5.6	166	32.00
7	657.5	21.2	8	56	64	132	158.	1.0	6.6	132	158.00
8	658.5	23.0	8	76	84	143	169.	1.0	7.6	143	169.00
9	659.5	22.5	13	54	67	227	141.	0.6	8.2	136	84.60
10	660.5	21.4	24	68	92	399	58.	1.4	9.6	559	81.20
11	661.6	23.6	24	59	83	439	108.	1.0	10.6	439	108.00
12	662.5	23.7	25	57	82	460	97.	1.0	11.6	460	97.00
13	663.5	22.7	27	46	73	476	96.	1.0	12.6	476	96.00
14	664.5	22.1	42	43	85	720	68.	1.0	13.6	720	68.00
15	665.5	21.8	37	47	84	626	34.	1.0	14.6	626	34.00
16	666.5	18.8	32	47	79	467	32.	1.0	15.6	467	32.00
17	667.3	20.5	31	45	76	493	49.	0.5	16.1	247	24.50
			<u>AVERAGES</u>							<u>TOTALS</u>	
	651.4- 659.6	20.6	8.1	76.1			105.0		8.2	1037	861.10
	659.6- 667.5	21.9	29.9	52.7			68.4		7.9	3994	540.70

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

Company James E. Russell Petroleum, Inc. Lease Nelson (Lowe) Well No. RW-18

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	651.7	19.3	4	60	0	0	4	86	60	340	14.74	5
2	652.6	19.6	4	61	0	0	4	92	61	208	16.12	5
3	653.6	24.6	3	57	0	0	3	84	57	252	66.72	10
4	654.7	18.3	9	128	0	0	9	89	128	198	6.73	5
5	655.6	17.2	13	173	0	0	13	82	173	110	1.57	15
6	656.5	19.7	11	168	2	31	9	81	137	564	16.86	5
7	657.5	21.6	8	134	0	0	8	78	134	580	15.93	5
8	658.5	23.4	8	145	0	0	8	79	145	158	44.98	5
9	659.5	22.7	13	229	0	0	13	76	229	262	25.49	5
10	660.5	21.0	24	391	3	49	21	75	342	132	1.80	25
11	661.6	23.6	24	439	2	37	22	63	402	288	15.89	5
12	662.5	23.3	25	452	2	36	23	70	416	370	5.62	20
13	663.5	23.0	27	482	2	36	25	62	446	294	41.23	10
14	664.5	21.8	42	710	10	169	32	65	541	284	11.06	15
15	665.5	21.6	37	620	10	168	27	64	452	264	13.07	15
16	666.5	19.1	32	474	7	104	25	68	370	246	6.30	15
17	667.3	20.3	31	488	4	63	27	69	425	528	7.42	15
						AVERAGES						
	659.6- 667.5	21.8			5.0	82	24.9	67.3	420		12.58	

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.