

15-001-26359

JAMES E. RUSSELL PETROLEUM, INC.

CORE ANALYSIS REPORT

NELSON LEASE

WELL NO. RW-6

ALLEN COUNTY, KANSAS

21-26-215

Core
Available

OILFIELD RESEARCH LABORATORIES

536 N. HIGHLAND

CHANUTE, KANSAS



OILFIELD RESEARCH LABORATORIES

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

July 1, 1983

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

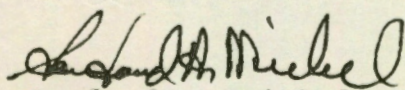
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Nelson Lease, Well No. RW-6, located in Allen County, Kansas and submitted to our laboratory on June 15 and June 16, 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-6
Location 420' WEL & 1455' SNL, SW $\frac{1}{4}$
Section 21 Twp. 26S Rge. 21E County Allen State Kansas

Elevation, Feet DATUM: MEAN SEA LEVEL (GROUND LEVEL) 1064.2
Name of Sand..... Bartlesville
Top of Core 620.0
Bottom of Core 697.4
Top of Sand 656.8
Bottom of Sand 690.5
Total Feet of Permeable Sand 13.2
Total Feet of Productive Sand 10.1

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.	
0 - 1	3.1	3.1	
1 - 2	2.7	5.8	
2 - 4	0.5	6.3	
4 - 8	2.9	9.2	
8 - 16	1.5	10.7	
18 - 22	0.8	11.5	
38 - 40	1.7	13.2	
Average Permeability Millidarcys			9.5
Average Percent Porosity			17.0
Average Percent Oil Saturation			45.9
Average Percent Water Saturation			40.4
Average Oil Content, Bbls./A. Ft.			616.
Total Oil Content, Bbls./Acre			8,130.
Average Percent Oil Recovery by Laboratory Flooding Tests			8.1
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.			106.

The core was sampled by a representative of Oilfield Research Laboratories. Salt water mud was 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>
620.0 - 622.5	Shale, gray.
622.5 - 623.3	Limestone, black.
623.3 - 625.6	Coal, (ground up).
625.6 - 640.0	No core.
640.0 - 656.8	Shale, gray.
656.8 - 657.9	Sandstone, very shaly, grayish light brown.
657.9 - 660.5	Shale, gray.
660.5 - 662.0	Shale, slightly sandy, gray.
662.0 - 663.8	Shale, gray.
663.8 - 664.0	Sandstone, very shaly, grayish brown.
664.0 - 665.6	Shale, gray.
665.6 - 665.9	Sandstone, shaly, grayish brown.
665.9 - 666.6	Sandstone, shaly, brown, with scattered gray shale and mica partings.
666.6 - 667.4	Sandstone, very shaly, grayish light brown.
667.4 - 668.8	Shale, gray.
668.8 - 669.2	Sandstone, shaly, brown, with gray shale and mica partings.
669.2 - 669.6	Sandstone, brown.
669.6 - 670.1	Sandstone, very shaly, grayish brown, with scattered coal, shale, and mica partings.
670.1 - 670.5	Sandstone, brown.

<u>Depth Interval, Feet</u>	<u>Description</u>
670.5 - 671.0	Sandstone, shaly, slightly carbonaceous, brownish black.
671.0 - 673.0	Sandstone, shaly, carbonaceous, black.
673.0 - 675.3	Sandstone, slightly shaly, carbonaceous, black.
675.3 - 675.7	Sandstone, very shaly, carbonaceous, grayish black with shale, mica, and coal partings.
675.7 - 676.8	Sandstone, brown, and gray shale, alternate layers.
676.8 - 677.4	Sandstone, very shaly, grayish brown.
677.4 - 678.6	Sandstone, shaly, brown, with gray shale and mica partings.
678.6 - 680.0	Shale, gray.
680.0 - 680.8	No core.
680.8 - 683.0	Shale, slightly sandy, gray.
683.0 - 683.2	Sandstone, shaly, brown.
683.2 - 683.8	Shale, gray.
683.8 - 684.1	Sandstone, shaly, brown.
684.1 - 684.5	Sandstone, very shaly, grayish brown.
684.5 - 686.6	Shale, slightly sandy, gray, with scattered brown sandstone partings.
686.6 - 687.0	Sandstone, slightly shaly, brown, with scattered gray shale and mica partings.
687.0 - 688.2	Sandstone, very shaly, grayish brown.
688.2 - 688.8	Sandstone, slightly shaly, light brown, with scattered coal inclusions.
688.8 - 690.5	Sandstone, brown.
690.5 - 697.4	Shale, gray.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 106 barrels of oil per acre was obtained from 5.7 feet of sand. The weighted average percent oil saturation was reduced from 40.1 to 32.0, or represents an average recovery of 8.1 percent. The weighted average effective permeability of the samples is 1.12 millidarcys, while the average initial fluid production pressure is 34.0 pounds per square inch.

PRIMARY RECOVERY

A detailed analysis of the core data would indicate that the pay sand section is from 665.9 feet to 678.6 feet, and from 684.1 feet to 690.5 feet. A well in this area should produce approximately 49 barrels of oil per acre foot by primary methods. These recovery estimates assume a pressured, virgin reservoir.

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 120 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	49	120	169

Oilfield Research Laboratories

RESULTS OF SATURATION & PERMEABILITY TESTS

Company James E. Russell Petroleum, Inc. Lease Nelson Well No. RW-6

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	657.5	14.5	25	66	91	281	0.33	1.1	1.1	309	0.36
2	666.5	15.6	52	43	95	629	1.8	0.7	1.8	440	1.26
3	669.4	17.5	46	43	89	625	21.	0.4	2.2	250	8.40
4	670.3	21.0	48	28	76	782	18.	0.4	2.6	313	7.20
5	670.7	22.0	63	29	92	1075	2.9	0.5	3.1	538	1.45
6	671.4	19.6	57	29	86	867	1.7	1.0	4.1	867	1.70
7	672.4	20.1	55	27	82	858	1.4	1.0	5.1	858	1.40
8	673.5	19.3	53	28	81	794	6.8	1.0	6.1	794	6.80
9	674.5	16.4	64	26	90	814	5.4	1.3	7.4	1058	7.02
10	675.5	14.8	61	33	94	700	0.26	0.4	7.8	280	0.10
11	676.4	17.1	37	49	86	491	13.	1.1	8.9	540	14.30
12	677.5	13.2	54	43	97	553	0.31	0.6	9.5	332	0.19
13	678.4	13.8	38	59	97	407	0.24	0.6	10.1	244	0.14
14	684.4	15.0	23	65	88	268	0.52	0.4	10.5	107	0.21
15	686.8	16.3	34	38	72	430	8.7	0.4	10.9	172	3.48
16	688.4	15.2	40	56	96	472	7.9	0.6	11.5	283	4.74
17	689.7	16.6	34	39	73	438	39.	1.7	13.2	745	66.30
AVERAGES											
TOTALS											
	656.8 - 666.6	14.9	35.5	57.1			0.90		1.8	749	1.62
	669.2 - 678.6	17.8	52.7	34.8			5.9		8.3	6074	48.70
	684.1 - 690.5	16.1	33.7	45.5			24.1		3.1	1307	74.73
	656.8 - 690.5	17.0	45.9	40.4			9.5		13.2	8130	125.05

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

Company James E. Russell Petroleum, Inc. Lease Nelson Well No. RW-6

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	657.5	15.0	24	279	0	0	24	67	279	0	Imp.	-
2	666.5	15.8	51	625	0	0	51	44	625	0	Imp.	-
3	669.4	17.2	46	614	16	214	30	61	400	6	0.52	30
4	670.3	21.4	48	797	13	216	35	51	581	30	0.52	35
5	670.7	22.3	62	1073	0	0	62	30	1073	0	Imp.	-
6	671.4	19.8	56	860	0	0	56	30	860	0	Imp.	-
7	672.4	20.2	55	862	0	0	55	28	862	0	Imp.	-
8	673.5	19.0	54	796	0	0	54	27	796	0	Imp.	-
9	674.5	16.7	63	816	0	0	63	28	816	0	Imp.	-
10	675.5	15.2	60	708	0	0	60	38	708	4	0.15	50
11	676.4	17.5	37	502	8	109	29	68	393	68	1.12	35
12	677.5	13.3	54	557	14	144	40	58	413	0	0.02	40
13	678.4	13.6	38	401	0	0	38	60	401	0	Imp.	-
14	684.4	15.5	22	265	0	0	22	67	265	0	Imp.	-
15	686.8	15.9	34	419	0	0	34	52	419	2	0.15	50
16	688.4	14.7	41	468	0	0	41	54	468	0	Imp.	-
17	689.7	16.6	34	438	3	39	31	67	399	100	1.80	30
AVERAGES												
	669.2 - 678.6	17.1			11.5	151	32.8	61.8	429		0.665	
	684.1 - 690.5	16.6			3.0	39	31.0	67.0	399		1.80	
	669.2 - 690.5	16.9			8.1	106	32.0	63.9	417		1.12	

Notes: cc—cubic centimeter.

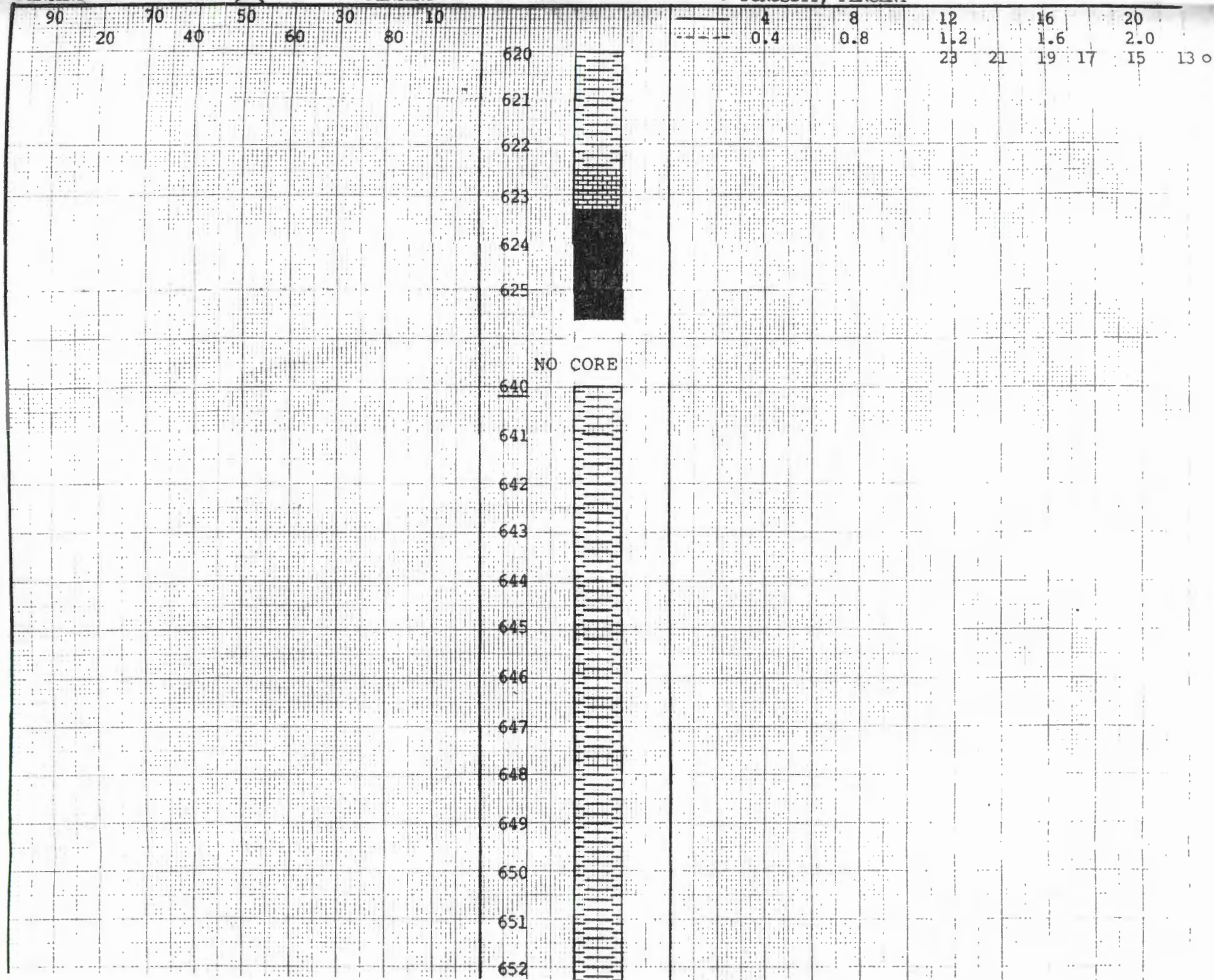
*—Volume of water recovered at the time of maximum oil recovery.

**—Determined by passing water through sample which still contains residual oil.

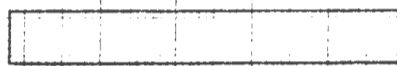
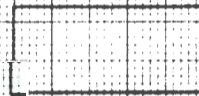
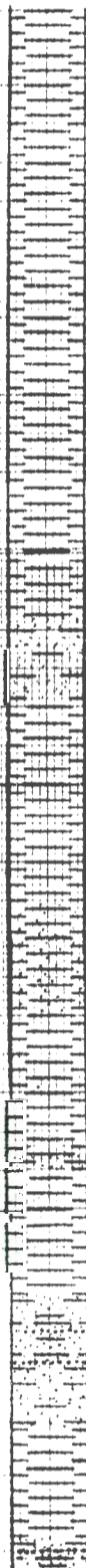
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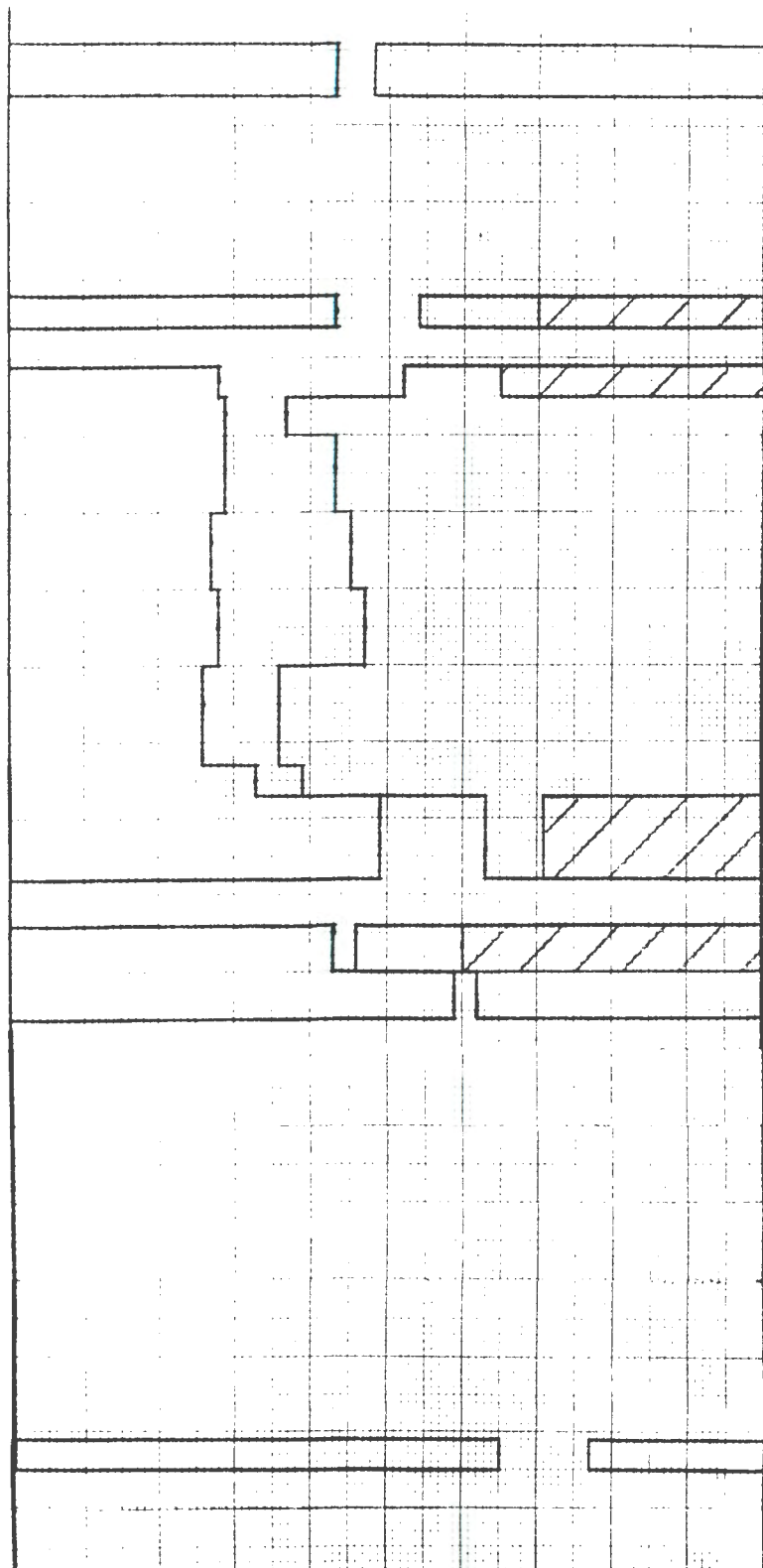
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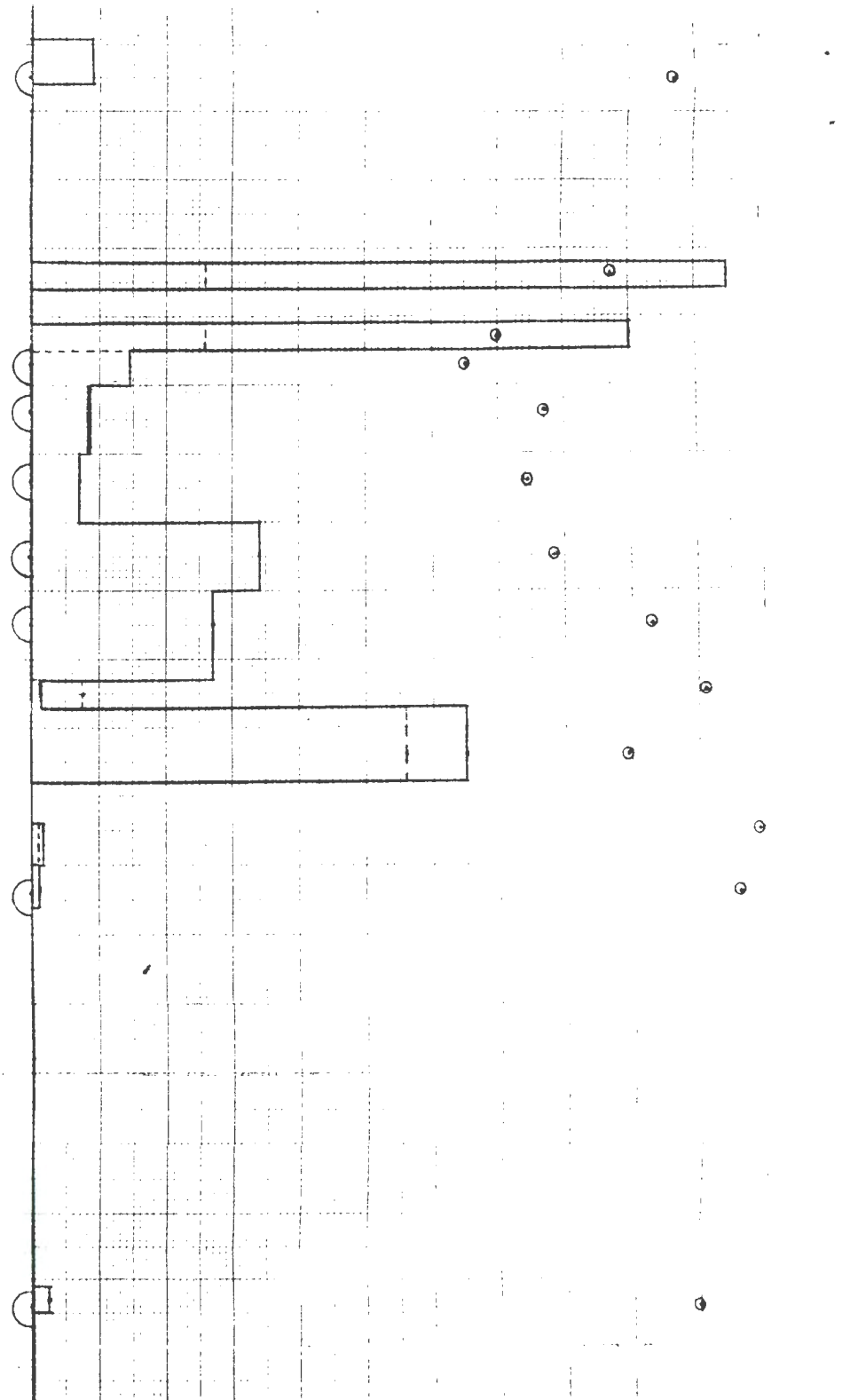
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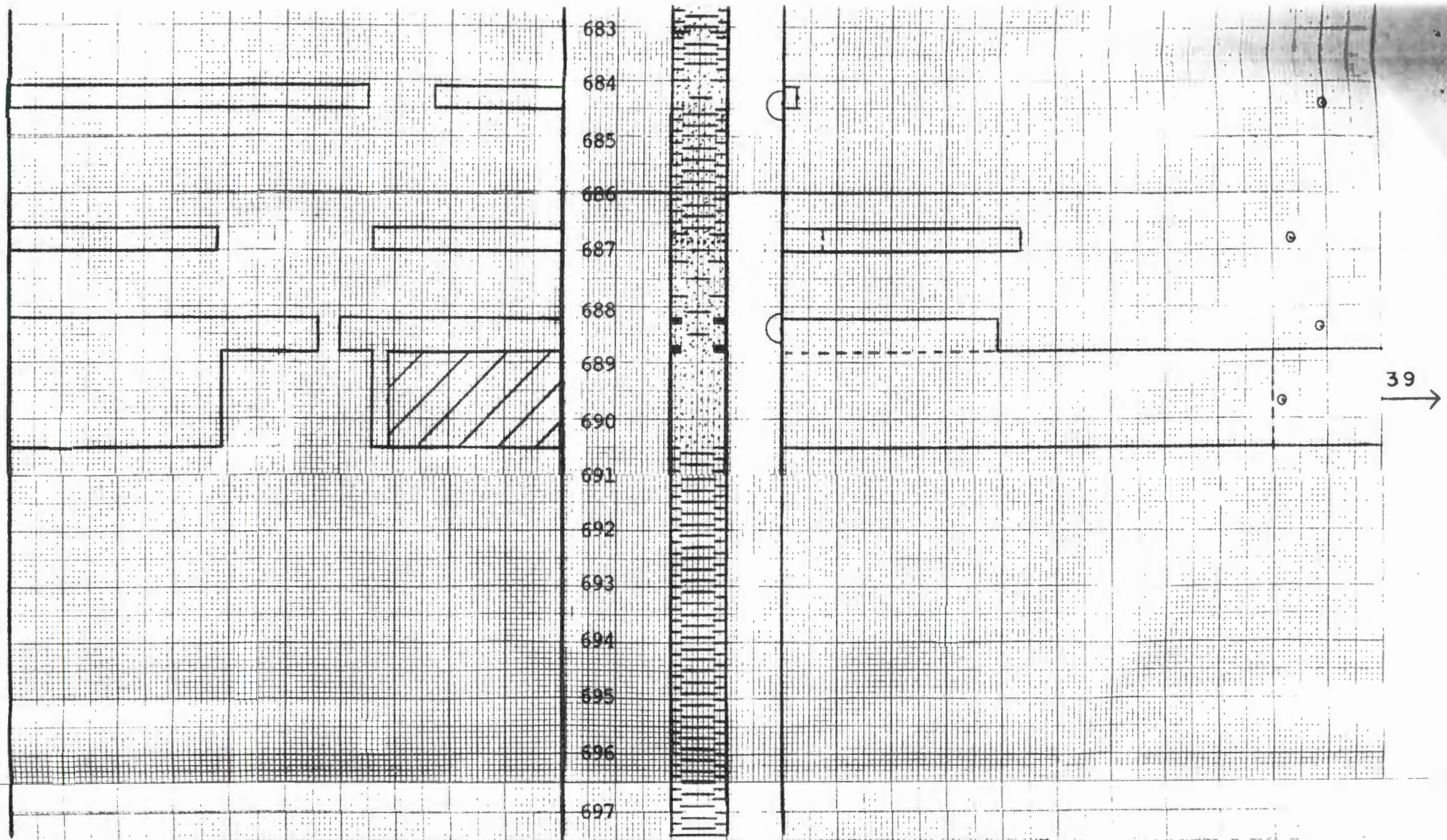




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NO CORE





KEY:



COAL



SANDSTONE



SHALE



LIMESTONE



CARBONACEOUS SHALY SANDSTONE



SANDY SHALE WITH SANDSTONE PARTINGS



SHALY SANDSTONE WITH COAL INCLUSIONS



ALTERNATE LAYERS OF SANDSTONE AND SHALE



SHALY SANDSTONE WITH SHALE AND MICA PARTINGS



SHALE



LIMESTONE



SANDY SHALE



SHALY SANDSTONE



IMPERMEABLE TO WATER



ALTERNATE LAYERS OF SANDSTONE AND SHALE



SHALY SANDSTONE WITH SHALE AND MICA PARTINGS



SHALY SANDSTONE WITH MICA AND COAL PARTINGS



CARBONACEOUS SHALY SANDSTONE WITH COAL AND MICA PARTINGS



FLOODPOT RESIDUAL OIL SATURATION

JAMES E. RUSSELL PETROLEUM, INC.

NELSON LEASE

ALLEN COUNTY, KANSAS

WELL NO. RW-6

DEPTH INTERVAL, FEET	AVERAGE PERCENT POROSITY	AVERAGE OIL SATURATION PERCENT	AVERAGE WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS
656.8 - 666.6	14.9	35.5	57.1	0.90
669.2 - 678.6	17.8	52.7	34.8	5.9
684.1 - 690.5	16.1	33.7	45.5	24.1
656.8 - 690.5	17.0	45.9	40.4	9.5

NOTE: ELEVATION, FEET - DATUM: MEAN SEA LEVEL (GROUND LEVEL) 1064.2

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
JULY, 1983 PDC