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JAMES E. RUSSELL PETROLEUM, INC.

CORE ANALYSIS REPORT

NELSON LEASE

WELL NO. RW-12

ALLEN COUNTY, KANSAS

21 - 26 - 21 E

OILFIELD RESEARCH LABORATORIES

536 N. HIGHLAND

CHANUTE, KANSAS



OILFIELD RESEARCH LABORATORIES

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

July 12, 1983

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

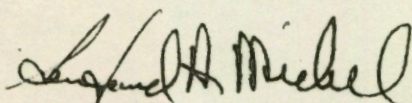
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Nelson Lease, Well No. RW-12, located in Allen County, Kansas and submitted to our laboratory on July 5, 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-12
Location 1440' WEL & 2200' SNL, SW $\frac{1}{4}$
Section 21 Twp. 26S Rge. 21E County Allen State Kansas

Elevation, Feet DATUM: MEAN SEA LEVEL (GROUND LEVEL) 1049.5
Name of Sand..... Bartlesville
Top of Core 645.0
Bottom of Core 698.0
Top of Sand (Tested) 651.4
Bottom of Sand 697.0
Total Feet of Permeable Sand 10.5
Total Feet of Productive Sand 9.5

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
1 - 2	1.0	1.0
28 - 51	3.1	4.1
60 - 100	4.1	8.2
184 - 189	2.3	10.5

	Laboratory	Net
Average Permeability Millidarcys	83.7	92.4
Average Percent Porosity	20.7	22.2
Average Percent Oil Saturation	44.6	45.7
Average Percent Water Saturation	34.8	31.8
Average Oil Content, Bbls./A. Ft.	726.	790.
Total Oil Content, Bbls./Acre	8,350.	7,502.
Average Percent Oil Recovery by Laboratory Flooding Tests	15.6	-
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	271.	-

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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>
645.0 - 649.0	Shale, gray.
649.0 - 650.6	Shale, slightly sandy, gray.
650.6 - 651.4	Sandstone, very shaly, grayish brown.
651.4 - 653.5	Sandstone, brown.
653.5 - 655.5	Shale, gray.
655.5 - 655.8	Sandstone, shaly, brown.
655.8 - 656.0	Sandstone, very shaly, grayish brown.
656.0 - 658.3	Sandstone, brown.
658.3 - 658.8	Sandstone, brown, with gray shale and coal partings.
658.8 - 664.0	No core.
664.0 - 665.3	Shale, slightly sandy, gray.
665.3 - 666.4	Sandstone, brown.
666.4 - 667.0	Shale, gray.
667.0 - 671.0	Sandstone, brown, with scattered gray shale nodules and inclusions.
670 671.0 - 672.0	Shale, gray.
672.0 - 673.5	Core ground up. — <i>lt. blue marker</i>
673.5 - 678.0	No core.
678.0 - 678.5	Limestone, gray. — <i>Dark blue</i>
678.5 - 695.0	Shale, gray.

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<u>Depth Interval, Feet</u>	<u>Description</u>
695.0 - 696.0	Sandstone, shaly, very slightly carbonaceous, dark brown.
696.0 - 697.0	Sandstone, very shaly, carbonaceous, gray.
697.0 - 698.0	Shale, slightly sandy, gray.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 2,570 barrels of oil per acre was obtained from 9.5 feet of sand. The weighted average percent oil saturation was reduced from 45.8 to 30.2, or represents an average recovery of 15.6 percent. The weighted average effective permeability of the samples is 6.31 millidarcys, while the average initial fluid production pressure is 22.0 pounds per square inch.

PRIMARY RECOVERY

A detailed analysis of the core data would indicate that the pay sand section is from interval 651.4 feet to 671.0 feet. A well in this area should produce approximately 69 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.

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WATERFLOOD RECOVERY

The estimated additional oil recovery from a well in this vicinity by waterflood is approximately 416 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	69	416	485

RESULTS OF SATURATION & PERMEABILITY TESTS

[illegible]

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

Company James E. Russell Petroleum, Inc. Lease Nelson Well No. RW-12

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	651.5	23.6	35	659	9	165	27	60	494	380	10.31	15
2	652.5	23.1	41	735	11	197	30	63	538	146	2.25	25
3	653.4	22.1	38	652	10	171	28	66	481	228	3.60	25
4	656.6	22.6	55	964	25	438	30	56	526	230	11.14	15
5	657.5	27.2	55	1161	24	506	31	60	655	166	19.12	10
6	665.5	20.4	45	712	14	222	31	62	490	10	0.22	40
7	667.5	19.0	56	825	26	383	30	60	442	140	2.10	20
8	668.5	20.0	47	729	15	233	32	59	496	376	6.00	20
9	669.5	21.8	36	609	7	118	29	66	491	158	2.70	20
10	670.5	21.0	38	619	7	114	31	62	505	136	2.62	30
11	695.5	14.5	47	529	0	0	47	34	529	0	Imp.	-
12	696.4	13.5	31	325	0	0	31	66	325	0	Imp.	-
AVERAGES												
	651.4 - 671.0	22.2			15.6	271	30.2	61.2	519		6.31	22.0

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.

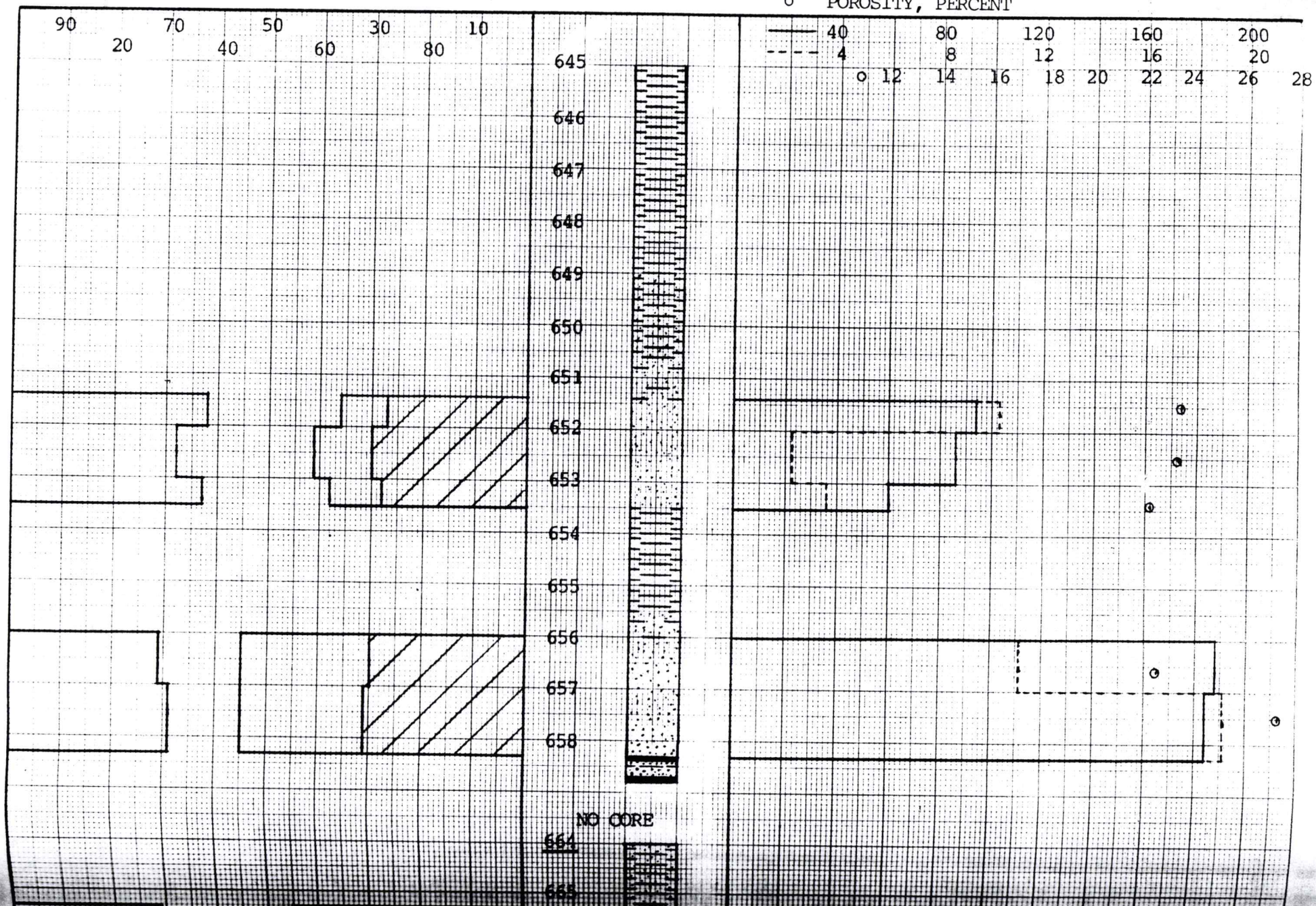
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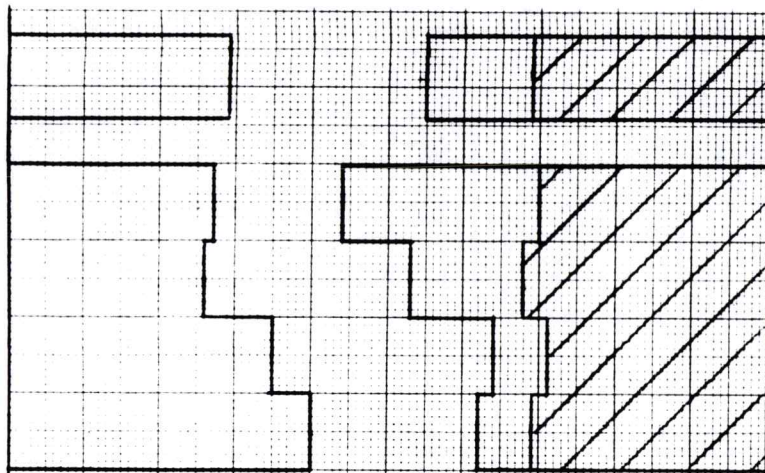
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WATER SAT.,
PERCENT

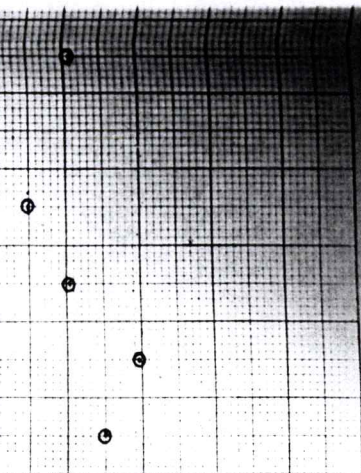
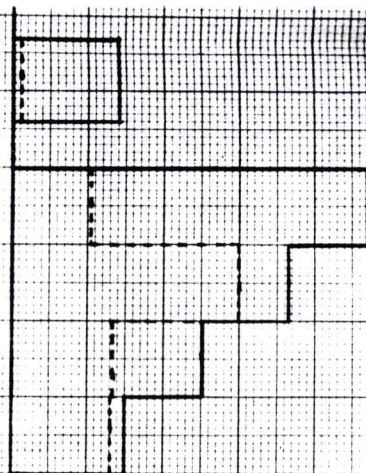
OIL SAT.,
PERCENT

— PERMEABILITY, IN MILLIDARCYS
 - - - EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYS
 o POROSITY, PERCENT



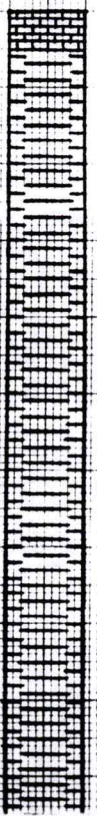


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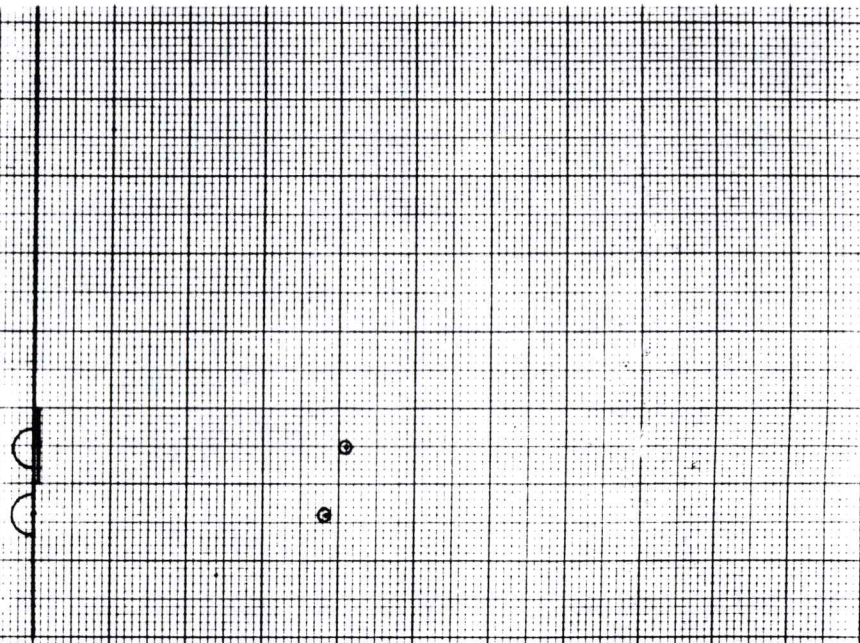


NO CORE

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KEY:



SANDSTONE



SHALE



SANDY SHALE



LIMESTONE



PERMEABLE TO WATER



SHALY SANDSTONE



CARBONACEOUS SHALY SANDSTONE



SANDSTONE WITH SHALE INCLUSIONS AND NODULES



SANDSTONE WITH COAL AND SHALE PARTINGS



CORE GROUND UP



FLOODPOT RESIDUAL OIL SATURATION

JAMES E. RUSSELL PETROLEUM, INC.

NELSON LEASE

ALLEN COUNTY, KANSAS

WELL NO. RW-12

DEPTH INTERVAL,
FEET

AVERAGE
PERCENT
POROSITY

AVERAGE OIL
SATURATION
PERCENT

AVERAGE WATER
SATURATION
PERCENT

AVERAGE
PERMEABILITY,
MILLIDARCYs

651.4 - 671.0

22.2

45.7

31.8

92.4

696
697
698



KEY:



SANDSTONE



SHALE



SANDY SHALE



LIMESTONE



IMPERMEABLE TO WATER



SHALY SANDSTONE



CARBONACEOUS SHALY SANDSTONE



SANDSTONE WITH SHALE INCLUSIONS AND NODULES



SANDSTONE WITH COAL AND SHALE PARTINGS



CORE GROUND UP



FLOODPOT RESIDUAL OIL SATURATION

JAMES E. RUSSELL PETROLEUM, INC.

NELSON LEASE

ALLEN COUNTY, KANSAS

WELL NO. RW-12

DEPTH INTERVAL, FEET	AVERAGE PERCENT POROSITY	AVERAGE OIL SATURATION PERCENT	AVERAGE WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS
651.4 - 671.0	22.2	45.7	31.8	92.4
695.0 - 697.0	14.0	39.0	49.0	1.2
651.4 - 697.0	20.7	44.6	34.8	83.7

NOTE: ELEVATION, FEET - DATUM: MEAN SEA LEVEL (GROUND LEVEL) 1049.5'

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
JULY, 1983 PDC