

OILFIELD RESEARCH LABORATORIES

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

October 19, 1981

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

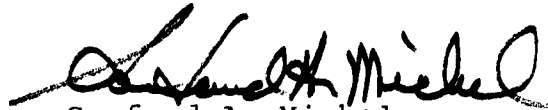
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Burke Lease, Well No. W-3, located in Anderson County, Kansas and submitted to our laboratory on September 22, 1981.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Sanford A. Michel

SAM/mkf

3 c to Abilene, Tx.
2 c to Chanute, Ks.

- 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 Burke Well No. W-3
Location 910' EWL & 330' SNL - NW $\frac{1}{4}$
Section 26 Twp. 22S Rge. 19E County Anderson State Kansas

Elevation, Feet Datum: Mean Sea Level (G.S.L.) 1100.2
Name of Sand SQUIRREL
Top of Core 788.0
Bottom of Core 804.7
Top of Sand 788.0
Bottom of Sand 797.5
Total Feet of Permeable Sand 7.0
Total Feet of Floodable Sand 2.3

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 4	4.4	4.4
4 - 18	2.6	7.0

Average Permeability Millidarcys 6.2
Average Percent Porosity 15.4
Average Percent Oil Saturation 40.3
Average Percent Water Saturation 37.6
Average Oil Content, Bbls./A. Ft. 479.
Total Oil Content, Bbls./Acre 3,834.
Average Percent Oil Recovery by Laboratory Flooding Tests 6.8
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. 77.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre 178.
Total Calculated Oil Recovery, Bbls./Acre

See "Calculated Recovery"
Section

The core was sampled by a representative of Oilfield Research Laboratories. Fresh water mud was used as a drilling fluid. The core was from a non-virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
788.0 - 789.0	Sandstone, brown.
789.0 - 790.3	Sandstone, shaly, grayish brown.
790.3 - 790.9	Shale and sandstone, laminated, gray and brown.
790.9 - 791.9	Sandstone, slightly shaly, brown.
791.9 - 792.8	Sandstone and shale, laminated, brown and gray.
792.8 - 793.3	Shale and sandstone, laminated, gray and light gray.
793.3 - 795.3	Sandstone and shale, laminated, brown and gray.
795.3 - 795.8	Sandstone, shaly, grayish brown with shale partings.
795.8 - 797.0	Sandstone and shale, laminated, brown and gray.
797.0 - 797.5	Sandstone, shaly, grayish brown, with shale partings.
797.5 - 804.7	Shale, gray.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 178 barrels of oil per acre was obtained from 2.3 feet of sand. The weighted average percent oil saturation was reduced from 51.9 to 45.1, or represents an average recovery of 6.8 percent. The weighted average effective permeability of the samples is 3.53 millidarcys, while the average initial fluid production

pressure is 40.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 9 samples tested, 2 produced water and oil. This indicates that approximately 22 percent of the sand represented by these samples is floodable pay sand.

CALCULATED RECOVERY

It would appear from a study of the core data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 460 barrels of oil per acre. This is an average recovery of 202 barrels per acre foot from 2.3 feet of floodable sand analyzed in this core.

These recovery values were calculated using the following data and assumptions:

Original formation volume factor, estimated	1.05
Reservoir water saturation, percent, estimated	20.0
Average porosity, percent	15.2
Oil saturation after flooding, percent	45.1
Performance factor, percent, estimated	55.0
Net floodable sand, feet	2.3

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease Burke Well No. W-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	788.5	16.8	44	26	70	574	17.	1.0	1.0	574	17.00
2	789.4	13.8	58	25	83	621	3.3	1.3	2.3	807	4.29
3	791.5	17.0	44	24	68	580	9.2	0.6	2.9	348	5.52
4	792.4	15.7	29	41	70	353	3.0	0.9	3.8	318	2.70
5	793.4	17.2	27	41	68	360	6.7	1.0	4.8	360	6.70
6	794.5	12.3	31	67	98	296	Imp.	1.0	5.8	296	0.00
7	795.5	17.3	43	34	77	577	3.9	0.5	6.3	289	1.95
8	796.4	15.9	43	36	79	530	2.4	0.7	7.0	371	1.68
9	797.4	14.8	41	41	82	471	3.9	1.0	8.0	471	3.90

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		James E. Russell Petroleum, Inc.	Lease	Burke	Well No.	W-3
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.			
788.0 - 797.5	7.0	6.2	43.74			
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
788.0 - 797.5	8.0	15.4	40.3	37.6	479	3,834

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company		James E. Russell Petroleum, Inc.		Lease		Burke		Well No.		W-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			
1	788.5	16.8	44	573	4	52	40	38	238	4.42	30
2	789.4	13.9	58	625	9	97	49	41	102	2.85	50
3	791.5	17.4	43	580	0	0	43	28	0	Imp.	-
4	792.4	15.2	30	354	0	0	30	42	0	Imp.	-
5	793.4	17.1	27	358	0	0	27	41	0	Imp.	-
6	794.5	12.3	31	296	0	0	31	67	0	Imp.	-
7	795.5	16.8	44	573	0	0	44	35	0	Imp.	-
8	796.4	15.8	43	527	0	0	43	38	0	Imp.	-
9	797.4	14.5	42	472	0	0	42	40	0	Imp.	-

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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SUMMARY OF LABORATORY FLOODING TESTS

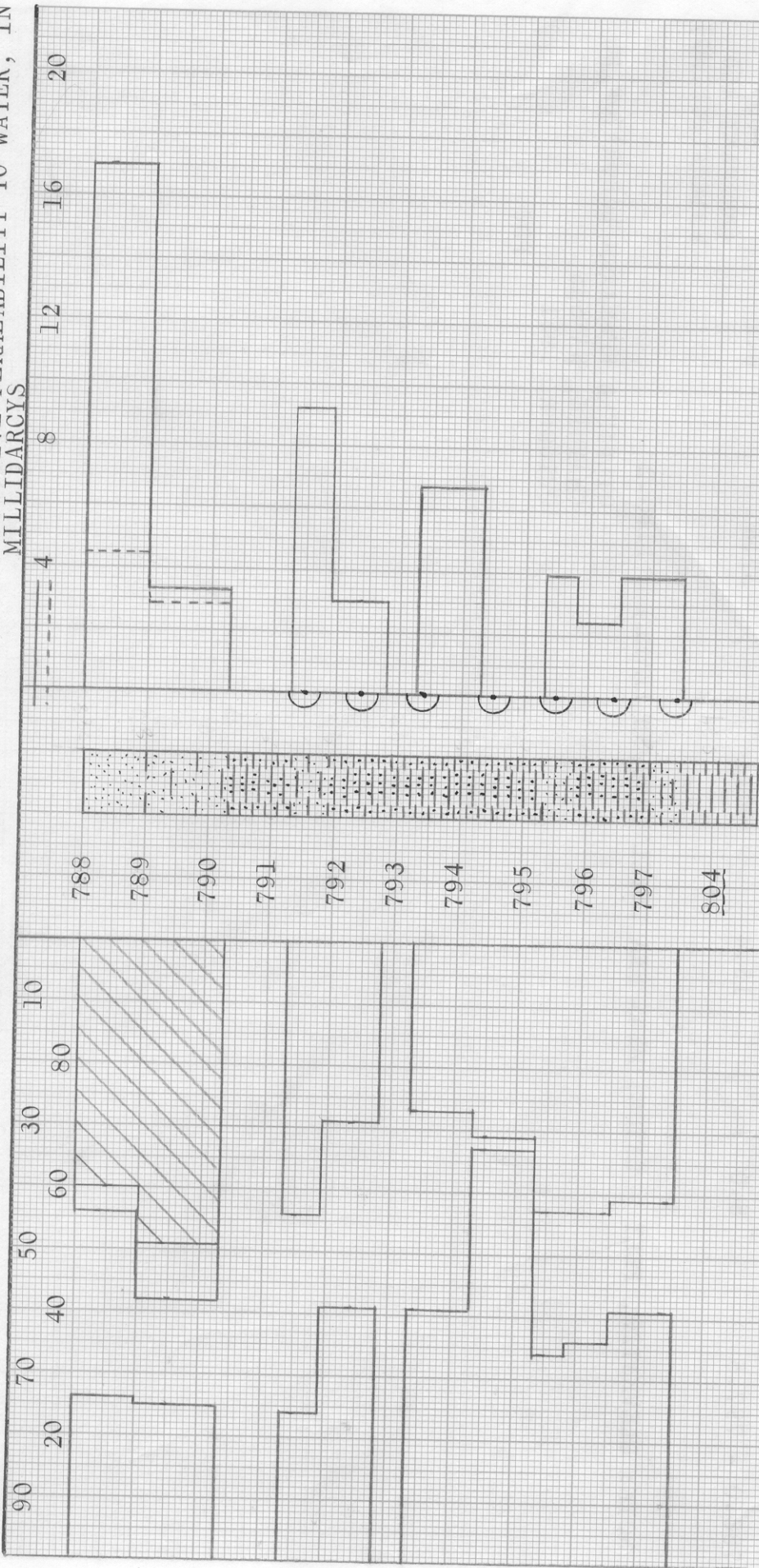
TABLE V

Company	James E. Russell Petroleum, Inc.	Lease	Burke	Well No.	W-3
Depth Interval, Feet	788.0 - 797.5				
Feet of Core Analyzed	2.3				
Average Percent Porosity	15.2				
Average Percent Original Oil Saturation	51.9				
Average Percent Oil Recovery	6.8				
Average Percent Residual Oil Saturation	45.1				
Average Percent Residual Water Saturation	39.7				
Average Percent Total Residual Fluid Saturation	84.8				
Average Original Oil Content, Bbls./A. Ft.	602.				
Average Oil Recovery, Bbls./A. Ft.	77.				
Average Residual Oil Content, Bbls./A. Ft.	525.				
Total Original Oil Content, Bbls./Acre	1,385.				
Total Oil Recovery, Bbls./Acre	178.				
Total Residual Oil Content, Bbls./Acre	1,207.				
Average Effective Permeability, Millidarcys	3.53				
Average Initial Fluid Production Pressure, p.s.i.	40.0				

NOTE: Only those samples which recovered oil were used in calculating the above averages.

WATER SAT., PERCENT $\longrightarrow$ $\longleftarrow$ OIL SAT., PERCENT

PERMEABILITY, IN MILLIDARCYS
EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYS



KEY:

SANDSTONE

SHALE

SHALY SANDSTONE

SANDY SHALE

LAMINATED SANDSTONE AND SHALE

SHALY SANDSTONE WITH SHALE PARTINGS

FLOODPOT RESIDUAL OIL SATURATION

IMPERMEABLE TO WATER

JAMES E. RUSSELL PETROLEUM, INC.

BURKE LEASE

WELL NO. W-3

ANDERSON COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED		AVERAGE		AVG. OIL		AVG. WATER		AVERAGE		CALCULATED	
			PERCENT	PERCENT	SATURATION	PERCENT	SATURATION	PERCENT	PERMEABILITY,	PERCENT	OIL RECOVERY	
			POROSITY		PERCENT		PERCENT		MILLIDARCS		BBLs. / ACRE	

788.0 - 797.5	8.0	15.4	40.3	37.6	6.2	460	(PRIMARY AND WATERFLOODING)				
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NOTE: ELEVATION, FEET - DATUM: MEAN SEA LEVEL (GROUND LEVEL) 1100.2

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
OCTOBER, 1981

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