

OILFIELD RESEARCH LABORATORIES

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

December 12, 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. 0-11, located in Anderson County, Kansas and submitted to our laboratory on December 8, 1981.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/pdc

3 c to Abilene, Texas

2 c to Chanute, Kansas

- 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. 0-11

Location 275' EWL & 1960' SNL NW $\frac{1}{4}$

Section 26 Twp. 22S Rge. 19E County Anderson State Kansas

Elevation, Feet - Datum: Mean Sea Level (Ground Level) 1111.3

Name of Sand	Squirrel
Top of Core	812.0
Bottom of Core	826.9
Top of Sand	812.0
Bottom of Sand	818.9
Total Feet of Permeable Sand	5.8
Total Feet of Floodable Sand	3.9

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 2	2.9	2.9
4 - 10	1.7	4.6
20 - 22	1.2	5.8

Average Permeability Millidarcys	7.0
Average Percent Porosity	13.0
Average Percent Oil Saturation	42.7
Average Percent Water Saturation	45.5
Average Oil Content, Bbls./A. Ft.	435.
Total Oil Content, Bbls./Acre	4,566.
Average Percent Oil Recovery by Laboratory Flooding Tests	6.9
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	82.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	318.

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:

<u>Depth Interval, Feet</u>	<u>Description</u>
812.0 - 813.2	Sandstone, brown.
813.2 - 813.9	Sandstone, slightly shaly, brown.
813.9 - 815.8	Shale, slightly sandy, grayish brown.
815.8 - 818.9	Sandstone, shaly, grayish brown.
818.9 - 822.5	Shale, slightly sandy, grayish brown.
822.5 - 826.9	Shale, slightly sandy, gray.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 318 barrels of oil per acre was obtained from 3.9 feet of sand. The weighted average percent oil saturation was reduced from 47.9 to 41.0, or represents an average recovery of 6.9 percent. The weighted average effective permeability of the samples is 0.29 millidarcys, while the average initial fluid production pressure is 30.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 11 samples tested, 4 produced water and oil. This indicates that approximately 36 percent of the sand represented by these samples is floodable pay sand.

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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 620 barrels of oil per acre. This is an average recovery of 159 barrels per acre foot from 3.9 feet of floodable sand analyzed in the core.

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

Original formation volume factor, estimated	1.05
Reservoir water saturation, percent, estimated	25.0
Average porosity, percent	15.0
Oil saturation after flooding, percent	41.0
Performance factor, percent, estimated	45.0
Net floodable sand, feet	3.9

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease Burke Well No. 0-11

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			Ft.	Cum. Ft.		
1	812.4	15.0	38	43	442	21.	1.2	1.2	530	25.20
2	813.4	14.9	62	22	717	9.6	0.7	1.9	502	6.72
3	814.4	9.7	40	44	301	0.39	0.9	2.8	271	0.35
4	815.4	9.8	42	52	319	1.6	1.0	3.8	319	1.60
5	816.4	12.5	34	52	330	Imp.	1.1	4.9	363	0.00
6	817.5	13.7	44	47	468	1.6	1.0	5.9	468	1.60
7	818.5	16.0	54	30	670	4.9	1.0	6.9	670	4.90
8	819.5	14.3	36	50	399	Imp.	0.7	7.6	279	0.00
9	820.4	10.9	40	53	338	Imp.	0.9	8.5	304	0.00
10	821.4	13.9	49	44	528	Imp.	1.0	9.5	528	0.00
11	822.4	11.9	36	58	332	Imp.	1.0	10.5	332	0.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Inc. Lease Burke Well No. 0-111

Depth Interval, Feet	Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
812.0 - 818.9	812.0 - 818.9	5.8	7.0	40.37	13.1	43.8	42.4	453	3,123
818.9 - 822.5	818.9 - 822.5	0.0	0.0	0.00	12.7	40.6	51.3	401	1,443
812.0 - 822.5	812.0 - 822.5	5.8	7.0	40.37	13.0	42.7	45.5	435	4,566

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Inc. Lease Burke Well No. 0-11

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	812.4	15.1	38	445	2	23	36	46	422	50	0.75	30
2	813.4	15.0	62	721	8	93	54	31	628	12	0.22	30
3	814.4	10.1	39	306	0	0	39	47	306	0	Imp.	-
4	815.4	9.9	42	323	0	0	42	53	323	0	Imp.	-
5	816.4	12.6	34	332	0	0	34	53	332	0	Imp.	-
6	817.5	13.8	44	471	7	75	37	55	396	0	0.03	35
7	818.5	16.1	54	674	12	150	42	43	524	0	0.04	25
8	819.5	14.0	37	402	0	0	37	50	402	0	Imp.	-
9	820.4	11.0	40	341	0	0	40	54	341	0	Imp.	-
10	821.4	13.8	49	525	0	0	49	45	525	0	Imp.	-
11	822.4	12.0	36	335	0	0	36	59	335	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. 0-11

Depth Interval, Feet 812.0 - 818.9

Feet of Core Analyzed 3.9

Average Percent Porosity 15.0

Average Percent Original Oil Saturation 47.9

Average Percent Oil Recovery 6.9

Average Percent Residual Oil Saturation 41.0

Average Percent Residual Water Saturation 44.8

Average Percent Total Residual Fluid Saturation 85.8

Average Original Oil Content, Bbbls./A. Ft. 560.

Average Oil Recovery, Bbbls./A. Ft. 82.

Average Residual Oil Content, Bbbls./A. Ft. 478.

Total Original Oil Content, Bbbls./Acre 2,184.

Total Oil Recovery, Bbbls./Acre 318.

Total Residual Oil Content, Bbbls./Acre 1,866.

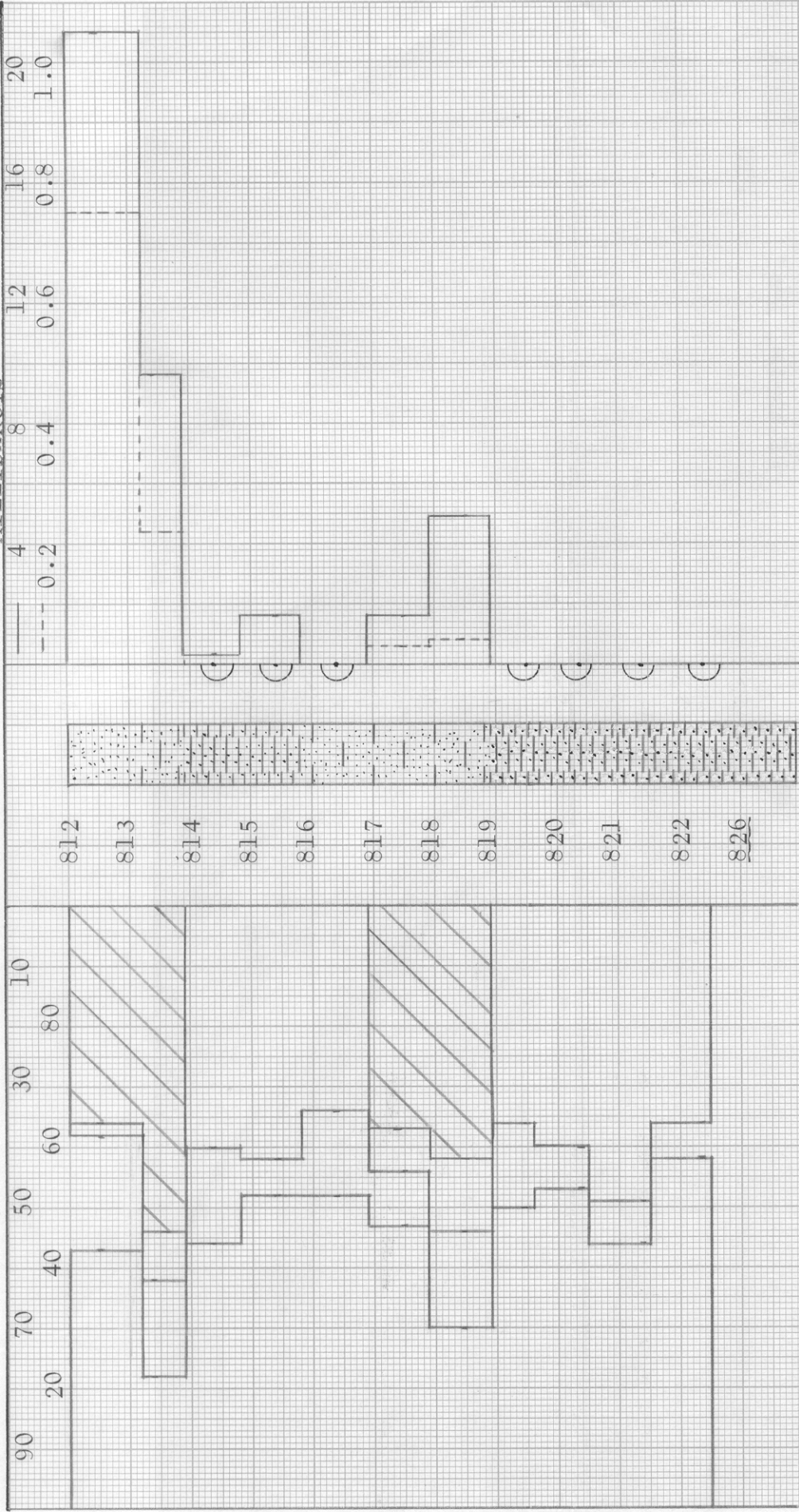
Average Effective Permeability, Millidarcys 0.29

Average Initial Fluid Production Pressure, p.s.i. 30.0

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

PERMEABILITY, IN MILLIDARCYS
 EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYS

WATER SAT., PERCENT
 OIL SAT., PERCENT



KEY:
 SANDSTONE
 IMPERMEABLE TO WATER

SHALY SANDSTONE
 SANDY SHALE
 FLOODPOT RESIDUAL OIL SATURATION

JAMES E. RUSSELL PETROLEUM, INC.

BUKKE LEASE

ANDERSON COUNTY, KANSAS

WELL NO. 0-11

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCS	CALCULATED OIL RECOVERY BBLs. / ACRE
812.0 - 818.9	6.9	13.1	43.8	42.4	7.0	
818.9 - 822.5	3.6	12.7	40.6	51.3	0.0	
812.0 - 822.5	10.5	13.0	42.7	45.5	7.0	620

NOTE: ELEVATION, FEET - DATUM: MEAN SEA LEVEL (GROUND LEVEL) 1111.3

(PRIMARY AND
WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
DECEMBER, 1981

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