

OILFIELD RESEARCH LABORATORIES

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

January 26, 1982

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 McCune Lease, Well No. 0-1, located in Anderson County, Kansas and submitted to our laboratory on January 22, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Sanford A. Michel

SAM/kas

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 McCune Well No. 0-1
 Location 330' SNL & 600' EWL, SW $\frac{1}{4}$
 Section 26 Twp. 22S Rge. 19E County Anderson State Kansas

Elevation, Feet Datum: Mean Sea Level (Ground Level) 1100.7
 Name of Sand Squirrel
 Top of Core 805.0
 Bottom of Core 822.0
 Top of Sand 807.3
 Bottom of Sand 821.5
 Total Feet of Permeable Sand 10.9
 Total Feet of Floodable Sand 1.2

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 1.0	5.0	5.0
2.0 - 5.0	3.8	8.8
6.0 - 9.0	2.1	10.9

Average Permeability Millidarcys 2.8
 Average Percent Porosity 13.7
 Average Percent Oil Saturation 37.5
 Average Percent Water Saturation 49.8
 Average Oil Content, Bbls./A. Ft. 405.
 Total Oil Content, Bbls./Acre 5,422.
 Average Percent Oil Recovery by Laboratory Flooding Tests 3.3
 Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. 39.
 Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre 47.
 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.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
805.0 - 807.3	Shale, gray.
807.3 - 807.9	Sandstone, shaly, calcareous, brown.
807.9 - 809.6	Sandstone, shaly, light brown.
809.6 - 810.4	Limestone, slightly shaly, gray.
810.4 - 810.8	Sandstone, slightly shaly, brown.
810.8 - 812.2	Sandstone and shale, laminated gray and brown.
812.2 - 812.9	Sandstone, shaly, slightly calcareous, grayish brown.
812.9 - 821.5	Shale and sandstone, laminated brown and gray.
821.5 - 822.0	Shale, gray.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 47 barrels of oil per acre was obtained from 1.2 feet of sand. The weighted average percent oil saturation was reduced from 50.0 to 46.7, or represents an average recovery of 3.3 percent. The weighted average effective permeability of the samples is 0.01 millidarcys, while the average initial fluid production pressure is 42.5 pounds per square inch (See Table V).

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 200 barrels of oil per acre. This is an average recovery of 166 barrels per acre foot from 1.2 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	25.0
Average porosity, percent	15.7
Oil saturation after flooding, percent	46.7
Performance factor, percent, estimated	55.0
Net floodable sand, feet	1.2

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease McCune Well No. 0-1

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	807.6	9.0	66	30	96	461	Imp.	0.6	0.6	277	0.00
2	808.4	15.8	58	26	84	711	6.3	0.9	1.5	640	5.67
3	809.4	14.5	56	28	84	630	8.3	0.8	2.3	504	6.64
4	810.6	17.8	38	32	70	525	6.5	0.4	2.7	210	2.60
5	811.6	14.9	29	64	93	335	4.3	1.4	4.1	469	6.02
6	812.5	4.3	23	70	93	77	Imp.	0.7	4.8	54	0.00
7	813.5	15.4	21	58	79	251	3.4	1.1	5.9	276	3.74
8	814.6	13.4	55	40	95	572	0.73	1.0	6.9	572	0.73
9	815.6	14.0	11	71	82	120	0.47	1.0	7.9	120	0.47
10	816.5	14.3	46	42	88	510	0.92	1.0	8.9	510	0.92
11	817.3	14.7	54	39	93	616	0.27	1.0	9.9	616	0.27
12	818.3	14.0	49	47	96	532	0.80	1.0	10.9	532	0.80
13	819.6	16.1	31	47	78	387	2.0	1.3	12.2	503	2.60
14	820.4	11.5	13	74	87	116	Imp.	1.2	13.4	139	0.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	James E. Russell Petroleum, Inc.	Lease	McCune	Well No.	0-1
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
807.3 - 810.8	2.1	7.1	14.91		
810.8 - 821.5	8.8	1.8	15.55		
807.3 - 821.5	10.9	2.8	30.46		
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Total Oil Content Bbls./Acre
807.3 - 810.8	2.7	14.2	56.2	28.4	1,631
810.8 - 821.5	10.7	13.6	32.8	55.3	3,791
807.3 - 821.5	13.4	13.7	37.5	49.8	5,422

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

CompanyJames E. Russell Petroleum, Inc.			LeaseMcCune			Well No.0-1					
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.
			%	Bbbls./A. Ft.	%	Bbbls./A. Ft.	% Oil	% Water			
1	807.6	9.1	66	466	0	0	66	31	0	Imp.	-
2	808.4	15.7	58	706	0	0	58	27	0	Imp.	-
3	809.4	14.6	56	634	4	45	52	33	0	0.01	50
4	810.6	17.7	38	522	2	27	36	35	0	0.01	35
5	811.6	15.4	28	335	0	0	28	65	0	Imp.	-
6	812.5	4.5	23	80	0	0	23	72	0	Imp.	-
7	813.5	15.9	20	247	0	0	20	60	0	Imp.	-
8	814.6	13.3	55	567	0	0	55	41	0	Imp.	-
9	815.6	14.1	11	120	0	0	11	72	0	Imp.	-
10	816.5	14.2	46	507	0	0	46	42	0	Imp.	-
11	817.3	15.1	53	621	0	0	53	41	0	Imp.	-
12	818.3	14.0	49	532	0	0	49	48	0	Imp.	-
13	819.6	16.2	31	390	0	0	31	48	0	Imp.	-
14	820.4	11.7	13	118	0	0	13	76	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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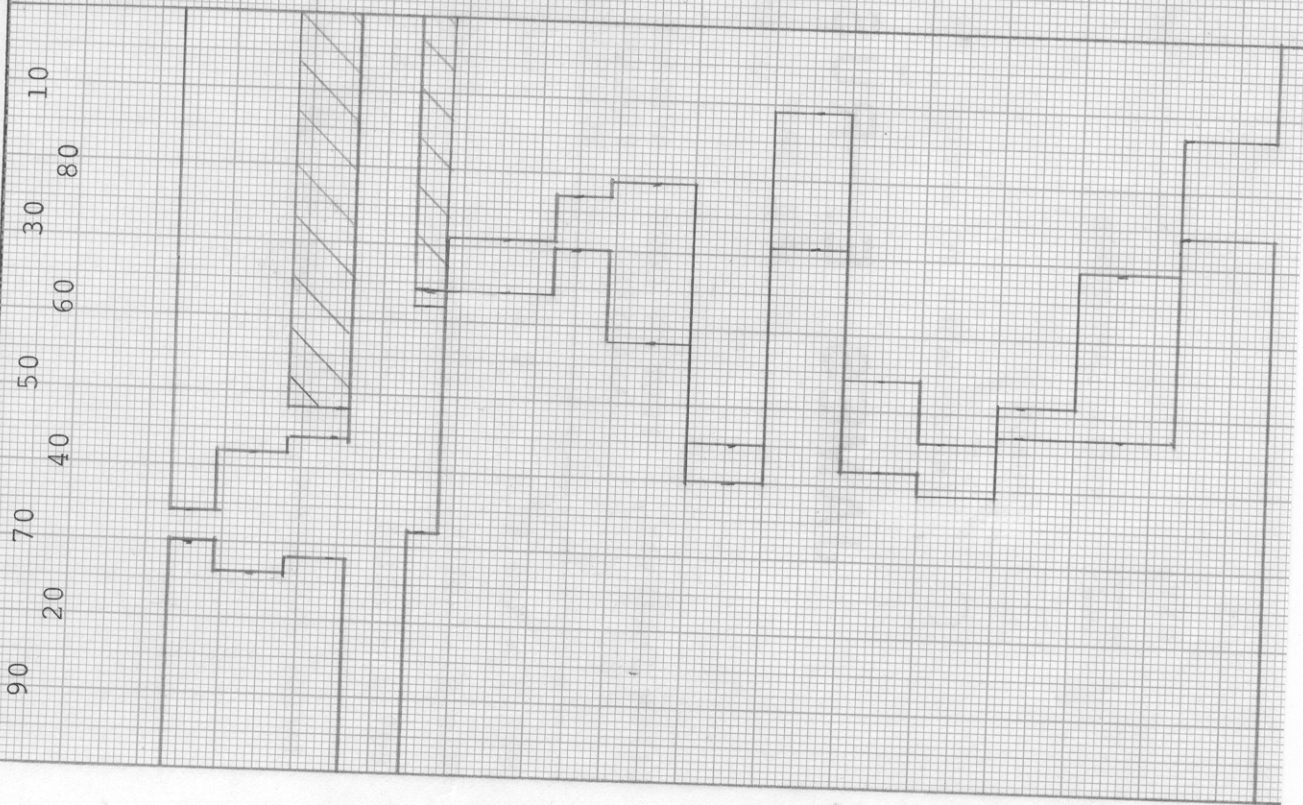
SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	James E. Russell Petroleum, Inc.	Lease	McCune	Well No.	0-1
Depth Interval, Feet	807.3 - 810.8				
Feet of Core Analyzed	1.2				
Average Percent Porosity	15.7				
Average Percent Original Oil Saturation	50.0				
Average Percent Oil Recovery	3.3				
Average Percent Residual Oil Saturation	46.7				
Average Percent Residual Water Saturation	33.7				
Average Percent Total Residual Fluid Saturation	80.4				
Average Original Oil Content, Bbls./A. Ft.	597.				
Average Oil Recovery, Bbls./A. Ft.	39.				
Average Residual Oil Content, Bbls./A. Ft.	558.				
Total Original Oil Content, Bbls./Acre	716.				
Total Oil Recovery, Bbls./Acre	47.				
Total Residual Oil Content, Bbls./Acre	669.				
Average Effective Permeability, Millidarcys	0.01				
Average Initial Fluid Production Pressure, p.s.i.	42.5				

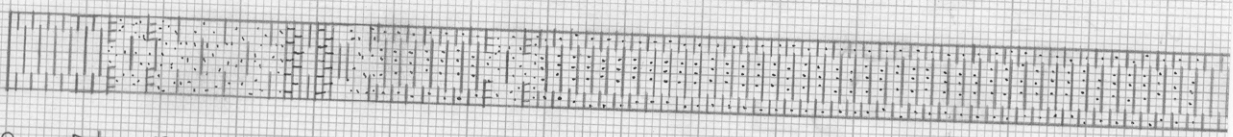
NOTE: Only those samples which recovered oil were used in calculating the above averages.

WATER SAT., PERCENT → ← OIL SAT., PERCENT



PERMEABILITY, IN MILLIDARCYS
EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYS

2 0.2 4 0.4 6 0.6 8 0.8 10 1.0



KEY:



SHALY SANDSTONE



SHALE



IMPERMEABLE TO WATER



SHALY CALCAREOUS SANDSTONE



LAMINATED SANDSTONE AND SHALE



SHALY LIMESTONE



FLOODPOT RESIDUAL OIL SATURATION

JAMES E. RUSSELL PETROLEUM, INC.

MC CUNE LEASE

WELL NO. 0-1

ANDERSON COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE POROSITY PERCENT	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY BBLs. / ACRE
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807.3 - 810.8 2.7 14.2 56.2 28.4 7.1

810.8 - 821.5 10.7 13.6 32.8 55.3 1.8

807.3 - 821.5 13.4 13.7 37.5 49.8 2.8

200

(PRIMARY AND
WATERFLOODING)

NOTE: ELEVATION, FEET - DATUM: MEAN SEA LEVEL (GROUND LEVEL) 1100.7

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CHANUTE, KANSAS
JANUARY, 1982