

OILFIELD RESEARCH LABORATORIES

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

February 6, 1979

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

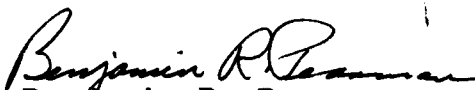
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the C. McGhee Lease, Well No. 11, Anderson County, Kansas, and submitted to our laboratory on January 25, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Benjamin R. Pearman

SAM:bl
3 c to Abilene, Texas
2 c to Chanute, Kansas

GENERAL INFORMATION & SUMMARY

1052.3

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company James E. Russell Pet., Inc. Lease C. McGhee Well No. 11

Location 220' EWL & 1,540' SNL, W $\frac{1}{2}$ SE $\frac{1}{4}$

Section 10 Twp. 23S Rge. 19E County Anderson State Kansas

Name of Sand	Squirrel
Top of Core	721.0
Bottom of Core	761.0
Top of Sand	721.0
Bottom of Sand	754.6
Total Feet of Permeable Sand	29.9
Total Feet of Floodable Sand	4.5

Distribution of Permeable Sand:
Permeability Range
Millidarcys

	Feet	Cum. Ft.
0 - 1	10.6	10.6
1 - 3	8.0	18.6
3 - 10	8.3	26.9
10 & above	3.0	29.9

Average Permeability Millidarcys	3.5
Average Percent Porosity	15.1
Average Percent Oil Saturation	32.9
Average Percent Water Saturation	46.3
Average Oil Content, Bbls./A. Ft.	388.
Total Oil Content, Bbls./Acre	12,374.
Average Percent Oil Recovery by Laboratory Flooding Tests	5.8
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	73.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	327.
Total Calculated Oil Recovery, Bbls./Acre (Primary & Waterflooding)	800.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet (Ground Level)	1052.3

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The core was reported to be from virgin territory. The drilling fluid consisted of fresh water mud. The core was sampled and the samples sealed in plastic bags by a representative of Oilfield Research Laboratories.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval,</u> <u>Feet</u>	<u>Description</u>	<u>Shallow Gas Zone</u>
193.0 - 199.5	Dark gray to black slightly sandy shale.	
199.5 - 209.5	Gray sandy shale.	
209.5 - 212.0	Gray calcareous fossiliferous sandy shale.	

Squirrel Sand

721.0 - 734.4	Gray and light brown finely laminated very shaly sandstone. First oil show.
734.4 - 743.3	Grayish brown very shaly sandstone.
743.3 - 744.3	Gray sandy shale.
744.3 - 745.5	Grayish brown very shaly sandstone.
745.5 - 746.2	Gray sandy shale.
746.2 - 754.6	Grayish brown very shaly sandstone.
754.6 - 761.0	Dark gray shale.

CONCLUSION

From a study of the data, it would appear that efficient primary and waterflood operations in the vicinity of this well should recover approximately 180 barrels of oil per acre. This is an average recovery of 180 barrels per acre foot from the 4.5 feet of floodable sand analyzed in this core.

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

Original formation volume factor	1.05
Reservoir water saturation, percent	30.
Average porosity, percent	16.9
Oil saturation after flooding, percent	39.5
Performance factor, percent	50.
Net floodable pay sand, feet	4.5

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease C. McGhee Well No. 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.		
					<u>Squirrel Band</u>					
1	721.8	14.6	29	49	329	0.42	1.0	1.0	329	0.42
2	722.6	13.8	15	64	161	1.6	1.0	2.0	161	1.60
3	723.5	14.5	23	54	259	0.52	1.0	3.0	259	0.52
4	724.4	12.6	20	72	196	Imp.	1.0	4.0	196	0.00
5	725.4	16.8	22	42	287	1.4	1.0	5.0	287	1.40
6	726.5	15.4	18	54	215	2.1	1.0	6.0	215	2.10
7	727.5	16.0	28	39	348	0.99	1.0	7.0	348	0.99
8	728.7	14.3	22	66	244	0.85	1.0	8.0	244	0.85
9	729.5	11.4	16	77	142	1.0	1.0	9.0	142	1.00
10	730.5	14.3	22	58	244	Imp.	1.0	10.0	244	0.00
11	731.5	13.4	29	62	302	0.42	1.0	11.0	302	0.42
12	732.5	16.9	34	37	446	2.8	1.0	12.0	446	2.80
13	733.5	15.7	33	43	402	1.3	1.4	13.4	563	1.82
14	734.5	14.4	43	45	480	1.6	0.6	14.0	288	0.96
15	735.5	16.5	22	43	282	1.0	1.0	15.0	282	1.00
16	736.4	14.1	27	55	295	3.6	1.0	16.0	295	3.60
17	737.6	17.9	28	36	389	3.3	1.0	17.0	389	3.30
18	738.5	17.1	40	32	531	12.	1.0	18.0	531	12.00
19	739.5	13.8	50	34	536	13.	1.0	19.0	536	13.00
20	740.5	13.3	26	60	268	6.6	1.0	20.0	268	6.60
21	741.5	16.8	40	36	521	4.8	1.0	21.0	521	4.80
22	742.5	17.6	48	28	655	6.8	1.3	22.3	852	8.84
23	744.7	18.0	43	35	601	5.9	1.2	23.5	721	7.08
24	746.5	17.6	45	33	614	7.5	0.8	24.3	491	6.00
25	747.5	13.0	36	60	363	6.5	1.0	25.3	363	6.50
26	748.3	18.0	38	35	531	13.	1.0	26.3	531	13.00

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease C. McGhee Well No. 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	Total			Ft.	Cum. Ft.		
27	749.5	12.7	44	52	96	433	0.25	1.0	27.3	433	0.25
28	750.5	16.1	34	48	82	425	2.2	1.0	28.3	425	2.20
29	751.5	14.5	45	30	75	506	1.6	1.0	29.3	506	1.60
30	752.5	12.3	48	36	84	458	0.30	1.0	30.3	458	0.30
31	753.5	15.6	44	39	83	533	0.45	1.0	31.3	533	0.45
32	754.5	10.5	44	24	68	358	0.16	0.6	31.9	215	0.10

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company <u>James E. Russell Petroleum, Inc.</u>			Lease <u>C. McGhee</u>		Well No. <u>11</u>	
<u>Squirrel Sand</u>						
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.			
721.0 - 732.0	9.0	1.0	9.30			
732.0 - 754.6	20.9	4.6	96.20			
721.0 - 754.6	29.9	3.5	105.50			

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
721.0 - 732.0	11.0	14.3	22.2	57.9	248	2,727
732.0 - 754.6	20.9	15.5	38.5	40.2	462	9,647
721.0 - 754.6	31.9	15.1	32.9	46.3	388	12,374

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company		James E. Russell Petroleum, Inc.		Lease		C. McGhee		Well No.		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			
						Squirrel Sand					
1	721.8	14.4	27	302	0	0	27	61	0	Imp.	-
2	722.6	13.9	16	172	0	0	16	77	0	Imp.	-
3	723.5	14.5	23	259	0	0	23	64	0	Imp.	-
4	724.4	12.8	19	190	0	0	19	72	0	Imp.	-
5	725.4	16.5	21	269	0	0	21	70	0	Imp.	-
6	726.5	15.7	19	231	0	0	19	70	0	Imp.	-
7	727.5	15.9	25	272	0	0	25	62	0	Imp.	-
8	728.7	14.4	22	246	0	0	22	67	0	Imp.	-
9	729.5	11.7	17	154	0	0	17	76	0	Imp.	-
10	730.5	14.4	20	223	0	0	20	63	0	Imp.	-
11	731.5	13.5	26	272	0	0	26	66	0	Imp.	-
12	732.5	16.6	31	400	0	0	31	60	0	Imp.	-
13	733.5	15.7	33	402	0	0	33	50	0	Imp.	-
14	734.5	14.7	44	502	0	0	44	47	0	Imp.	-
15	735.5	16.1	24	299	0	0	24	65	0	Imp.	-
16	736.4	14.2	25	275	0	0	25	63	0	Imp.	-
17	737.6	17.6	29	396	0	0	29	60	0	Imp.	-
18	738.5	17.5	38	516	0	0	38	54	0	Imp.	-
19	739.5	14.3	50	555	12	133	38	46	1	0.08	50
20	740.5	14.3	26	289	0	0	26	69	1	0.08	50
21	741.5	17.3	40	537	4	54	36	59	1	0.08	50
22	742.5	17.8	48	663	6	83	42	53	2	0.15	50
23	744.7	17.7	43	590	2	27	41	49	3	0.15	50
24	746.5	17.6	41	560	0	0	41	50	0	Imp.	-
25	747.5	13.3	37	382	0	0	37	56	0	Imp.	-
26	748.3	17.6	37	505	0	0	37	54	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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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Inc. Lease C. McGhee Well No. 11

Sample No.	Depth, Feet	Effective Porosity Percent		Original Oil Saturation		Oil Recovery		Residual Saturation			Volume of Water Recovered cc ²	Effective Permeability Millidarcys ²	Initial Fluid Production Pressure Lbs./Sq./In.
		%	Bbls./A. Ft.	%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
27	749.5	13.1	427	42	0	0	0	42	53	427	0	Imp.	-
28	750.5	16.0	410	33	0	0	0	33	60	410	0	Imp.	-
29	751.5	14.8	493	43	0	0	0	43	49	493	0	Imp.	-
30	752.5	12.7	483	49	0	0	0	49	42	483	0	Imp.	-
31	753.5	15.5	542	45	0	0	0	45	43	542	0	Imp.	-
32	754.5	10.9	355	42	0	0	0	42	49	355	0	Imp.	-

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company James E. Russell Petroleum, Inc. Lease C. McGhee Well No. 11

SQUIRREL SAND

732.0 - 754.6

Depth Interval, Feet

Feet of Core Analyzed

4.5

Average Percent Porosity

16.9

Average Percent Original Oil Saturation

45.3

Average Percent Oil Recovery

5.8

Average Percent Residual Oil Saturation

39.5

Average Percent Residual Water Saturation

51.7

Average Percent Total Residual Fluid Saturation

91.2

Average Original Oil Content, Bbls./A. Ft.

592.

Average Oil Recovery, Bbls./A. Ft.

73.

Average Residual Oil Content, Bbls./A. Ft.

519.

Total Original Oil Content, Bbls./Acre

2,662.

Total Oil Recovery, Bbls./Acre

327.

Total Residual Oil Content, Bbls./Acre

2,335.

Average Effective Permeability, Millidarcys

0.12

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

50.

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