



OILFIELD RESEARCH LABORATORIES

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

February 19, 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 cores taken from the C. McGhee Lease, Well No. 12, Anderson County, Kansas, and submitted to our laboratory on February 5, and 12, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman
Benjamin R. Pearman

SAM:cb

3 c to Abilene, Texas
2 c to Chanute, Kansas

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

The data contained in this conclusion applies to the Squirrel Sand only.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>	<u>Shallow Gas Zone</u>
206.0 - 209.5	Gray shale.	
209.5 - 212.0	Black slightly carbonaceous shale.	
212.0 - 214.0	Dark gray shale.	
214.0 - 225.0	Gray shale.	
<u>Squirrel Sand</u>		
723.0 - 729.4	Gray shale; first oil show.	
729.4 - 730.5	Brownish gray very shaly sandstone; 30% sand.	
730.5 - 733.0	Gray sandy shale; 10% sand.	
733.0 - 733.5	Light brown very shaly sandstone; 20% sand.	
733.5 - 734.7	Gray sandy shale.	
734.7 - 735.5	Light brown shaly sandstone; 50% sand.	
735.5 - 736.0	Gray and brown laminated sandstone and shale; 50% sand.	
736.0 - 737.0	Light brown sandstone; 90% sand.	
737.0 - 741.6	Light brown very laminated sandstone and shale; 10% to 20% sand.	

OILFIELD RESEARCH LABORATORIES

- 4 -

- 741.6 - 744.2 Light brown slightly laminated shaly sandstone; 90% sand.
- 744.2 - 745.0 Light brown very shaly sandstone; 10% sand.
- 745.0 - 751.1 Light brown and gray finely laminated sandstone and shale; 40% sand.
- 751.1 - 752.9 Grayish brown slightly shaly sandstone; 80% sand.
- 752.9 - 753.7 Gray very shaly sandstone; 5% sand.
- 753.7 - 758.2 Brown sandstone; 90% sand.
- 758.2 - 759.1 Gray sandy shale.
- 759.1 - 759.9 Gray and light brown laminated sandstone and shale; 60% sand.
- 759.9 - 762.0 Dark brown sandstone; 95% sand.
- 762.0 - 762.6 Dark brown and gray finely laminated sandstone and shale; 50% sand.
- 762.6 - 763.7 Dark brown slightly shaly sandstone; 90% sand.
- 763.7 - 767.6 Dark brown sandstone; 95% sand.
- 767.6 - 769.7 Dark brown slightly shaly sandstone; 90% sand.
- 769.7 - 770.1 Gray sandy shale; 30% sand.
- 770.1 - 771.2 Dark brown slightly shaly sandstone; 80% sand.
- 771.2 - 772.8 Dark brown very shaly sandstone; 20% sand.
- 772.8 - 774.7 Dark gray carbonaceous sandstone; 90% sand.
- 774.7 - 776.2 Gray calcareous slightly shaly sandstone.
- 776.2 - 779.7 Gray sandy 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 830 barrels of oil per acre. This is an average recovery of 260 barrels per acre foot from the 3.2 acre feet of floodable pay sand analyzed in this core.

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

Original formation volume factor	1.06
Reservoir water saturation, percent	25.0
Average porosity, percent	16.3
Oil saturation after flooding, percent	30.0
Performance factor, percent	50.0
Net floodable pay sand, feet	3.2

Oilfield Research Laboratories

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease C. McGhee well No. 12

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	207.5									
2	208.5	*6.3	2	92	20	Imp.				
3	209.2	*5.8	1	95	11	Imp.				
4	209.7	*2.7	9	88	97	Imp.				
5	210.5	*2.1	1	34	35	0.35				
6	211.5		3	29	32	0.13				
7	212.5		6	66	72	-				
8	213.5					-				
9	214.5					0.20				
10	215.5					Imp.				
						Imp.				

SHALLOW GAS ZONE

Note: * Washburn -- Bunning

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc.

Lease C. McGhee

Well No. 12

SQUIRREL SAND

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	730.3	13.3	20	58	206	1.7	1.1	1.1	227	1.87
2	733.3	14.1	17	45	186	Imp.	0.5	1.6	93	0.00
3	735.4	14.6	13	62	147	1.6	0.8	2.4	118	1.28
4	736.4	17.6	15	43	205	7.2	1.0	3.4	205	7.20
5	737.4	16.0	14	51	174	0.28	1.0	4.4	174	0.28
6	738.5	11.7	1	79	9	0.32	1.0	5.4	9	0.32
7	739.5	14.1	17	63	186	0.22	1.0	6.4	186	0.22
8	740.5	13.6	24	68	253	Imp.	1.0	7.4	253	0.00
9	741.5	12.4	13	81	125	Imp.	0.6	8.0	75	0.00
10	742.5	17.3	16	45	215	4.0	1.4	9.4	301	5.60
11	743.5	12.7	26	70	256	5.6	1.2	10.6	307	6.72
12	744.6	17.0	21	45	277	Imp.	0.8	11.4	222	0.00
13	745.5	15.6	20	51	242	0.64	1.0	12.4	242	0.64
14	746.5	14.9	17	57	197	0.36	1.0	13.4	197	0.36
15	747.5	11.4	16	79	142	0.18	1.0	14.4	142	0.18
16	748.5	11.4	27	67	239	Imp.	1.0	15.4	239	0.00
17	749.5	11.7	15	82	136	Imp.	1.0	16.4	136	0.00
18	750.5	11.5	19	77	170	Imp.	1.1	17.5	187	0.00
19	751.5	15.0	24	55	279	2.9	0.9	18.4	251	2.61
20	752.5	17.8	25	43	345	4.9	0.9	19.3	311	4.41
21	753.6	14.0	13	68	141	0.37	0.8	20.1	113	0.30
22	754.5	16.2	32	44	407	5.0	1.3	21.4	529	6.50
23	755.5	13.7	43	45	457	2.6	1.0	22.4	457	2.60
24	756.5	17.5	33	40	448	9.9	1.0	23.4	448	9.90
25	757.5	16.8	35	41	456	8.9	1.2	24.6	547	10.68
26	759.5	11.8	18	74	165	4.7	0.8	25.4	132	3.76
27	760.5	17.1	42	33	557	4.7	1.1	26.5	613	5.17
28	761.5	16.3	43	39	544	4.1	1.0	27.5	544	4.10
29	762.5	14.6	44	41	505	2.1	0.6	28.1	303	1.26

Oilfield Research Laboratories

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease C. McGhee Well No. 12

SQUIRREL SAND

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.		
30	763.5	16.4	44	34	78	560	1.8	1.1	29.2	616	1.98
31	764.5	17.4	47	29	76	634	5.0	1.3	30.5	824	6.50
32	765.5	16.9	44	37	81	577	3.1	1.0	31.5	577	3.10
33	766.5	16.0	46	39	85	571	6.7	1.0	32.5	571	6.70
34	767.5	13.8	36	57	93	385	5.0	0.6	33.1	231	3.00
35	768.6	16.6	43	36	79	554	3.8	1.4	34.5	776	5.32
36	769.5	14.0	46	44	90	500	9.1	0.7	35.2	350	6.37
37	770.5	16.1	50	33	83	625	3.9	1.1	36.3	688	4.29
38	771.5	14.1	36	52	88	394	0.78	0.8	37.1	315	0.62
39	772.5	15.3	36	48	84	427	3.6	0.8	37.9	342	2.88
40	773.5	14.1	62	27	89	678	0.27	1.2	39.1	814	0.32
41	774.5	11.7	57	37	94	517	Imp.	0.7	39.8	362	0.00

Oilfield Research Laboratories

SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Inc. Lease C. McGhee Well No. 12

SQUIRREL SAND

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.	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
729.4 - 751.1	11.5	2.1	24.67	729.4 - 751.1	17.5	14.0	17.5	62.4	189	3,313
751.1 - 774.7	21.6	4.3	92.37	751.1 - 774.7	22.3	15.6	39.7	41.4	480	10,714
729.4 - 774.7	33.1	3.5	117.04	729.4 - 774.7	39.8	14.9	29.9	50.6	352	14,027

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV
SQUIRREL SAND

Company James E. Russell Petroleum, Inc.

Lease C. McChhee

Well No. 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			
1	730.3	13.8	19	203	0	0	19	57	5	0.15	50
2	733.3	13.6	18	190	0	0	18	63	0	Imp.	-
3	735.4	14.2	15	165	0	0	15	65	0	Imp.	-
4	736.4	17.7	17	234	0	0	17	72	27	0.52	40
5	737.4	15.8	13	159	0	0	13	59	0	Imp.	-
6	738.5	12.2	2	19	0	0	2	79	0	Imp.	-
7	739.5	13.8	17	182	0	0	17	65	0	Imp.	-
8	740.5	13.8	21	225	0	0	21	70	0	Imp.	-
9	741.5	12.4	15	144	0	0	15	79	0	Imp.	-
10	742.5	17.5	16	217	0	0	16	68	18	0.30	40
11	743.5	13.1	24	244	0	0	24	70	0	Imp.	-
12	744.6	17.1	22	292	0	0	22	60	0	Imp.	-
13	745.5	15.9	21	259	0	0	21	58	0	Imp.	-
14	746.5	14.8	16	184	0	0	16	64	0	Imp.	-
15	747.5	11.7	14	127	0	0	14	76	0	Imp.	-
16	748.5	11.4	27	239	0	0	27	67	0	Imp.	-
17	749.5	11.6	18	162	0	0	18	74	0	Imp.	-
18	750.5	11.4	18	159	0	0	18	75	0	Imp.	-
19	751.5	15.5	26	313	0	0	26	60	6	0.15	50
20	752.5	18.0	23	321	0	0	23	64	11	0.22	40
21	753.6	14.0	13	141	0	0	13	68	0	Imp.	-
22	754.5	16.4	30	382	0	0	30	50	0	Imp.	-
23	755.5	14.2	43	474	11	121	32	53	4	0.22	50
24	756.5	17.3	33	441	5	67	28	58	3	0.15	50
25	757.5	17.3	35	470	5	67	30	55	9	0.15	50
26	759.5	11.6	16	144	0	0	16	70	0	Imp.	-
27	760.5	17.1	41	544	0	0	41	37	0	Imp.	-
28	761.5	16.1	41	512	0	0	41	43	0	Imp.	-
29	762.5	14.8	45	517	0	0	45	41	0	Imp.	-
30	763.5	16.5	44	563	0	0	44	39	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.

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV
SQUIRREL SAND

Company James E. Russell Petroleum, Inc. Lease C. McGhee Well No. 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			
31	764.5	17.4	43	580	0	0	43	40	0	Imp.	-
32	765.5	17.1	45	597	0	0	45	43	0	Imp.	-
33	766.5	16.3	48	607	0	0	48	41	0	Imp.	-
34	767.5	14.1	34	372	0	0	34	59	0	Imp.	-
35	768.6	16.5	40	512	0	0	40	43	0	Imp.	-
36	769.5	14.5	43	484	0	0	43	47	0	Imp.	-
37	770.5	15.8	48	588	0	0	48	43	0	Imp.	-
38	771.5	14.1	38	416	0	0	38	52	0	Imp.	-
39	772.5	15.4	36	430	0	0	36	52	0	Imp.	-
40	773.5	14.4	59	659	0	0	59	33	0	Imp.	-
41	774.5	12.0	58	540	0	0	58	30	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.

Oilfield Research Laboratories

SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

SQUIRREL SAND

Company James E. Russell Petroleum, Inc. Lease C. McGhee Well No. 12

Depth Interval, Feet	751.1 - 774.7
Feet of Core Analyzed	3.2
Average Percent Porosity	16.3
Average Percent Original Oil Saturation	36.9
Average Percent Oil Recovery	6.9
Average Percent Residual Oil Saturation	30.0
Average Percent Residual Water Saturation	55.3
Average Percent Total Residual Fluid Saturation	85.3
Average Original Oil Content, Ebls./A. Ft.	363.
Average Oil Recovery, Ebls./A. Ft.	84.
Average Residual Oil Content, Ebls./A. Ft.	279.
Total Original Oil Content, Ebls./Acre	1,162.
Total Oil Recovery, Ebls./Acre	269.
Total Residual Oil Content, Ebls./Acre	893.
Average Effective Permeability, Millidarcys	0.55
Average Initial Fluid Production Pressure, p.s.i.	50.

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