OILFIELD RESEARCH LABORATORIES
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January 23, 1980

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. 17, Anderson County, Kansas, and submitted to our laboratory on January 2, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/tem

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

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company James E. Russell Petroleum, Inc. Lease C. McGhee Well No. 17

Location 1100' EWL & 1540' SNL SE¼

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

Elevation, Feet Datum: Mean Sea Level (Ground Level) 1071.1

Name of Sand	Squirrel
Top of Core	732.0
Bottom of Core	772.3
Top of Sand	732.0
Bottom of Sand	759.8
Total Feet of Permeable Sand	21.5
Total Feet of Floodable Sand	5.3

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 1	6.9	6.9
1 - 5	7.7	14.6
5 - 10	4.6	19.2
10 - 20	1.3	20.5
20 - 30	1.0	21.5

Average Permeability Millidarcys	5.1
Average Percent Porosity	14.3
Average Percent Oil Saturation	33.6
Average Percent Water Saturation	53.9
Average Oil Content, Bbls./A. Ft.	383.
Total Oil Content, Bbls./Acre	10,540.
Average Percent Oil Recovery by Laboratory Flooding Tests	3.6
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	48.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	255.
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 virgin area.

FORMATION CORED

Depth Interval, Feet	Description
732.0 - 734.9	First oil show; sandstone and shale, brown and gray laminated.
734.9 - 738.0	Sandstone, brown, shaly.
738.0 - 742.2	Sandstone and shale, brown and gray, laminated.
742.2 - 744.6	Sandstone, brown, shaly.
744.6 - 744.9	Shale, gray, sandy.
744.9 - 745.6	Sandstone, brown, shaly.
745.6 - 746.9	Shale, gray, sandy.
746.9 - 748.7	Sandstone and shale, brown and gray, laminated.
748.7 - 753.0	Sandstone, brown, shaly.
753.0 - 755.5	Shale, grayish, brown, sandy.
755.5 - 759.2	Sandstone and shale, brown and gray, laminated.
759.2 - 759.8	Sandstone, brown shaly, slightly calcareous.
759.8 - 762.1	Shale, sandy, slightly calcareous.
762.1 - 762.8	Limestone, black fossiliferous.
762.8 - 765.0	Shale, gray, sandy.
765.0 - 771.0	Shale, black, slightly calcareous.
771.0 - 771.5	Shale, black, fossiliferous, calcareous.
771.5 - 772.3	Coal.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 255 barrels of oil per acre was obtained from 5.3 feet of sand. The weighted average percent oil saturation was reduced from 36.1 to 32.5, or represents an average recovery of 3.6 percent. The weighted average effective permeability of the samples is 0.27 millidarcys, while the average initial fluid production pressure is 48.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 28 samples tested, 5 produced water and oil, and 4 samples produced water only. This indicates that approximately 18 percent of the sand represented by these samples is floodable pay sand.

Please note that the coregraph presents residual oil saturation instead of recovery, as in the past.

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 1,170 barrels of oil per acre. This is an average recovery of 221 barrels per acre foot from 5.3 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	30.0
Primary reserves, estimated, percent	4.0

Average porosity, percent	16.7
Oil saturation after flooding, percent	32.5
Performance factor, percent, estimated	50.0
Net floodable pay sand, feet	5.3

A primary and waterflood recovery is herewith presented

Average porosity for pay sand (740.0 - 759.8)	15.2%
Net pay sand thickness	11.5'
Estimated primary reserves, as a percent of porosity	4.0%
Estimated primary reserves, barrels per acre foot	47.
Estimated primary reserves, barrels per acre	540.
Estimated waterflood reserves, barrels per acre	1,030.
Estimated total reserves, barrels per acre	1,570.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease C. McGhee Well No. 17

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	732.5	14.7	34	46	80	388	1.0	1.0	1.0	388	1.00
2	733.5	14.2	30	59	89	331	Imp.	1.0	2.0	331	0.00
3	734.5	16.6	26	48	74	335	0.15	0.9	2.9	302	0.14
4	735.5	17.8	22	47	69	304	7.4	1.1	4.0	334	8.14
5	736.5	14.2	30	54	84	331	4.4	1.0	5.0	331	4.40
6	737.5	15.3	27	53	80	321	2.5	1.0	6.0	321	2.50
7	738.5	14.8	33	55	88	379	0.45	1.0	7.0	379	0.45
8	739.5	14.1	17	67	84	186	0.27	1.0	8.0	186	0.27
9	740.5	13.1	49	49	98	498	26.	1.0	9.0	498	26.00
10	741.5	13.8	30	67	97	321	Imp.	1.2	10.2	385	0.00
11	742.5	15.1	24	56	80	281	7.8	0.8	11.0	225	6.24
12	743.5	10.1	36	59	95	282	3.6	1.0	12.0	282	3.60
13	744.5	13.2	42	50	92	430	4.1	0.6	12.6	258	2.46
14	745.5	9.1	2	90	92	14	8.0	0.7	13.3	13	7.20
15	746.5	12.3	24	70	94	229	Imp.	1.3	14.6	298	0.00
16	747.5	14.7	52	43	95	593	0.24	1.0	15.6	593	0.24
17	748.5	13.7	36	56	92	383	0.92	0.8	16.4	306	0.74
18	749.5	18.9	38	43	81	557	13.	1.3	17.7	724	16.90
19	750.5	17.7	45	36	81	618	9.4	1.0	18.7	618	9.40
20	751.5	18.0	34	42	76	475	8.9	1.0	19.7	475	8.90
21	752.5	15.6	49	46	95	593	4.7	1.0	20.7	593	4.70
22	753.3	10.0	27	70	97	210	Imp.	1.0	21.7	210	0.00
23	754.4	13.1	26	70	96	264	Imp.	1.5	23.2	396	0.00
24	755.6	13.3	29	53	82	299	2.7	0.5	23.7	150	1.35
25	756.5	15.0	39	44	83	454	2.4	1.0	24.7	454	2.40
26	757.5	16.8	48	31	79	626	1.5	1.0	25.7	626	1.50
27	758.5	15.2	36	43	79	425	.71	1.2	26.9	510	0.85
28	759.5	12.2	48	28	76	454	1.3	0.6	27.5	354	1.01

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Inc. Lease C. McGhee Well No. 17

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
732.0 - 740.0	7.0	2.4	16.90
740.0 - 759.8	14.5	6.5	93.49
732.0 - 759.8	21.5	5.1	110.39

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
732.0 - 740.0	8.0	13.8	27.3	53.6	322	2,572
740.0 - 759.8	19.5	14.4	36.2	54.0	409	7,968
732.0 - 759.8	27.5	14.3	33.6	53.9	383	10,540

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Incorporated Lease C. McGhee Well No. 17

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	732.5	14.5	34	382	0	0	34	55	382	0	Imp.	-
2	733.5	14.3	30	332	0	0	30	61	332	0	Imp.	-
3	734.5	16.8	26	339	0	0	26	51	339	4	0.22	50
4	735.5	17.5	22	299	0	0	22	75	299	31	0.75	35
5	736.5	14.4	30	335	2	22	28	62	313	10	0.22	50
6	737.5	15.3	27	320	0	0	27	64	320	0	Imp.	-
7	738.5	14.6	33	374	2	22	31	67	352	4	0.15	50
8	739.5	14.0	17	185	0	0	17	70	185	0	Imp.	-
9	740.5	13.6	48	507	0	0	48	50	507	0	Imp.	-
10	741.5	13.7	30	319	0	0	30	67	319	0	Imp.	-
11	742.5	15.3	24	285	0	0	24	72	285	37	0.82	40
12	743.5	10.4	36	290	0	0	36	60	290	0	Imp.	-
13	744.5	13.0	42	424	0	0	42	51	424	0	Imp.	-
14	745.5	9.4	2	15	0	0	2	92	15	22	0.45	50
15	746.5	12.4	24	231	0	0	24	71	231	0	Imp.	-
16	747.5	14.7	52	593	0	0	52	43	593	0	Imp.	-
17	748.5	14.0	36	391	0	0	36	56	391	0	Imp.	-
18	749.5	18.5	38	545	4	57	34	63	488	22	0.30	50
19	750.5	17.4	45	607	7	95	38	61	512	32	0.45	40
20	751.5	18.0	34	475	3	42	31	65	433	12	0.22	50
21	752.5	15.6	49	593	0	0	49	47	593	0	Imp.	-
22	753.3	10.4	26	209	0	0	26	70	209	0	Imp.	-
23	754.4	13.2	26	266	0	0	26	70	266	0	Imp.	-
24	755.6	13.2	29	297	0	0	29	56	297	0	Imp.	-
25	756.5	15.2	39	460	0	0	39	50	460	0	Imp.	-
26	757.5	16.7	48	622	0	0	48	40	622	0	Imp.	-
27	758.5	15.2	36	425	0	0	36	48	425	0	Imp.	-
28	759.5	12.6	48	469	0	0	48	35	469	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, Incorporated Lease C. McGhee Well No. 17

Depth Interval, Feet	732.0 - 740.0	740.0 - 759.8	732.0 - 759.8
Feet of Core Analyzed	2.0	3.3	5.3
Average Percent Porosity	14.5	18.0	16.7
Average Percent Original Oil Saturation	31.5	38.9	36.1
Average Percent Oil Recovery	2.0	4.6	3.6
Average Percent Residual Oil Saturation	29.5	34.3	32.5
Average Percent Residual Water Saturation	64.5	63.0	63.6
Average Percent Total Residual Fluid Saturation	94.0	97.3	96.1
Average Original Oil Content, Bbls./A. Ft.	355.	543.	472.
Average Oil Recovery, Bbls./A. Ft.	22.	64.	48.
Average Residual Oil Content, Bbls./A. Ft.	333.	479.	424.
Total Original Oil Content, Bbls./Acre	709.	1,790.	2,499.
Total Oil Recovery, Bbls./Acre	44.	211.	255.
Total Residual Oil Content, Bbls./Acre	665.	1,579.	2,244.
Average Effective Permeability, Millidarcys	0.19	0.32	0.27
Average Initial Fluid Production Pressure, p.s.i.	50.0	46.7	48.0

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