OILFIELD RESEARCH LABORATORIES

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

December 3, 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 Unit 2 (Martin-Glover) Lease, Well No. R-40, located in Anderson County, Kansas and submitted to our laboratory on November 29, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/rmc

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

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company James E. Russell Petroleum, Inc. Lease Unit 2 (Martin-Glover) Well No. R-40

Location 1650' EWL & 330' SNL, NE¼

Section 32 Twp. 22S Rge. 19E County Anderson State Kansas

Elevation, Feet Datum: Mean Sea Level (Ground Level)	1089.3
Name of Sand	Squirrel
Top of Core	783.0
Bottom of Core	803.9
Top of Sand	786.0
Bottom of Sand	802.0
Total Feet of Permeable Sand	10.0
Total Feet of Floodable Sand	6.9

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 4	1.5	1.5
4 - 8	3.2	4.7
8 - 12	3.7	8.4
13 - 25	1.6	10.0

Average Permeability Millidarcys	8.3
Average Percent Porosity	15.9
Average Percent Oil Saturation	40.1
Average Percent Water Saturation	39.6
Average Oil Content, Bbls./A. Ft.	489.
Total Oil Content, Bbls./Acre	5,579.
Average Percent Oil Recovery by Laboratory Flooding Tests	9.3
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	112.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	772.
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:

Depth Interval, Feet	Description
783.0 - 786.0	Shale, gray, slightly sandy, slightly calcareous.
786.0 - 786.2	Sandstone, shaly, gray.
786.2 - 786.5	Sandstone, grayish brown, very shaly.
786.5 - 788.0	Shale, slightly sandy, gray.
788.0 - 788.9	Sandstone, shaly, brown.
788.9 - 789.1	Shale, gray.
789.1 - 790.0	Sandstone, slightly shaly, brown.
790.0 - 791.5	Sandstone, brown with scattered gray shale partings.
791.5 - 792.3	Shale, gray with scattered fine brown sandstone partings.
792.3 - 792.6	Sandstone, shaly, grayish brown.
792.6 - 793.0	Sandstone, very shaly, grayish brown.
793.0 - 794.0	Sandstone, shaly, grayish brown.
794.0 - 794.2	Shale, gray.
794.2 - 794.4	Shale, gray, sandstone, brown, alternate layers.
794.4 - 794.6	Sandstone, brown.
794.6 - 795.0	Shale, gray.
795.0 - 796.2	Sandstone, brown, shale, gray, alternate layers.
796.2 - 796.7	Sandstone, brown.
796.7 - 797.6	Sandstone, brown, shale, gray, alternate layers.
797.6 - 798.3	Sandstone, very shaly, grayish brown.
798.3 - 798.7	Sandstone, brown.

Depth Interval, Feet	Description
798.7 - 799.7	Sandstone, shaly, brown with gray shale partings.
799.7 - 800.6	Sandstone, brown with scattered fine gray shale partings.
800.6 - 802.0	Sandstone, very shaly, grayish brown.
802.0 - 803.9	Shale, slightly sandy, gray.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 772 barrels of oil per acre was obtained from 6.9 feet of sand. The weighted average percent oil saturation was reduced from 41.7 to 32.4, or represents an average recovery of 9.3 percent. The weighted average effective permeability of the samples is 0.63 millidarcys, while the average initial fluid production pressure is 28.1 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 15 samples tested, 8 produced water and oil. This indicates that approximately 53 percent of the sand represented by these samples is floodable pay sand.

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 1,770 barrels of oil per acre. This is an average recovery of 257 barrels per acre foot from 6.9 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.06
Reservoir water saturation, percent, estimated	25.0
Average porosity, percent	15.7
Oil saturation after flooding, percent	32.4
Performance factor, percent, estimated	55.0
Net floodable sand, feet	6.9

Oilfield Research Laboratories

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. **Lease** Unit 2 (Martin-Glover) **Well No.** R-40

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	786.3	14.5	41	50	91	461	0.43	0.3	0.3	138	0.13
2	788.6	16.4	43	38	81	547	2.1	0.9	1.2	492	1.89
3	789.7	13.6	59	28	87	623	9.4	0.9	2.1	561	8.46
4	790.6	15.9	48	20	68	592	13.	1.0	3.1	592	13.00
5	791.4	18.6	33	36	69	476	11.	0.5	3.6	238	5.50
6	792.4	16.2	18	58	76	226	3.1	0.3	3.9	68	0.93
7	793.8	16.7	32	39	71	415	4.9	1.0	4.9	415	4.90
8	794.5	18.6	30	32	62	433	18.	0.2	5.1	87	3.60
9	795.6	14.9	34	50	84	393	5.4	1.2	6.3	472	6.48
10	796.6	16.6	33	43	76	425	11.	0.5	6.8	213	5.50
11	797.5	16.1	51	34	85	637	10.	0.9	7.7	573	9.00
12	798.6	17.8	49	29	78	677	24.	0.4	8.1	271	9.60
13	799.5	15.8	32	54	86	392	5.1	1.0	9.1	392	5.10
14	800.5	17.5	33	42	75	448	10.	0.9	10.0	403	9.00
15	801.5	14.2	43	43	86	474	Imp.	1.4	11.4	664	0.00

Oilfield Research Laboratories

SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Inc. Lease Unit 2 (Martin-Glover) Well No. R-40

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
786.2 - 794.6	5.1	7.5	38.41
795.0 - 802.0	4.9	9.1	44.68
786.2 - 802.0	10.0	8.3	83.09

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
786.2 - 794.6	5.1	16.1	41.6	34.4	508	2,591
795.0 - 802.0	6.3	15.8	38.8	43.8	474	2,988
786.2 - 802.0	11.4	15.9	40.1	39.6	489	5,579

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Inc. Lease Unit 2 (Martin-Glover) Well No. R-40

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	786.3	14.6	41	464	0	0	41	51	464	0	Imp.	-
2	788.6	16.8	42	547	0	0	42	39	547	0	Imp.	-
3	789.7	13.7	59	627	24	255	35	54	372	28	0.42	20
4	790.6	15.8	48	588	15	184	33	60	404	68	1.12	20
5	791.4	19.0	32	472	0	0	32	37	472	0	Imp.	-
6	792.4	16.4	18	229	0	0	18	59	229	0	Imp.	-
7	793.8	16.6	32	412	3	39	29	66	373	138	1.67	20
8	794.5	18.5	30	431	0	0	30	34	431	0	Imp.	-
9	795.6	14.8	34	390	2	23	32	61	367	2	0.07	50
10	796.6	16.5	33	422	4	51	29	69	371	12	0.23	45
11	797.5	16.1	51	637	13	162	38	60	475	24	0.37	25
12	798.6	17.9	49	680	17	236	32	59	444	48	0.75	20
13	799.5	15.9	32	395	2	25	30	63	370	20	0.33	25
14	800.5	17.4	33	445	0	0	33	43	445	0	Imp.	-
15	801.5	14.2	43	474	0	0	43	44	474	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

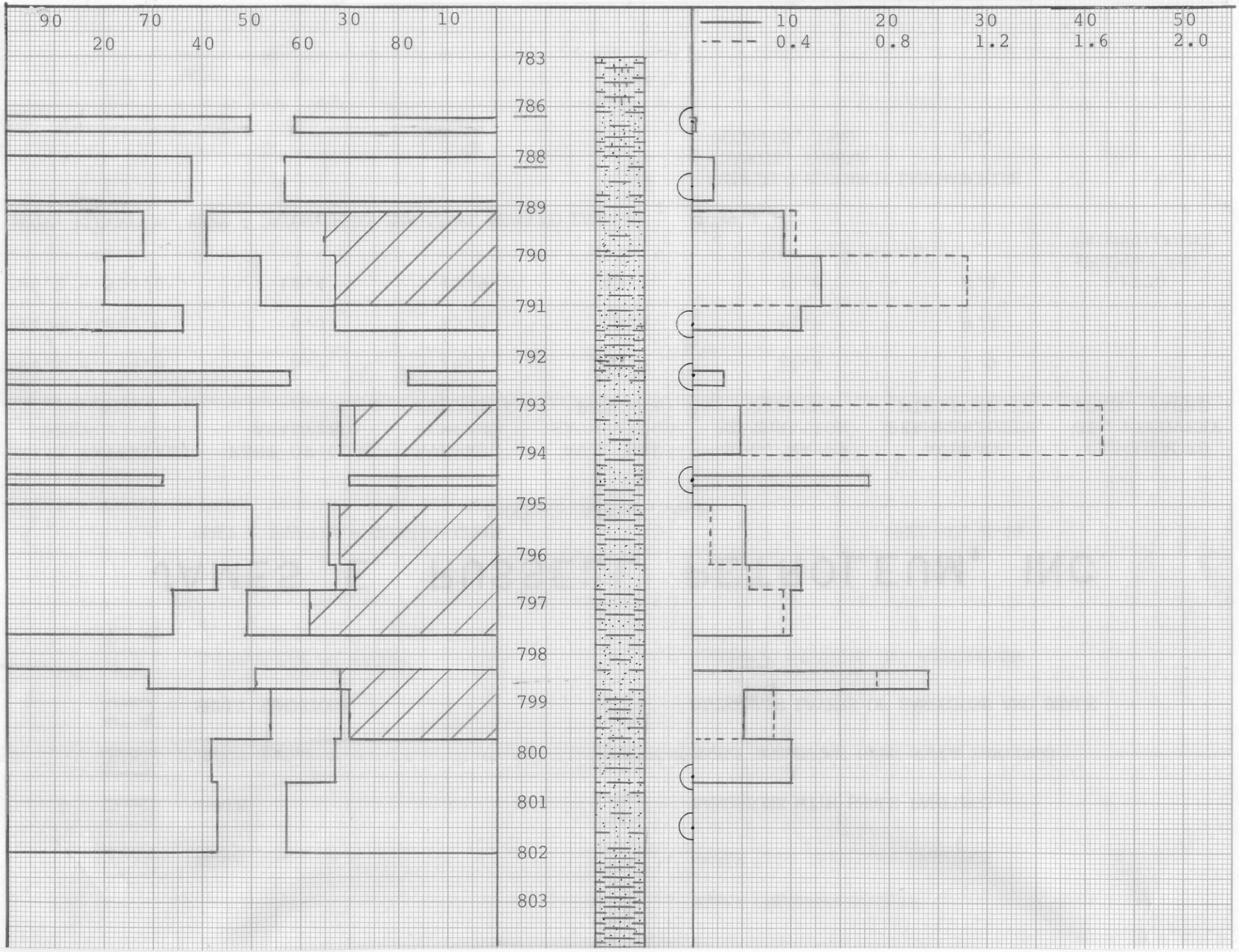
SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company James E. Russell Petroleum, Inc. Lease Unit 2 (Martin-Glover) Well No. R-40

Depth Interval, Feet	786.2 - 794.6	795.0 - 802.0	786.2 - 802.0
Feet of Core Analyzed	2.9	4.0	6.9
Average Percent Porosity	15.4	15.9	15.7
Average Percent Original Oil Saturation	45.9	38.7	41.7
Average Percent Oil Recovery	13.7	6.2	9.3
Average Percent Residual Oil Saturation	32.2	32.5	32.4
Average Percent Residual Water Saturation	60.2	62.1	61.3
Average Percent Total Residual Fluid Saturation	92.4	94.6	93.7
Average Original Oil Content, Bbls./A. Ft.	539.	481.	505.
Average Oil Recovery, Bbls./A. Ft.	156.	80.	112.
Average Residual Oil Content, Bbls./A. Ft.	383.	401.	393.
Total Original Oil Content, Bbls./Acre	1,565.	1,921.	3,486.
Total Oil Recovery, Bbls./Acre	453.	319.	772.
Total Residual Oil Content, Bbls./Acre	1,112.	1,602.	2,714.
Average Effective Permeability, Millidarcys	1.09	0.29	0.63
Average Initial Fluid Production Pressure, p.s.i.	20.0	33.0	28.1

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
90 70 50 30 10
20 40 60 80
10 20 30 40 50
0.4 0.8 1.2 1.6 2.0
783
786
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803

KEY:

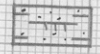

SANDSTONE

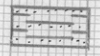

SHALE


SANDY SHALE


SHALY SANDSTONE


IMPERMEABLE TO WATER


SANDY CALCAREOUS SHALE


SHALE WITH SANDSTONE PARTINGS


SANDSTONE WITH SHALE PARTINGS


SHALY SANDSTONE WITH SHALE PARTINGS


ALTERNATE LAYERS OF SANDSTONE AND SHALE


FLOODPOT RESIDUAL OIL SATURATION

JAMES E. RUSSELL PETROLEUM, INC.

UNIT 2 (MARTIN - GLOVER) LEASE

WELL NO. R-40

ANDERSON COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY BBLS. /ACRE
786.2 - 794.6	5.1	16.1	41.6	34.4	7.5	
795.0 - 802.0	6.3	15.8	38.8	43.8	9.1	
786.2 - 802.0	11.4	15.9	40.1	39.6	8.3	1770 (PRIMARY AND WATERFLOODING)

NOTE: ELEVATION, FEET - DATUM: MEAN SEA LEVEL (GROUND LEVEL) 1089.3

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
DECEMBER, 1982

PDC