

# OILFIELD RESEARCH LABORATORIES

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

November 29, 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 (H. V. Scully) Lease, Well No. R-34, located in Anderson County, Kansas and submitted to our laboratory on November 22, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

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**

Unit 2

Company James E. Russell Petroleum, Inc. Lease (H. V. Scully) Well No. R-34  
 Location 1960' EWL and 2600' SNL, SE¼  
 Section 29 Twp. 22S Rge. 19E County Anderson State Kansas

Elevation, Feet ..... Datum: Mean Sea Level (Ground Level) 1085.1

Name of Sand ..... Squirrel

Top of Core ..... 773.0

Bottom of Core ..... 794.0

Top of Sand ..... 776.0

Bottom of Sand ..... 794.0

Total Feet of Permeable Sand ..... 12.2

Total Feet of Floodable Sand ..... 6.2

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 10	7.2	7.2
14 - 23	1.8	9.0
47 - 80	3.2	12.2

Average Permeability Millidarcys ..... 23.9

Average Percent Porosity ..... 17.1

Average Percent Oil Saturation ..... 38.7

Average Percent Water Saturation ..... 45.2

Average Oil Content, Bbls./A. Ft. .... 513.

Total Oil Content, Bbls./Acre ..... 7,795.

Average Percent Oil Recovery by Laboratory Flooding Tests ..... 5.7

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. .... 83.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre ..... 513.

Total Calculated Oil Recovery, Bbls./Acre ..... See "Calculated Recovery"

Section

-2-

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 non-virgin area.

#### FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
773.0 - 776.0	Shale, gray, slightly sandy.
776.0 - 779.4	Sandstone, very shaly, grayish light brown.
779.4 - 779.8	Sandstone, shaly, grayish light brown.
779.8 - 783.0	Sandstone, brown.
783.0 - 785.4	Sandstone, brown with scattered gray shale partings.
785.4 - 786.2	Sandstone, brown.
786.2 - 787.0	Sandstone, shaly, brown.
787.0 - 789.5	Sandstone, brown with scattered gray shale partings.
789.5 - 790.8	Sandstone, shaly, grayish brown.
790.8 - 791.6	Sandstone, slightly shaly, brown.
791.6 - 794.0	Sandstone, very shaly, grayish brown.

#### LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 513 barrels of oil per acre was obtained from 6.2 feet of sand. The weighted average percent oil saturation was reduced from 39.4 to 33.7, or represents an average recovery of 5.7 percent. The weighted average effective permeability of the samples

-3-

is 3.58 millidarcys, while the average initial fluid production pressure is 22.1 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 16 samples tested, 7 produced water and oil, and 2 samples water only. This indicates that approximately 44 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 1,620 barrels of oil per acre. This is an average recovery of 262 barrels per acre foot from 6.2 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	30.0
Average porosity, percent	18.6
Oil saturation after flooding, percent	33.7
Performance factor, percent, estimated	55.0
Net floodable sand, feet	6.2

**Oilfield Research Laboratories**  
**RESULTS OF SATURATION & PERMEABILITY TESTS**

**TABLE 1-B**

Company James E. Russell Petroleum, Inc. Lease Unit 2 (H. V. Scully) Well No. R-34

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	776.5	13.4	47	50	489	Imp.	1.0	1.0	489	0.00
2	777.5	13.6	33	56	348	Imp.	1.0	2.0	348	0.00
3	779.5	17.7	42	44	577	3.0	0.4	2.4	231	1.20
4	780.6	19.1	31	45	459	78.	1.2	3.6	551	93.60
5	781.6	19.6	40	35	608	79.	1.0	4.6	608	79.00
6	782.7	19.7	43	39	657	47.	1.0	5.6	657	47.00
7	783.5	15.7	45	42	548	5.2	1.0	6.6	548	5.20
8	785.5	19.0	35	39	516	14.	0.8	7.4	413	11.20
9	786.4	18.6	43	50	621	5.0	0.8	8.2	497	4.00
10	787.7	19.4	34	42	512	22.	1.0	9.2	512	22.00
11	788.6	18.1	35	62	492	9.9	1.5	10.7	738	14.85
12	789.6	17.4	33	50	446	5.1	0.7	11.4	312	3.57
13	790.5	18.4	47	31	671	3.5	0.6	12.0	403	2.10
14	791.5	16.9	42	37	551	7.8	0.8	12.8	441	6.24
15	792.5	15.9	40	41	493	0.98	1.4	14.2	690	1.37
16	793.7	12.8	36	46	357	Imp.	1.0	15.2	357	0.00

# Oilfield Research Laboratories

## SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Inc. Lease Unit 2 (H. V. Scully) Well No. R-34

Depth Interval, Feet	Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
776.0 - 787.0	776.0 - 787.0	6.2	38.9	241.20	17.3	39.6	44.5	530	4,342
787.0 - 794.0	787.0 - 794.0	6.0	8.4	50.13	16.9	37.6	45.9	493	3,453
776.0 - 794.0	776.0 - 794.0	12.2	23.9	291.33	17.1	38.7	45.2	513	7,795

# Oilfield Research Laboratories

## RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Inc. Lease Unit 2 (H. V. Scully) Well No. R-34

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	776.5	13.7	46	489	0	0	48	50	0	Imp.	-
2	777.5	13.4	34	353	0	0	34	56	0	Imp.	-
3	779.5	17.8	42	580	2	28	40	58	28	0.43	30
4	780.6	19.2	31	462	2	30	29	61	420	6.07	20
5	781.6	19.6	40	608	7	106	33	58	338	7.65	20
6	782.7	19.6	43	654	12	182	31	59	260	3.67	20
7	783.5	15.8	45	552	6	74	39	52	108	1.67	20
8	785.5	18.8	35	510	4	58	31	64	60	0.90	25
9	786.4	18.7	43	624	5	73	38	48	102	1.27	20
10	787.7	19.9	33	509	0	0	33	45	0	Imp.	-
11	788.6	18.0	35	489	0	0	35	62	34	0.50	30
12	789.6	16.9	34	446	0	0	34	60	6	0.15	50
13	790.5	18.8	46	671	0	0	46	32	0	Imp.	-
14	791.5	16.8	42	547	0	0	42	38	0	Imp.	-
15	792.5	15.6	42	508	0	0	41	41	0	Imp.	-
16	793.7	13.1	35	356	0	0	35	48	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

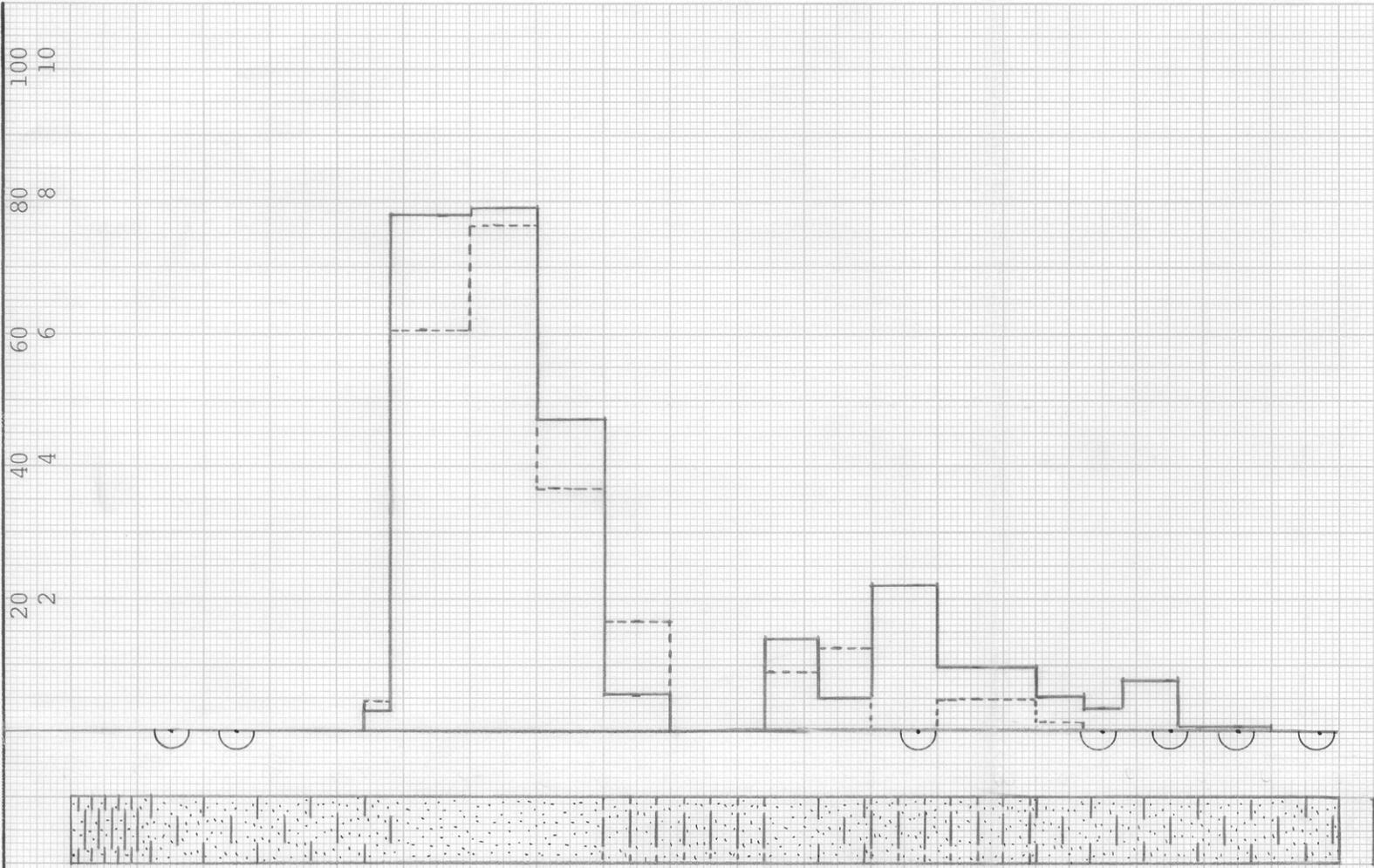
TABLE V

Company James E. Russell Petroleum, Inc. Lease Unit 2 (H. V. Scully) Well No. R-34

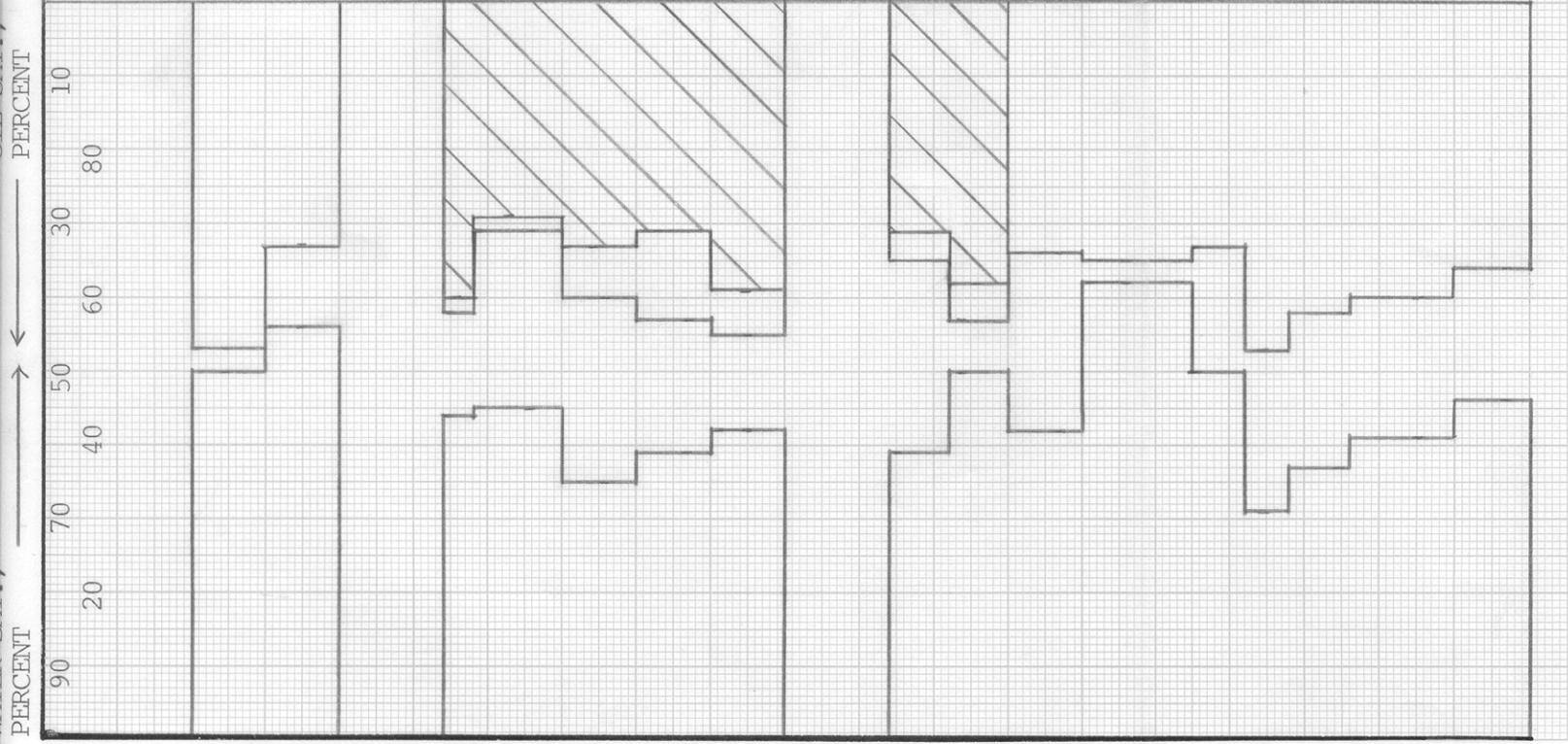
Depth Interval, Feet	776.0 - 787.0
Feet of Core Analyzed	6.2
Average Percent Porosity	18.6
Average Percent Original Oil Saturation	39.4
Average Percent Oil Recovery	5.7
Average Percent Residual Oil Saturation	33.7
Average Percent Residual Water Saturation	57.3
Average Percent Total Residual Fluid Saturation	91.0
Average Original Oil Content, Bbls./A. Ft.	566.
Average Oil Recovery, Bbls./A. Ft.	83.
Average Residual Oil Content, Bbls./A. Ft.	483.
Total Original Oil Content, Bbls./Acre	3,507.
Total Oil Recovery, Bbls./Acre	513.
Total Residual Oil Content, Bbls./Acre	2,994.
Average Effective Permeability, Millidarcys	3.58
Average Initial Fluid Production Pressure, p.s.i.	22.1

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

--- EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCY

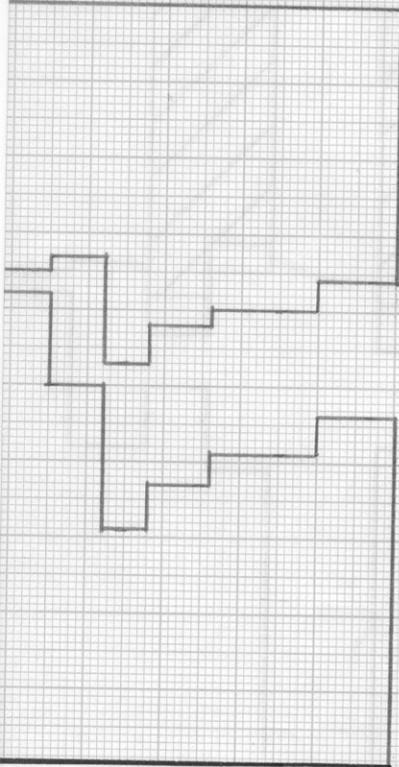


773 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794



PERCENT ← → PERCENT

789  
790  
791  
792  
793  
794



KEY:



SANDSTONE



IMPERMEABLE TO WATER



FLOODPOT RESIDUAL OIL SATURATION

SANDY SHALE

SHALY SANDSTONE

SANDSTONE WITH SHALE PARTINGS

# JAMES E. RUSSELL PETROLEUM, INC.

UNIT 2 (H.V. SCULLY) LEASE

WELL NO. R-34

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
776.0 - 787.0	8.2	17.3	39.6	44.5	38.9	
787.0 - 794.0	7.0	16.9	37.6	45.9	8.4	
776.0 - 794.0	15.2	17.1	38.7	45.2	23.9	1620 (PRIMARY AND WATERFLOODING)

NOTE: ELEVATION, FEET - DATUM: MEAN SEA LEVEL (GROUND LEVEL) 1085.1

OILFIELD RESEARCH LABORATORIES  
CHANUTE, KANSAS  
NOVEMBER, 1982  
PDC