

OILFIELD RESEARCH LABORATORIES

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

May 14, 1981

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 (S. W. Boone) Lease, Well No. R-25, located in Anderson County, Kansas and submitted to our laboratory on April 29, 1981.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

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

- REGISTERED ENGINEERS -

CORE ANALYSIS - WATER ANALYSIS - REPRESSURING ENGINEERING - SURVEYING & MAPPING - PROPERTY EVALUATION & OPERATION

Ottfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Unit 2

Company James E. Russell Petroleum, Inc. Lease (S. W. Boone) Well No. R-25

Location 60' EWL & 680' SNL NW $\frac{1}{4}$

Section 33 Twp. 22S Rge. 19E County Anderson State Kansas

Elevation, Feet Datum: Mean Sea Level (Ground Level) 1086.2

Name of Sand Squirrel

Top of Core 773.0

Bottom of Core 792.7

Top of Sand 773.0

Bottom of Sand 786.3

Total Feet of Permeable Sand 13.3

Total Feet of Floodable Sand 3.0

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 3	5.0	5.0
3 - 10	2.0	7.0
10 - 25	4.4	11.4
70 - 100	1.9	13.3

Average Permeability Millidarcys 18.6

Average Percent Porosity 17.0

Average Percent Oil Saturation 39.6

Average Percent Water Saturation 40.5

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

Total Oil Content, Bbls./Acre 6,822.

Average Percent Oil Recovery by Laboratory Flooding Tests 3.7

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. 54.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre 162.

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 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 - 773.9	Sandstone, shaly, grayish light brown.
773.9 - 777.0	Sandstone, light brown, slightly calcareous.
777.0 - 777.8	Sandstone, shaly, slightly calcareous, brown.
777.8 - 779.7	Sandstone, light brown, slightly calcareous.
779.7 - 786.3	Sandstone and shale, light brown and gray laminated.
786.3 - 792.7	Shale, gray, sandy.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 162 barrels of oil per acre was obtained from 3.0 feet of sand. The weighted average percent oil saturation was reduced from 37.9 to 34.2, or represents an average recovery of 3.7 percent. The weighted average effective permeability of the samples is 2.18 millidarcys, while the average initial fluid production pressure is 28.3 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 13 samples tested, 3 produced water and oil. This indicates that approximately 23 percent of the sand represented by these samples is floodable pay sand.

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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 810 barrels of oil per acre. This is an average recovery of 270 barrels per acre foot from 3.0 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	25.0
Average porosity, percent	18.7
Oil saturation after flooding, percent	34.2
Performance factor, percent, estimated	50.0
Net floodable sand, feet	3.0

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease Unit 2 (S. W. Boone) Well No. R-25

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	773.4	14.7	14	65	79	160	1.0	0.9	0.9	144	0.90
2	774.5	16.5	41	46	87	525	10.	1.1	2.0	578	11.00
3	775.5	18.6	29	49	78	419	14.	1.0	3.0	419	14.00
4	776.5	18.9	35	45	80	513	14.	1.0	4.0	513	14.00
5	777.5	14.6	47	50	97	532	0.87	0.8	4.8	426	0.70
6	778.6	20.4	32	43	75	506	71.	0.9	5.7	455	63.90
7	779.6	20.0	40	25	65	621	97.	1.0	6.7	621	97.00
8	780.5	16.4	49	40	89	623	4.9	1.0	7.7	623	4.90
9	781.5	11.9	58	32	90	535	0.22	1.0	8.7	535	0.22
10	782.4	20.6	35	31	66	559	21.	1.3	10.0	727	27.30
11	783.5	14.9	51	29	88	590	2.9	1.2	11.2	708	3.48
12	784.5	17.2	40	37	77	534	7.4	1.0	12.2	534	7.40
13	785.5	15.4	41	44	85	490	2.0	1.1	13.3	539	2.20

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		James E. Russell Petroleum, Inc.		Lease		Unit 2 (S. W. Boone)		Well No.		R-25	
Depth Interval, Feet		Feet of Core Analyzed		Average Permeability, Millidarcys		Permeability Capacity Ft. x Md.					
773.0 - 779.7		6.7		30.1		201.50					
779.7 - 786.3		6.6		6.9		45.50					
773.0 - 786.3		13.3		18.6		247.00					
Depth Interval, Feet		Feet of Core Analyzed		Average Percent Oil Saturation		Average Percent Water Saturation		Average Oil Content Bbl./A. Ft.		Total Oil Content Bbls./Acre	
773.0 - 779.7		6.7		17.8		34.0		45.8		471	
779.7 - 786.3		6.6		16.2		45.3		35.2		555	
773.0 - 786.3		13.3		17.0		39.6		40.5		513	
										3,156	
										3,666	
										6,822	

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company			James E. Russell Petroleum, Inc.			Lease		Unit 2 (S. W. Boone)			Well No.		R-25	
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.		
			%	Bbbls./A. Ft.	%	Bbbls./A. Ft.	% Oil	% Water	Bbbls./A. Ft.					
1	773.4	14.8	14	161	0	0	14	67	161	0	Imp.	-		
2	774.5	16.4	41	522	4	51	37	54	471	26	0.93	40		
3	775.5	18.2	30	424	0	0	30	50	424	0	Imp.	-		
4	776.5	19.4	34	512	0	0	34	46	512	0	Imp.	-		
5	777.5	14.5	47	529	0	0	47	50	529	0	Imp.	-		
6	778.6	20.2	32	501	2	31	30	57	470	124	1.95	20		
7	779.6	20.0	40	621	5	78	35	56	543	232	3.75	25		
8	780.5	16.7	48	622	0	0	48	42	622	0	Imp.	-		
9	781.5	11.9	58	535	0	0	58	32	535	0	Imp.	-		
10	782.4	20.3	36	567	0	0	36	35	567	0	Imp.	-		
11	783.5	14.9	51	590	0	0	51	30	590	0	Imp.	-		
12	784.5	17.7	39	536	0	0	39	39	536	0	Imp.	-		
13	785.5	15.2	42	495	0	0	42	45	495	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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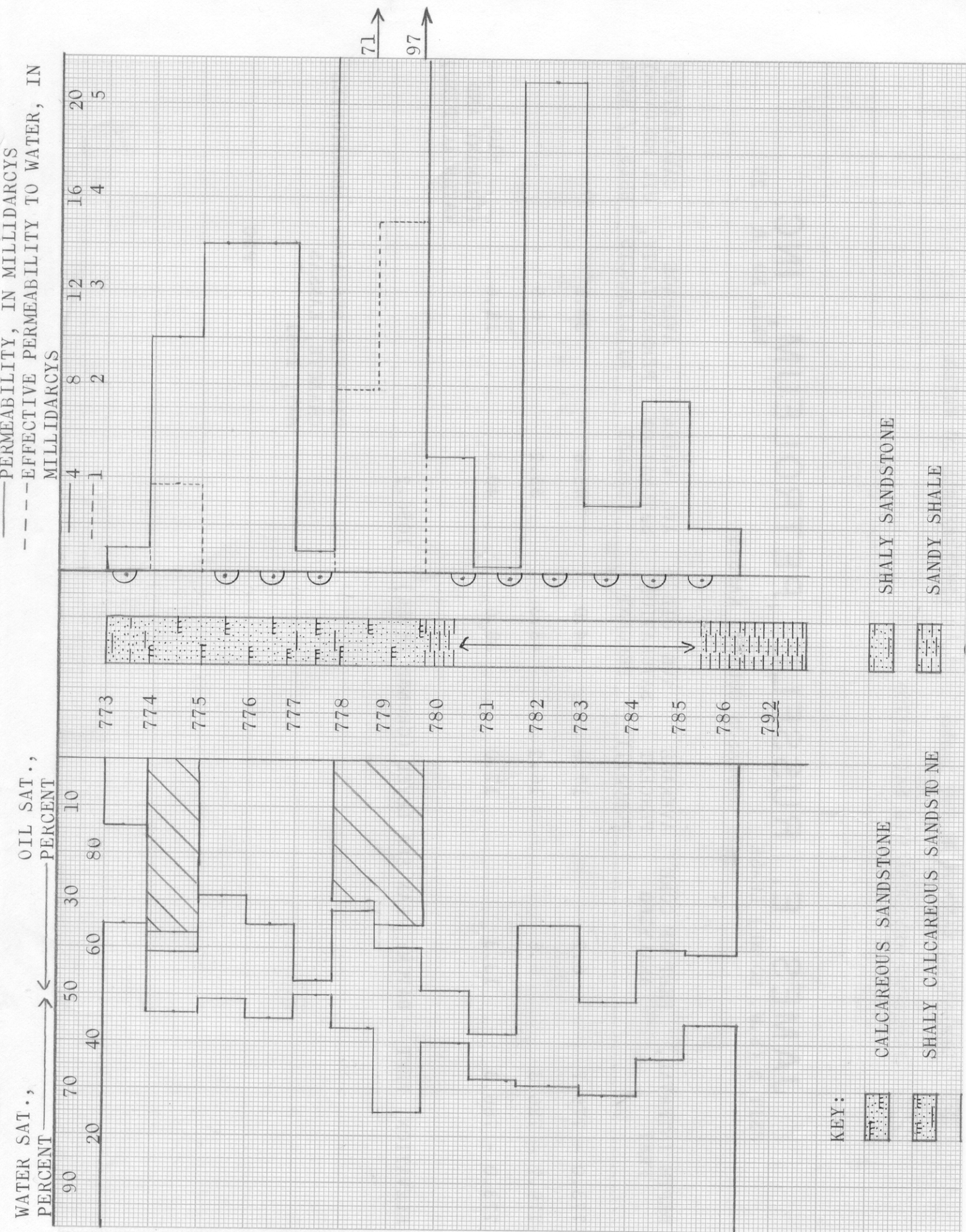
SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company James E. Russell Petroleum, Inc. Lease Unit 2 (S. W. Boone) Well No. R-25

Depth Interval, Feet	773.0 - 779.7
Feet of Core Analyzed	3.0
Average Percent Porosity	18.7
Average Percent Original Oil Saturation	37.9
Average Percent Oil Recovery	3.7
Average Percent Residual Oil Saturation	34.2
Average Percent Residual Water Saturation	55.6
Average Percent Total Residual Fluid Saturation	89.8
Average Original Oil Content, Bbls./A. Ft.	549.
Average Oil Recovery, Bbls./A. Ft.	54.
Average Residual Oil Content, Bbls./A. Ft.	495.
Total Original Oil Content, Bbls./Acre	1,646.
Total Oil Recovery, Bbls./Acre	162.
Total Residual Oil Content, Bbls./Acre	1,484.
Average Effective Permeability, Millidarcys	2.18
Average Initial Fluid Production Pressure, p.s.i.	28.3

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



 LAMINATED SANDSTONE AND SHALE  IMPERMEABLE TO WATER

 FLOODPOT RESIDUAL OIL SATURATION

JAMES E. RUSSELL PETROLEUM, INC.

UNIT 2 (S.W. BOONE) LEASE

WELL NO. R - 25

ANDERSON COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE POROSITY PERCENT	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY BBLs. / ACRE
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773.0 - 779.7	6.7	17.8	34.0	45.8	30.1	
779.7 - 786.3	6.6	16.2	45.3	35.2	6.9	
773.0 - 786.3	13.3	17.0	39.6	40.5	18.6	810 (PRIMARY AND WATERFLOODING)

ELEVATION, FEET - DATUM: MEAN SEA LEVEL (GROUND LEVEL) 1086.2

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
MAY, 1981

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