

OILFIELD RESEARCH LABORATORIES

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

January 10, 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 core taken from the Ard Lease, Well No. W-2, Allen County, Kansas, and submitted to our laboratory on January 6, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Benjamin R. Pearman

BRP:km

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

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GENERAL INFORMATION & SUMMARY

Company	James E. Russell Petroleum, Inc.	Lease	Ard	Well No.	W-2
Location	390' WEL & 250' NSL SE $\frac{1}{4}$				
Section	10	Twp	26S	Rge	20E
		County	Allen		State
					Kansas
Name of Sand					Bartlesville
Top of Core					695.0
Bottom of Core					716.5
Top of Sand					696.5
Bottom of Sand					702.6
Total Feet of Permeable Sand					3.1
Total Feet of Floodable Sand					2.1
Distribution of Permeable Sand:					
Permeability Range Millidarcys	Feet		Cum. Ft.		
0 - 5	1.0		1.0		
5 - 30	2.1		3.1		
Average Permeability Millidarcys					18.9
Average Percent Porosity					15.7
Average Percent Oil Saturation					45.5
Average Percent Water Saturation					43.2
Average Oil Content, Bbls./A. Ft.					5553.
Total Oil Content, Bbls./Acre					1,714.
Average Percent Oil Recovery by Laboratory Flooding Tests					13.6
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.					165.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre					346.
Total Calculated Oil Recovery, Bbls./Acre	(Primary & Waterflooding)				395.
Packer Setting, Feet					
Viscosity, Centipoises @					
A. P. I. Gravity, degrees @ 60 °F					
Elevation, Feet	(Ground Level)				984.5

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

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
695.0 - 696.5	Gray sandy shale.
696.5 - 697.0	Light brown sandstone.
697.0 - 697.5	Gray sandy shale.
697.5 - 698.0	Light brown slightly shaly sandstone.
698.0 - 699.3	Brown sandstone.
699.3 - 701.8	Gray shale.
701.8 - 702.6	Brown sandstone.
702.6 - 716.5	Gray shale.

SUMMARY

It would appear from a study of the data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 395 barrels of oil per acre. This is an average recovery of 188 barrels per acre foot from the 2.1 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	1.05
Reservoir water saturation, percent	30.0
Average porosity, percent	14.9

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Oil saturation after flooding, percent	34.2
Performance factor, percent	50.0
Net floodable pay sand, feet	2.1

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease Ard Well No. W-2

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	696.8	16.4	33	50	83	420	4.5	0.5	0.5	210	2.25
2	697.8	16.4	48	46	94	611	4.3	0.5	1.0	306	2.15
3	698.6	14.1	49	44	93	537	25.	1.3	2.3	701	32.50
4	702.5	17.4	46	36	82	621	27.	0.8	3.1	497	21.60

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company James E. Russell Petroleum, Inc. Lease Ard Well No. W-2

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
696.5 - 702.6	3.1	18.9	58.50

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
696.5 - 702.6	3.1	15.7	45.5	43.2	553	1,714

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company James E. Russell Petroleum, Inc. Lease Ard Well No. W-2

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	696.8	16.2	33	415	0	0	33	57	415	0	Imp.	-
2	697.8	16.9	48	630	0	0	48	45	630	0	Imp.	-
3	698.6	14.6	49	555	14	159	35	62	396	40	0.98	35
4	702.5	17.2	46	614	13	174	33	63	440	19	0.41	35

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.

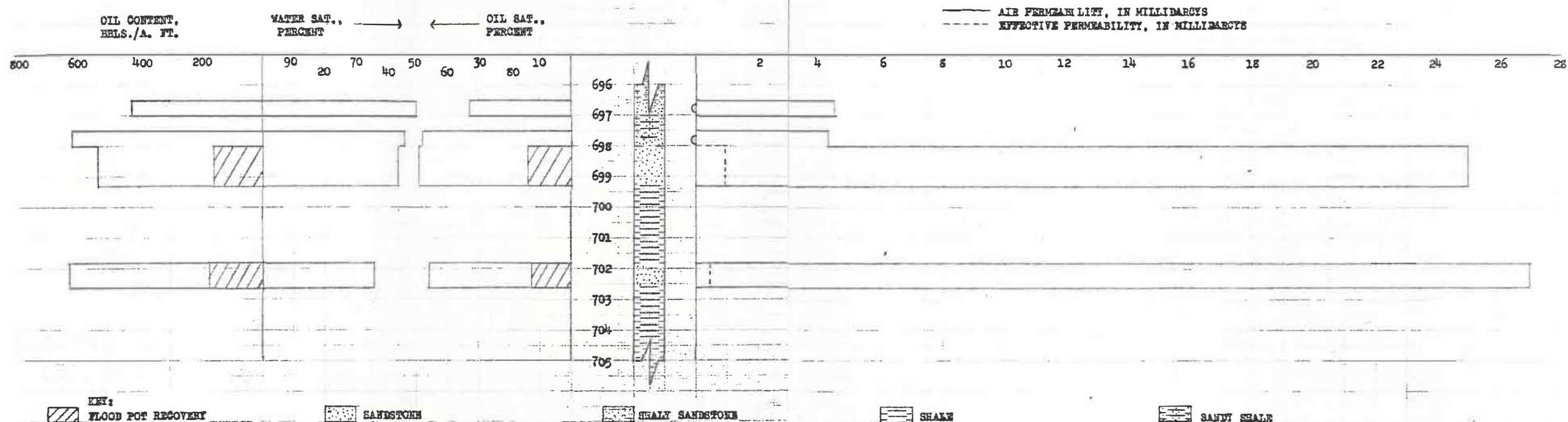
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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	James E. Russell Petroleum, Inc.	Lease	Ard	Well No.	W-2
Depth Interval, Feet	696.5 - 702.6				
Feet of Core Analyzed	2.1				
Average Percent Porosity	14.9				
Average Percent Original Oil Saturation	47.8				
Average Percent Oil Recovery	13.6				
Average Percent Residual Oil Saturation	34.2				
Average Percent Residual Water Saturation	62.4				
Average Percent Total Residual Fluid Saturation	96.6				
Average Original Oil Content, Bbls./A. Ft.	578.				
Average Oil Recovery, Bbls./A. Ft.	165.				
Average Residual Oil Content, Bbls./A. Ft.	413.				
Total Original Oil Content, Bbls./Acre	1,213.				
Total Oil Recovery, Bbls./Acre	346.				
Total Residual Oil Content, Bbls./Acre	867.				
Average Effective Permeability, Millidarcys	0.76				
Average Initial Fluid Production Pressure, p.s.i.	35.				

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



JAMES E. RUSSELL PETROLEUM, INC.

ARD LEASE

ALLAM COUNTY, KANSAS

WELL NO. K-2

OILFIELD RESEARCH LABORATORIES
CHANNUTE, KANSAS
JANUARY, 1979.

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVG. OIL CONTENT BELS./A. FT.	TOTAL OIL CONTENT BELS./ACRE	AVG. AIR PERMEABILITY, MILLIDARCY	CALCULATED OIL RECOVERY, BELS./ACRE
696.5 - 702.6	5.1	15.7	45.5	43.2	553	1,714	18.9	395 (PRIMARY & WATERFLOODING)