



OILFIELD RESEARCH LABORATORIES

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September 22, 1978

Walter D. Wells, Jr., Inc.
7757 San Felipe Rd.
Suite 200
Houston, Texas 77063

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the C. Watts Lease, Well No. 4-FF, Neosho County, Kansas, and submitted to our laboratory on September 14, 1978.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman
Benjamin R. Pearman

BRP:cb

4 c to Houston, Texas
1 c to Chanute, Kansas

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GENERAL INFORMATION & SUMMARY

Company Walter D. Wells, Jr., Inc. Lease C. Watts Well No. 4-FF

Location _____

Section 32 Twp 27S Rge. 19E County Neosho State Kansas

Name of Sand	- - - - -	Cattleman
Top of Core	- - - - -	709.0
Bottom of Core	- - - - -	715.0
Top of Sand	- - - - -	709.0
Bottom of Sand	- - - - -	713.1
Total Feet of Permeable Sand	- - - - -	4.1
Total Feet of Floodable Sand	- - - - -	2.4

Distribution of Permeable Sand:
Permeability Range
Millidarcys

	Feet	Cum. Ft.
5 - 15	1.7	1.7
60 - 105	2.4	4.1

Average Permeability Millidarcys	- - - - -	51.5
Average Percent Porosity	- - - - -	17.1
Average Percent Oil Saturation	- - - - -	35.5
Average Percent Water Saturation	- - - - -	36.2
Average Oil Content, Bbls./A. Ft.	- - - - -	500.
Total Oil Content, Bbls./Acre	- - - - -	2,052.
Average Percent Oil Recovery by Laboratory Flooding Tests	- - - - -	3.0
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	- - - - -	44.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	- - - - -	106.
Total Calculated Oil Recovery, Bbls./Acre (Primary & Waterflooding)	- - - - -	650.
Packer Setting, Feet	- - - - -	
Viscosity, Centipoises @	- - - - -	
A. P. I. Gravity, degrees @ 60 °F	- - - - -	
Elevation, Feet	- - - - -	

Fresh water mud was used as the circulating fluid while taking this core. The well was reportedly drilled in non-virgin territory. The core was sampled in the laboratory approximately four hours after being cut.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
709.0 - 710.7	Brown and gray laminated sandstone and shale.
710.7 - 713.1	Brown sandstone.
713.1 - 715.0	Gray shale.

SUMMARY

A study of the results of the laboratory tests indicates that efficient primary and waterflooding operations in the vicinity of this well should recover approximately 650 barrels of oil per acre. This is an average recovery of 270 barrels per acre foot from the 2.4 feet of floodable pay sand analyzed in this core.

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

Original formation volume factor	1.06
Reservoir water saturation, percent	20.0
Average porosity, percent	19.0
Oil saturation after flooding, percent	38.9
Performance factor, percent	50.0
Net floodable pay sand, feet	2.4

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Walter D. Wells, Jr., Inc. Lease C. Watts Well No. 4-FF

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.	Conn. Ft.		
1	709.3	11.0	10	81	91	86	15.	0.8	0.8	69	12.00
2	710.4	17.0	41	31	72	541	5.3	0.9	1.7	487	4.77
3	711.6	19.5	41	24	65	620	61.	1.3	3.0	806	79.30
4	712.5	18.8	43	22	65	627	105.	1.1	4.1	690	115.50

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Walter D. Wells, Jr., Inc.	Lease	C. Watts	Well No.	4-FF
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
709.0 - 713.1	4.1	51.5	211.57		
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
709.0 - 713.1	4.1	17.1	35.5	36.2	500
					2,052

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company		Walter D. Wells, Jr., Inc.		Lease		C. Watts		Well No.		4-FF	
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	709.3	11.3	9	79	0	0	9	85	0	Imp.	-
2	710.4	16.8	41	534	0	0	41	36	0	Imp.	-
3	711.6	19.3	41	614	3	45	38	60	49	1.68	20
4	712.5	18.5	43	617	3	43	40	58	370	10.63	20

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	Walter D. Wells, Jr., Inc.	Lease	C. Watts	Well No.	4-FF
Depth Interval, Feet	709.0 - 713.1				
Feet of Core Analyzed	2.4				
Average Percent Porosity	19.0				
Average Percent Original Oil Saturation	41.9				
Average Percent Oil Recovery	3.0				
Average Percent Residual Oil Saturation	38.9				
Average Percent Residual Water Saturation	59.0				
Average Percent Total Residual Fluid Saturation	97.9				
Average Original Oil Content, Bbls./A. Ft.	615.				
Average Oil Recovery, Bbls./A. Ft.	44.				
Average Residual Oil Content, Bbls./A. Ft.	571.				
Total Original Oil Content, Bbls./Acre	1,477.				
Total Oil Recovery, Bbls./Acre	106.				
Total Residual Oil Content, Bbls./Acre	1,371.				
Average Effective Permeability, Millidarcys	5.78				
Average Initial Fluid Production Pressure, p.s.i.	20.0				

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