

OILFIELD RESEARCH LABORATORIES

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

August 31, 1982

Gerald Williams Production
113 South Kansas
Olathe, Kansas 66061

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Alberti Lease, Well No. 19, located in Miami County, Kansas and submitted to our laboratory on August 26, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/rmc

4 c to Olathe, Kansas
1 c to Rantoul, Kansas

- REGISTERED ENGINEERS -

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

Oilfield Research Laboratories
GENERAL INFORMATION & SUMMARY

Company Gerald Williams Production Lease Alberti Well No. 19
 Location 500' FSL and 550' FEL, NW $\frac{1}{4}$
 Section 30 Twp. 16S Rge. 22E County Miami State Kansas

Elevation, Feet

Name of Sand.....

Squirrel

Top of Core

672.0

Bottom of Core

692.0

Top of Sand

672.0

Bottom of Sand

687.0

Total Feet of Permeable Sand

11.3

Total Feet of Floodable Sand

5.0

Distribution of Permeable Sand:
 Permeability Range
 Millidarcys

Feet

Cum. Ft.

0 - 5

3.7

3.7

5 - 10

4.8

8.5

10 - 25

2.8

11.3

Average Permeability Millidarcys

7.0

Average Percent Porosity

14.4

Average Percent Oil Saturation

28.0

Average Percent Water Saturation

60.2

Average Oil Content, Bbls./A. Ft.

343.

Total Oil Content, Bbls./Acre

4,633.

Average Percent Oil Recovery by Laboratory Flooding Tests

4.9

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

61.

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

306.

Total Calculated Oil Recovery, Bbls./Acre

See "Calculated Recovery"
 Section

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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:

<u>Depth Interval, Feet</u>	<u>Description</u>
672.0 - 673.0	Gray slightly calcareous very shaly sandstone.
673.0 - 673.6	Grayish brown very shaly sandstone containing a vertical fracture.
673.6 - 674.0	Gray sandy limestone containing a vertical fracture.
674.0 - 676.0	Brown slightly calcareous shaly sandstone.
676.0 - 678.0	Brown slightly shaly sandstone.
678.0 - 678.8	Light brown shaly sandstone.
678.8 - 680.5	Grayish brown very shaly sandstone.
680.5 - 681.7	Alternate layers gray shale and brown sandstone.
681.7 - 682.2	Grayish brown very shaly sandstone.
682.2 - 683.8	Brown sandstone.
683.8 - 685.0	Gray very shaly sandstone.
685.0 - 686.0	Gray shale.
686.0 - 687.0	Grayish brown shaly sandstone.
687.0 - 692.0	Gray shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 306 barrels of oil per acre was obtained from 5.0 feet of sand. The weighted average percent oil saturation was reduced from 36.3 to 31.4, or represents an average recovery of 4.9 percent.

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The weighted average effective permeability of the samples is 0.40 millidarcys, while the average initial fluid production pressure is 36.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 14 samples tested, 5 produced water and oil, and 1 sample water only. This indicates that approximately 35 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 750 barrels of oil per acre. This is an average recovery of 150 barrels per acre foot from 5.0 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	40.0
Average porosity, percent	16.7
Oil saturation after flooding, percent	31.4
Performance factor, percent, estimated	45.0
Net floodable sand, feet	5.0

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Gerald Williams Production Lease Alberti Well No. 19

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	672.5	6.6	13	82	95	67	Imp.	1.0	1.0	67	0.00
2	673.5	8.8	25	72	97	171	0.98	0.6	1.6	103	0.59
3	674.5	12.4	36	45	81	346	1.5	1.4	3.0	484	2.10
4	675.5	16.4	35	45	80	445	5.6	1.0	4.0	445	5.60
5	676.4	16.4	44	47	91	560	8.0	1.0	5.0	560	8.00
6	677.4	17.7	29	50	79	398	8.2	1.0	6.0	398	8.20
7	678.4	19.4	37	47	84	557	5.5	0.8	6.8	446	4.40
8	679.6	15.6	14	82	96	169	0.38	1.7	8.5	287	0.65
9	680.6	21.1	32	41	73	524	23.	0.6	9.1	314	13.80
10	681.6	20.8	40	51	91	645	11.	0.6	9.7	387	6.60
11	682.5	20.9	33	48	81	535	10.	1.0	10.7	535	10.00
12	683.5	19.8	32	56	88	492	24.	0.6	11.3	295	14.40
13	684.5	4.1	5	91	96	16	Imp.	1.2	12.5	19	0.00
14	686.5	10.2	37	60	97	293	5.2	1.0	13.5	293	5.20

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		Gerald Williams Production		Lease	Alberti	Well No.		19
Depth Interval, Feet		Feet of Core Analyzed		Average Permeability, Millidarcys		Permeability Capacity Ft. x Md.		
672.0 - 687.0		11.3		7.0		79.54		
Depth Interval, Feet		Feet of Core Analyzed		Average Percent Oil Saturation		Average Percent Water Saturation		Total Oil Content Bbls./Acre
672.0 - 687.0		13.5		14.4		28.0		4,633
						60.2		343

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Gerald Williams Production										Lease		Alberti		Well No.		19	
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	672.5	6.7	13	68	0	0	13	83	68	0	Imp.	-					
2	673.5	8.7	25	169	0	0	25	72	169	0	Imp.	-					
3	674.5	12.4	36	346	6	58	30	61	288	14	0.22	30					
4	675.5	16.5	35	448	6	77	29	60	371	6	0.22	35					
5	676.4	16.4	44	560	5	64	39	58	496	4	0.15	45					
6	677.4	17.4	30	405	0	0	30	68	405	0	Imp.	-					
7	678.4	19.3	37	554	0	0	37	55	554	0	Imp.	-					
8	679.6	15.7	14	171	0	0	14	82	171	0	Imp.	-					
9	680.6	21.0	32	521	2	33	30	62	488	36	0.60	35					
10	681.6	20.8	40	645	0	0	40	57	645	26	0.30	45					
11	682.5	20.7	33	530	4	64	29	62	466	58	0.97	35					
12	683.5	19.6	33	502	0	0	33	59	502	0	Imp.	-					
13	684.5	4.1	5	16	0	0	5	91	16	0	Imp.	-					
14	686.5	10.5	36	293	0	0	36	61	293	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

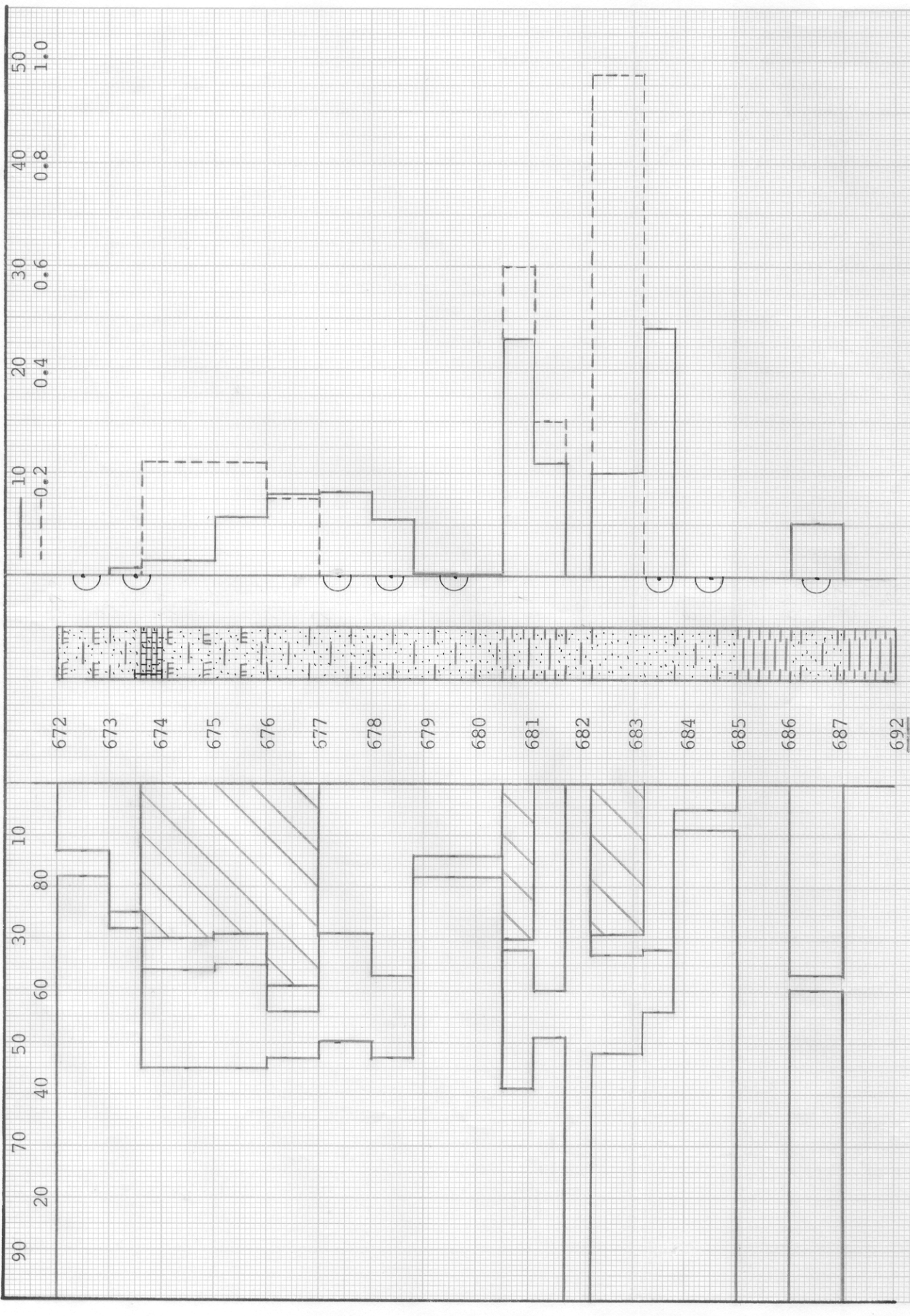
TABLE V

Company	Gerald Williams Production	Lease	Alberti	Well No.	19
Depth Interval, Feet	672.0 - 687.0				
Feet of Core Analyzed	5.0				
Average Percent Porosity	16.7				
Average Percent Original Oil Saturation	36.3				
Average Percent Oil Recovery	4.9				
Average Percent Residual Oil Saturation	31.4				
Average Percent Residual Water Saturation	60.5				
Average Percent Total Residual Fluid Saturation	91.9				
Average Original Oil Content, Bbls./A. Ft.	467.				
Average Oil Recovery, Bbls./A. Ft.	61.				
Average Residual Oil Content, Bbls./A. Ft.	406.				
Total Original Oil Content, Bbls./Acre	2,335.				
Total Oil Recovery, Bbls./Acre	306.				
Total Residual Oil Content, Bbls./Acre	2,029.				
Average Effective Permeability, Millidarcys	0.40				
Average Initial Fluid Production Pressure, p.s.i.	36.0				

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

PERMEABILITY, IN MILLIDARCYS
EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYS

WATER SAT., PERCENT
OIL SAT., PERCENT



SHALY CALCAREOUS SANDSTONE
SANDY LIMESTONE

KEY:
SANDSTONE

685
686
687
692

KEY:



SANDSTONE



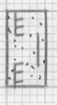
SHALY SANDSTONE



SHALE



IMPERMEABLE TO WATER



SHALY CALCAREOUS SANDSTONE



SANDY LIMESTONE



ALTERNATE LAYERS OF SANDSTONE AND SHALE



FORMATION CONTAINING A VERTICAL FRACTURE



FLOODPOT RESIDUAL OIL SATURATION

GERALD WILLIAMS PRODUCTION

ALBERTI LEASE

MIAMI COUNTY, KANSAS

WELL NO. 19

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
672.0 - 687.0	13.5	14.4	28.0	60.2	7.0	750 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
AUGUST, 1982
PDC