JOHN DAVIS

CORE ANALYSIS REPORT

UMBARGER LEASE WELL NO. K-15

WILSON COUNTY, KANSAS

OILFIELD RESEARCH LABORATORIES

538 N. HIGHLAND CHANUTE, KANSAS

OILFIELD RESEARCH LABORATORIES

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

November 20, 1978]

John Davis
212 East Locust
Independence, Kansas 67301

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Umbarger Lease, Well No. K-15, Wilson County, Kansas, and submitted to our laboratory on November 9, 1978.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman

Benjamin R. Pearman

BRP:km
5 c to Independence, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company John Davis Lease Umbarger Well No. K-15

Location 330' WEL & 1000' NSL SW

Section 36 Twp. 28S Rge. 16E County Wilson State Kansas

Name of Sand	Squirrel
Top of Core	660.0
Bottom of Core	671.0
Top of Sand	660.0
Bottom of Sand	671.0
Total Feet of Permeable Sand	9.8
Total Feet of Floodable Sand	8.4

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
2 - 10	1.4	1.4
10 - 20	3.9	5.3
20 - 50	1.5	6.8
50 & Above	3.0	9.8

Average Permeability Millidarcys	37.4
Average Percent Porosity	17.7
Average Percent Oil Saturation	47.0
Average Percent Water Saturation	23.0
Average Oil Content, Bbls./A. Ft.	646.
Total Oil Content, Bbls./Acre	6,330.
Average Percent Oil Recovery by Laboratory Flooding Tests	5.3
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	72.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	533.
Total Calculated Oil Recovery, Bbls./Acre (Primary & Waterflooding)	2,300.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

Salt water mud was used as the circulating fluid while taking this core. The core was sampled and the samples were sealed in plastic bags by a representative of the client. The well was reportedly drilled in virgin territory.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
660.0 - 661.4	Brown slightly calcareous sandstone.
661.4 - 662.6	Gray limestone.
662.6 - 664.3	Brown sandstone.
664.3 - 668.4	Brown slightly shaly sandstone.
668.4 - 671.0	Brown slightly carbonaceous sandstone.

SUMMARY

A study of the laboratory data indicates that efficient primary and waterflooding operations in the vicinity of this well should recover approximately 2,300 barrels of oil per acre. This is an average recovery of 275 barrels of oil per acre foot from 8.4 feet of floodable pay sand.

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

Original formation volume factor	1.04
Reservoir water saturation, percent	15.0
Average porosity, percent	18.0
Oil saturation after flooding, percent	42.3
Performance factor, percent	50.0
Net floodable pay sand, feet	8.4

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company John Davis Lease Umbarger Well No. K-15

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	660.5	14.2	48	23	71	529	8.2	1.0	1.0	529	8.20
2	661.3	14.9	39	26	65	451	2.4	0.4	1.4	180	0.96
3	662.8	17.8	45	28	73	621	37.	0.5	1.9	311	18.50
4	663.5	17.5	47	28	75	638	20.	1.2	3.1	765	24.00
5	664.5	18.3	40	32	72	568	20.	0.7	3.8	398	14.00
6	665.5	17.9	47	22	69	652	17.	1.0	4.8	652	17.00
7	666.5	18.5	40	29	69	574	71.	1.0	5.8	574	71.00
8	667.5	17.6	51	20	71	696	89.	1.4	7.2	975	124.60
9	668.5	20.1	50	15	65	780	57.	0.6	7.8	468	34.20
10	669.5	19.2	49	17	66	730	43.	1.0	8.8	730	43.00
11	670.5	18.2	53	17	70	748	11.	1.0	9.8	748	11.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company John Davis Lease Umbarger Well No. K-15

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
660.0 - 671.0	9.8	37.4	366.46

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
660.0 - 671.0	9.8	17.7	47.0	23.0	646	6,330

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company John Davis Lease Umbarger Well No. K-15

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	660.5	14.7	48	546	9	102	39	51	444	25	0.49	25
2	661.3	14.8	39	447	0	0	39	28	447	0	Imp.	-
3	662.8	18.1	45	631	5	70	40	54	561	114	2.17	20
4	663.5	18.0	47	654	5	69	42	55	585	14	0.31	35
5	664.5	18.6	40	577	2	28	38	51	549	28	0.44	30
6	665.5	18.2	47	663	5	71	42	44	592	15	0.29	35
7	666.5	19.0	40	589	0	0	40	51	589	117	2.56	25
8	667.5	18.1	51	715	7	99	44	39	616	200	5.02	20
9	668.5	20.3	50	788	4	64	46	35	724	86	1.47	20
10	669.5	19.5	49	740	3	45	46	36	695	60	1.04	25
11	670.5	18.0	53	738	0	0	53	35	783	52	1.08	25

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 John Davis Lease Umbarger Well No. K-15

Depth Interval, Feet	660.0 - 671.0
Feet of Core Analyzed	7.4
Average Percent Porosity	18.0
Average Percent Original Oil Saturation	47.6
Average Percent Oil Recovery	5.3
Average Percent Residual Oil Saturation	42.3
Average Percent Residual Water Saturation	45.3
Average Percent Total Residual Fluid Saturation	87.6
Average Original Oil Content, Bbls./A. Ft.	666.
Average Oil Recovery, Bbls./A. Ft.	72.
Average Residual Oil Content, Bbls./A. Ft.	594.
Total Original Oil Content, Bbls./Acre	4,928.
Total Oil Recovery, Bbls./Acre	533.
Total Residual Oil Content, Bbls./Acre	4,395.
Average Effective Permeability, Millidarcys	1.56
Average Initial Fluid Production Pressure, p.s.i.	26.3

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