

DAVIS OIL COMPANY

CORE ANALYSIS REPORT

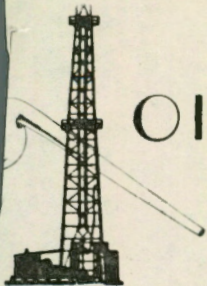
UMBARGER LEASE WELL NO. D-9

WILSON COUNTY, KANSAS

OILFIELD RESEARCH LABORATORIES

536 N. HIGHLAND

CHANUTE, KANSAS



OILFIELD RESEARCH LABORATORIES

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

May 13, 1980

Davis Oil Company
212 East Locust
Independence, Kansas 67301

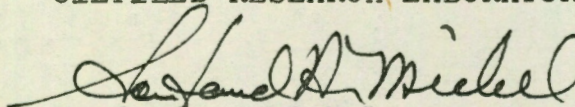
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Umbarger Lease, Well No. D-9, Wilson County, Kansas, and submitted to our laboratory on April 8, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Sanford A. Michel

SAM/tem

5 c to Independence, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Davis Oil Company Lease Umbarger Well No. D-9

Location -

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

Elevation, Feet	-
Name of Sand	Squirrel
Top of Core	658.0
Bottom of Core	678.0
Top of Sand	658.4
Bottom of Sand	672.9
Total Feet of Permeable Sand	10.6
Total Feet of Floodable Sand	6.2

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 5	4.4	4.4
5 - 50	1.6	6.0
50 - 100	2.0	8.0
100 - 200	2.6	10.6

Average Permeability Millidarcys	103.1
Average Percent Porosity	16.5
Average Percent Oil Saturation	46.0
Average Percent Water Saturation	36.6
Average Oil Content, Bbls./A. Ft.	580.
Total Oil Content, Bbls./Acre	8,411.
Average Percent Oil Recovery by Laboratory Flooding Tests	5.4
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	81.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	503.
Total Calculated Oil Recovery, Bbls./Acre	See "Calculated Recovery" Section.

-2-

The core was sampled and the samples sealed in plastic bags by a representative of the client. Fresh water mud was used as a drilling fluid. The core was reported to be 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>
658.0 - 658.4	Gray calcareous sandy shale.
658.4 - 659.7	Brown slightly calcareous sandstone.
659.7 - 664.6	Dark brown sandstone.
664.6 - 670.2	Brown and gray laminated sandstone and shale.
670.2 - 672.9	Grayish brown shaly sandstone.
672.9 - 678.0	Gray sandy shale.

LABORATORY FLOODING TESTS

The upper portion of the sand in this core responded to laboratory flooding tests, as a total recovery of 503 barrels of oil per acre was obtained from 6.2 feet of sand. The weighted average percent oil saturation was reduced from 43.3 to 37.9, or represents an average recovery of 5.4 percent. The weighted average effective permeability of the samples is 7.19 millidarcys, while the average initial fluid production pressure is 15.0 pounds per square inch (See Table V).

-3-

By observing the data given in Table IV, you will note that of the 15 samples tested, 7 produced water and oil. This indicates that approximately 47 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 1,870 barrels of oil per acre. This is an average recovery of 301 barrels per acre foot from 6.2 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.04
Reservoir water saturation, percent, estimated	20.0
Average porosity, percent	19.9
Oil saturation after flooding, percent	37.9
Performance factor, percent, estimated	50.0
Net floodable sand, feet	6.2

Oilfield Research Laboratories

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Davis Oil Company Lease Umbarger Well No. D-9

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	658.5	13.5	45	33	78	471	163.	0.6	0.6	283	97.50
2	659.5	23.6	41	35	76	751	137.	0.7	1.3	526	95.90
3	660.5	20.7	43	32	75	691	121.	1.3	2.6	898	167.30
4	661.5	21.7	43	26	69	724	79.	1.0	3.6	724	121.00
5	662.5	20.2	41	24	65	643	71.	1.0	4.6	643	79.00
6	663.3	18.8	39	33	72	569	32.	1.0	5.6	569	71.00
7	664.5	16.7	56	23	79	726	12.	0.6	6.2	436	7.20
8	665.3	15.5	46	44	90	553	2.1	1.4	7.6	774	2.94
9	666.5	16.5	58	29	87	742	Imp.	1.0	8.6	742	0.00
10	667.5	11.5	76	22	98	678	Imp.	1.0	9.6	678	0.00
11	668.5	13.2	47	40	87	481	Imp.	1.0	10.6	481	0.00
12	669.5	14.6	51	36	87	578	1.3	1.2	11.8	694	1.56
13	670.5	13.3	44	50	94	454	0.19	0.8	12.6	363	0.15
14	671.8	14.1	31	50	81	339	2.2	1.0	13.6	339	2.20
15	672.8	12.9	29	69	98	290	Imp.	0.9	14.5	261	0.00

Oilfield Research Laboratories

SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Davis Oil Company Lease Umbarger Well No. D-9

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
658.4 - 664.6	6.2	103.1	638.90
664.6 - 672.9	4.4	1.6	6.85
658.4 - 672.9	10.6	60.9	645.75

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
658.4 - 664.6	6.2	19.7	43.3	29.5	658	4,079
664.6 - 672.9	8.3	14.1	48.1	41.9	522	4,332
658.4 - 672.9	14.5	16.5	46.0	36.6	580	8,411

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Davis Oil Company Lease Umberger Well No. D-9

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	658.5	13.3	45	464	5	52	40	42	412	75	1.05	20
2	659.5	23.5	41	747	3	55	38	60	692	142	2.10	20
3	660.5	21.1	43	704	4	65	39	59	639	272	9.00	15
4	661.5	22.0	43	734	5	85	38	54	649	389	8.55	15
5	662.5	20.3	41	646	4	63	37	52	583	245	13.00	10
6	663.3	19.3	39	584	6	90	33	58	494	303	9.16	10
7	664.5	16.9	56	734	14	184	42	50	550	19	0.15	15
8	665.3	15.7	46	560	0	0	46	46	560	0	Imp.	-
9	666.5	16.1	58	724	0	0	58	37	724	0	Imp.	-
10	667.5	11.5	76	678	0	0	76	22	678	0	Imp.	-
11	668.5	13.3	47	485	0	0	47	46	485	0	Imp.	-
12	669.5	14.3	51	566	0	0	51	40	566	0	Imp.	-
13	670.5	13.8	43	460	0	0	43	53	460	0	Imp.	-
14	671.8	14.0	31	337	0	0	31	54	337	0	Imp.	-
15	672.8	13.2	28	287	0	0	28	70	287	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.

Oilfield Research Laboratories

SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company <u>Davis Oil Company</u>	Lease <u>Umbarger</u>	Well No. <u>D-9</u>
Depth Interval, Feet	658.4 - 664.6	
Length of Core Analyzed	6.2	
Average Percent Porosity	19.9	
Average Percent Original Oil Saturation	43.3	
Average Percent Oil Recovery	5.4	
Average Percent Residual Oil Saturation	37.9	
Average Percent Residual Water Saturation	54.5	
Average Percent Total Residual Fluid Saturation	92.4	
Average Original Oil Content, Bbls./A. Ft.	665.	
Average Oil Recovery, Bbls./A. Ft.	81.	
Average Residual Oil Content, Bbls./A. Ft.	584.	
Total Original Oil Content, Bbls./Acre	4,121.	
Total Oil Recovery, Bbls./Acre	503.	
Total Residual Oil Content, Bbls./Acre	3,618.	
Average Effective Permeability, Millidarcys	7.19	
Average Initial Fluid Production Pressure, p.s.i.	15.0	

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