



OILFIELD RESEARCH LABORATORIES

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November 12, 1979

Two J Drilling Company
P.O. Box 70
Sedan, Kansas 67361

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core samples taken from the Paul Folsom Lease, Well No. 1, Chautauqua County, Kansas, and submitted to our laboratory on October 24, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman
Benjamin R. Pearman

SAM/tem
8 c to Sedan, Kansas

- REGISTERED ENGINEERS -

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

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GENERAL INFORMATION & SUMMARY

Company Two J Drilling Company Lease Paul Folsom Well No. 1

Location SE - SE - SE

Section 15 Twp. 33S Rge. 10E County Chautauqua State Kansas

Name of Sand	Wayside
Top of Core	1416.0
Bottom of Core	1433.0
Top of Sand	1416.0
Bottom of Sand	1433.0
Total Feet of Permeable Sand	16.0
Total Feet of Floodable Sand	4.0

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

0 - 10	5.0	5.0
10 - 20	2.0	7.0
20 - 40	8.0	15.0
40 - 50	1.0	16.0

Average Permeability Millidarcys	20.3
Average Percent Porosity	14.7
Average Percent Oil Saturation	16.9
Average Percent Water Saturation	62.4
Average Oil Content, Bbls./A. Ft.	194.
Total Oil Content, Bbls./Acre	3,292.
Average Percent Oil Recovery by Laboratory Flooding Tests	2.3
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	27.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	108.

Total Calculated Oil Recovery, Bbls./Acre See "Calculated Recovery" Section.

Packer Setting, Feet

Viscosity, Centipoises @

A. P. I. Gravity, degrees @ 60 °F

Elevation, Feet

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. Each sample represents one foot.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
1416.0 - 1418.0	Light brown sandstone.
1418.0 - 1419.0	Light brown shaly sandstone.
1419.0 - 1420.0	Light brown slightly shaly sandstone.
1420.0 - 1424.0	Light brown sandstone.
1424.0 - 1425.0	Light brown slightly shaly sandstone.
1425.0 - 1426.0	Light brown shaly sandstone.
1426.0 - 1427.0	Light brown sandstone.
1427.0 - 1428.0	Light brown shaly sandstone.
1428.0 - 1430.0	Light brown sandstone.
1430.0 - 1432.0	Light brown shaly sandstone.
1432.0 - 1433.0	Gray sandy shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 108 barrels of oil per acre was obtained from 4.0 feet of sand. The weighted average percent oil saturation was reduced from 23.3 to 21.0, or represents an average recovery of 2.3 percent. The weighted average effective permeability of the samples is 1.26 millidarcys, while the average initial fluid production pressure is 23.8 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 17 samples tested, 4 produced water and oil, and 12 samples produced water only. This indicates that approximately 24 percent of the sand represented by these samples is floodable pay sand.

CALCULATED RECOVERY

It would appear from a study of the data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 660 barrels of oil per acre. This is an average recovery of 164 barrels per acre foot from 4.0 feet of floodable sand analyzed in this core.

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

Original formation volume factor	1.08
Reservoir water saturation, percent	45.0
Average porosity, percent	15.7
Oil saturation after flooding, percent	21.0
Performance factor, percent	45.0
Net floodable pay sand, feet	4.0

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Two J Drilling Company Lease Paul Folsom Well No. 1

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation		Oil Content Bbbs. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water			Ft.	Cum. Ft.		
1	1416.5	17.6	17	61	232	41.	1.0	1.0	232	41.00
2	1417.5	17.3	21	58	282	37.	1.0	2.0	282	37.00
3	1418.5	14.7	13	66	148	6.5	1.0	3.0	148	6.50
4	1419.5	16.3	13	69	164	14.	1.0	4.0	164	14.00
5	1420.5	16.0	1	74	12	29.	1.0	5.0	12	29.00
6	1421.5	15.2	14	63	165	22.	1.0	6.0	165	22.00
7	1422.5	15.4	4	71	48	31.	1.0	7.0	48	31.00
8	1423.5	14.3	15	72	166	29.	1.0	8.0	166	29.00
9	1424.5	13.9	16	59	173	14.	1.0	9.0	173	14.00
10	1425.5	13.7	26	56	276	7.2	1.0	10.0	276	7.20
11	1426.5	15.8	20	54	245	30.	1.0	11.0	245	30.00
12	1427.5	13.4	19	59	198	8.0	1.0	12.0	198	8.00
13	1428.5	13.9	20	61	216	22.	1.0	13.0	216	22.00
14	1429.5	15.8	14	58	172	24.	1.0	14.0	172	24.00
15	1430.5	14.5	33	50	371	5.5	1.0	15.0	371	5.50
16	1431.5	14.9	32	50	370	5.3	1.0	16.0	370	5.30
17	1432.5	7.7	9	80	54	Imp.	1.0	17.0	54	0.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		Lease		Well No.	
Two J Drilling Company		Paul Folsom		1	
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
1416.0 - 1425.0	9.0	24.8	223.50		
1425.0 - 1433.0	7.0	14.6	102.00		
1416.0 - 1433.0	16.0	20.3	325.50		

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 Bbl./Acre
1416.0 - 1425.0	9.0	15.6	12.7	65.9	154	1,390
1425.0 - 1433.0	8.0	13.7	21.6	58.5	238	1,902
1416.0 - 1433.0	17.0	14.7	16.9	62.4	194	3,292

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Two J Drilling Company			Lease			Paul Folsom			Well No. 1		
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.
			%	Bbbls./A. Ft.	%	Bbbls./A. Ft.	% Oil	% Water			
1	1416.5	18.0	17	237	0	0	17	79	135	2.47	15
2	1417.5	17.5	21	285	2	27	19	77	128	2.25	15
3	1418.5	15.1	13	152	0	0	13	84	20	0.33	15
4	1419.5	16.5	14	179	0	0	14	84	82	1.35	15
5	1420.5	16.3	2	25	0	0	2	95	288	4.20	15
6	1421.5	15.5	13	156	0	0	13	85	138	2.62	15
7	1422.5	15.8	4	49	0	0	4	93	95	1.95	15
8	1423.5	14.6	15	170	0	0	15	81	117	2.02	15
9	1424.5	14.2	17	187	0	0	17	76	51	0.75	15
10	1425.5	14.1	28	306	0	0	28	70	20	0.30	25
11	1426.5	16.1	20	250	2	25	18	80	129	2.25	20
12	1427.5	13.8	20	214	0	0	20	75	17	0.30	30
13	1428.5	14.3	20	222	2	22	18	77	14	0.22	30
14	1429.5	16.1	15	187	0	0	15	82	72	1.27	20
15	1430.5	14.6	33	374	0	0	33	64	14	0.22	35
16	1431.5	14.7	32	365	3	34	29	67	17	0.30	30
17	1432.5	7.8	9	54	0	0	9	82	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	Two J Drilling Company	Lease	Paul Folsom	Well No.	1
Depth Interval, Feet	1416.0 - 1425.0	1425.0 - 1433.0	1416.0 - 1433.0		
Feet of Core Analyzed	1.0	3.0	4.0		
Average Percent Porosity	17.5	15.0	15.7		
Average Percent Original Oil Saturation	21.0	24.0	23.3		
Average Percent Oil Recovery	2.0	2.3	2.3		
Average Percent Residual Oil Saturation	19.0	21.7	21.0		
Average Percent Residual Water Saturation	77.0	74.7	75.3		
Average Percent Total Residual Fluid Saturation	96.0	96.4	96.3		
Average Original Oil Content, Bbls./A. Ft.	285.	279.	281.		
Average Oil Recovery, Bbls./A. Ft.	27.	27.	27.		
Average Residual Oil Content, Bbls./A. Ft.	258.	252.	254.		
Total Original Oil Content, Bbls./Acre	285.	837.	1,122.		
Total Oil Recovery, Bbls./Acre	27.	81.	108.		
Total Residual Oil Content, Bbls./Acre	258.	756.	1,014.		
Average Effective Permeability, Millidarcys	2.25	0.92	1.26		
Average Initial Fluid Production Pressure, p.s.i.	15.0	26.7	23.8		

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