OILFIELD RESEARCH LABORATORIES

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June 23, 1980

Three Way Oil Company
Box 223
Yates Center, Kansas 66783

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Eggers Lease, Well No. 2, Woodson County, Kansas, and submitted to our laboratory on May 9, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/tem

5 c to Yates Center, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Three Way Oil Company Lease Eggers Well No. 2

Location 1420' FWL & 200' FSL SW¼

Section 7 Twp. 26S Rge. 17E County Woodson State Kansas

Elevation, Feet	
Name of Sand	Squirrel
Top of Core	844.0
Bottom of Core	856.5
Top of Sand	844.4
Bottom of Sand	856.5
Total Feet of Permeable Sand	9.3
Total Feet of Floodable Sand	4.6

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 10	5.1	5.1
50 - 70	1.6	6.7
70 - 80	0.9	7.6
90 - 100	1.7	9.3

Average Permeability Millidarcys	37.9
Average Percent Porosity	16.2
Average Percent Oil Saturation	33.7
Average Percent Water Saturation	39.4
Average Oil Content, Bbls./A. Ft.	436.
Total Oil Content, Bbls./Acre	5,275.
Average Percent Oil Recovery by Laboratory Flooding Tests	5.9
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	80.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	370.
Total Calculated Oil Recovery, Bbls./Acre	See "Calculated Recovery" Section.

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 virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
844.0 - 844.4	Gray sandy shale.
844.4 - 846.9	Dark brown sandstone.
846.9 - 851.0	Grayish brown shaly sandstone.
851.0 - 852.1	Dark brown sandstone.
852.1 - 854.1	Grayish brown shaly sandstone.
854.1 - 854.7	Brown sandstone.
854.7 - 856.5	Grayish brown shaly sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 370 barrels of oil per acre was obtained from 4.6 feet of sand. The weighted average percent oil saturation was reduced from 46.8 to 40.9, or represents an average recovery of 5.9 percent. The weighted average effective permeability of the samples is 7.16 millidarcys, while the average initial fluid production pressure is 18.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 13 samples tested, 5 produced water and oil, and 3 samples produced water only. This indicates that approximately 38 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 1,410 barrels of oil per acre. This is an average recovery of 306 barrels per acre foot from 4.6 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.06
Reservoir water saturation, percent, estimated	10.0
Average porosity, percent	17.9
Oil saturation after flooding, percent	40.9
Performance factor, percent, estimated	50.0
Net floodable sand, feet	4.6

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Three Way Oil Company Lease Eggers Well No. 2

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	844.5	14.7	38	56	94	433	91.	0.6	0.6	260	54.60
2	845.8	19.9	47	18	65	726	70.	1.0	1.6	726	70.00
3	846.5	17.4	55	18	73	742	74.	0.9	2.5	668	66.60
4	847.2	19.5	44	21	65	666	8.0	1.1	3.6	733	8.80
5	848.5	15.9	49	30	79	604	2.6	1.0	4.6	604	2.60
6	849.7	14.3	11	62	73	122	0.82	1.0	5.6	122	0.82
7	850.6	14.7	33	44	77	376	9.2	1.0	6.6	376	9.20
8	851.7	19.6	30	20	50	456	97.	1.1	7.7	502	106.70
9	852.5	14.7	34	40	74	388	0.31	1.0	8.7	388	0.31
10	853.3	14.8	35	41	76	402	Imp.	1.0	9.7	402	0.00
11	854.3	12.7	29	58	87	286	55.	0.6	10.3	172	33.00
12	855.5	14.5	16	67	83	180	Imp.	1.0	11.3	180	0.00
13	856.3	16.4	14	56	70	178	Imp.	0.8	12.1	142	0.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Three Way Oil Company Lease Eggers Well No. 2

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
844.4 - 849.0	4.6	44.0	202.60
849.0 - 856.5	4.7	31.9	150.03
844.0 - 856.5	9.3	37.9	352.63

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
844.4 - 849.0	4.6	17.6	47.1	26.3	650	2,991
849.0 - 856.5	7.5	15.4	25.4	47.4	305	2,285
844.0 - 856.5	12.1	16.2	33.7	39.4	436	5,275

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Three Way Oil Company Lease Eggers Well No. 2

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	844.5	15.2	37	436	4	47	33	61	389	247	8.75	15
2	845.8	19.8	47	722	5	77	42	46	645	224	2.40	15
3	846.5	17.5	55	747	7	95	48	44	652	225	2.85	20
4	847.2	19.3	44	659	4	60	40	50	599	172	1.87	20
5	848.5	16.2	48	603	9	113	39	49	490	157	2.10	20
6	849.7	14.3	11	122	0	0	11	63	122	0	Imp.	-
7	850.6	14.6	33	374	0	0	33	49	374	29	0.37	35
8	851.7	20.0	29	450	0	0	29	52	450	282	12.42	15
9	852.5	15.0	33	384	0	0	33	43	384	0	Imp.	-
10	853.3	14.6	35	396	0	0	35	42	396	0	Imp.	-
11	854.3	12.9	29	290	0	0	29	58	290	0	Imp.	-
12	855.5	14.6	16	181	0	0	16	69	181	0	Imp.	-
13	856.3	16.1	14	175	0	0	14	59	175	11	0.15	30

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 Three Way Oil Company Lease Eggers Well No. 2

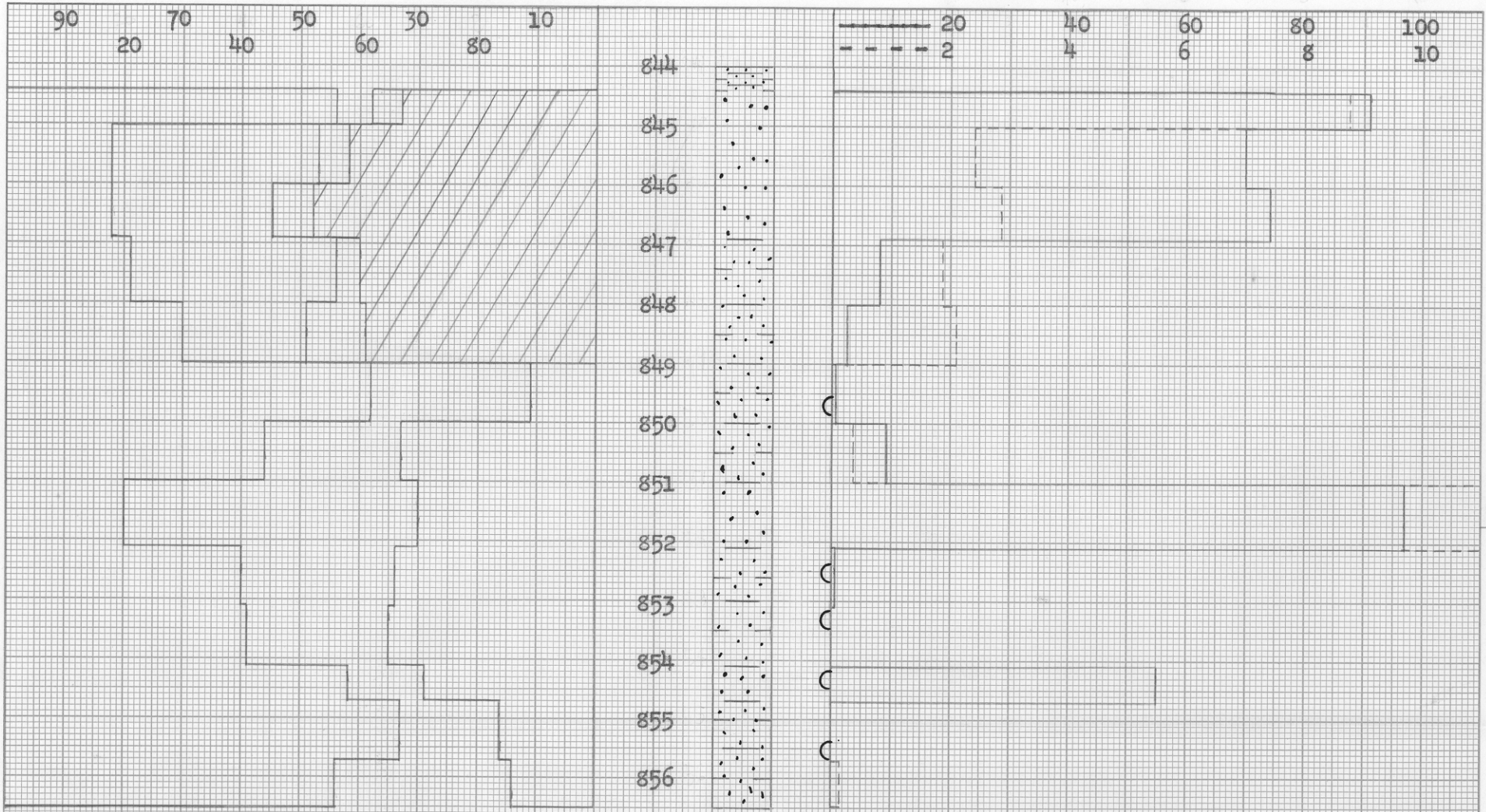
Depth Interval, Feet	844.4 - 849.0
Feet of Core Analyzed	4.6
Average Percent Porosity	17.9
Average Percent Original Oil Saturation	46.8
Average Percent Oil Recovery	5.9
Average Percent Residual Oil Saturation	40.9
Average Percent Residual Water Saturation	49.2
Average Percent Total Residual Fluid Saturation	90.1
Average Original Oil Content, Bbls./A. Ft.	649.
Average Oil Recovery, Bbls./A. Ft.	80.
Average Residual Oil Content, Bbls./A. Ft.	569.
Total Original Oil Content, Bbls./Acre	2,985.
Total Oil Recovery, Bbls./Acre	370.
Total Residual Oil Content, Bbls./Acre	2,615.
Average Effective Permeability, Millidarcys	7.16
Average Initial Fluid Production Pressure, p.s.i.	18.0

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

WATER SAT., PERCENT → ← OIL SAT., PERCENT

PERMEABILITY, IN MILLIDARCYS

EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYS



KEY:

SANDSTONE

SANDY SHALE

IMPERMEABLE TO WATER

SHALY SANDSTONE

FLOODPOT RESIDUAL OIL SATURATION

THREE - WAY OIL COMPANY

EGGERS LEASE — WELL NO. 2

WOODSON COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY BBLS./ACRE
844.4 - 849.0	4.6	17.6	47.1	26.3	44.0	
849.0 - 856.5	7.5	15.4	25.4	47.4	31.9	
844.0 - 856.5	12.1	16.2	33.7	39.4	37.9	1,410 (PRIMARY & WATERFLOODING)

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CHANUTE, KANSAS
JUNE, 1980. HR