OILFIELD RESEARCH LABORATORIES

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June 10, 1981

T. I. Energy, Inc.
Ottawa Professional Building
4th & Main
Ottawa, Kansas 66067

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Kramer Lease, Well No. 1, located in Johnson County, Kansas and submitted to our laboratory on June 3, 1981.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

5 c to Ottawa, Kansas

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GENERAL INFORMATION & SUMMARY

Company T. I. Energy, Inc. Lease Kramer Well No. 1

Location 1085' FSL & 165' FWL SW¼

Section 16 Twp. 14S Rge. 22E County Johnson State Kansas

Elevation, Feet		
Name of Sand		Bartlesville
Top of Core		916.0
Bottom of Core		933.5
Top of Sand		916.0
Bottom of Sand		925.4
Total Feet of Permeable Sand	(Tested)	5.0
Total Feet of Floodable Sand	(Tested)	4.0

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 1	1.0	1.0
10 - 20	1.0	2.0
100 - 200	2.0	4.0
300 - 400	1.0	5.0

Average Permeability Millidarcys	127.4
Average Percent Porosity	19.8
Average Percent Oil Saturation	39.4
Average Percent Water Saturation	33.0
Average Oil Content, Bbls./A. Ft.	616.
Total Oil Content, Bbls./Acre	3,079.
Average Percent Oil Recovery by Laboratory Flooding Tests	5.3
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	88.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	352.
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 non-virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
916.0 - 923.6	Dark brown slightly calcareous sandstone.
923.6 - 925.4	Gray laminated sandstone and shale.
925.4 - 933.5	Gray sandy shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 352 barrels of oil per acre was obtained from 4.0 feet of sand. The weighted average percent oil saturation was reduced from 40.8 to 35.5, or represents an average recovery of 5.3 percent. The weighted average effective permeability of the samples is 19.64 millidarcys, while the average initial fluid production pressure is 17.5 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 5 samples tested, 4 produced water and oil. This indicates that approximately 80 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 1,470 barrels of oil per acre. This is an average recovery of 368 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, estimated	1.07
Reservoir water saturation, percent, estimated	15.0
Average porosity, percent	21.6
Oil saturation after flooding, percent	35.5
Performance factor, percent, estimated	50.0
Net floodable sand, feet	4.0

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company T. I. Energy, Inc. Lease Kramer Well No. 1

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	916.9	20.0	36	26	62	559	115.	1.0	1.0	559	115.00
2	919.4	22.7	51	27	78	898	151.	1.0	2.0	898	151.00
3	922.2	22.0	44	18	62	751	352.	1.0	3.0	751	352.00
4	923.3	21.7	32	51	83	539	18.	1.0	4.0	539	18.00
5	925.3	12.6	34	43	77	332	0.74	1.0	5.0	332	0.74

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company T. I. Energy, Inc. Lease Kramer Well No. 1

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
916.0 - 925.4	5.0	127.4	636.74

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
916.0 - 925.4	5.0	19.8	39.4	33.0	616	3,079

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company T. I. Energy, Inc. Lease Kramer 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.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
1	916.9	20.1	36	561	5	78	31	47	483	375	25.52	25
2	919.4	22.7	51	898	4	70	47	44	828	474	19.16	15
3	922.2	22.1	44	754	10	171	34	59	583	254	29.39	15
4	923.3	21.5	32	533	2	33	30	55	500	137	4.50	15
5	925.3	12.3	35	334	0	0	35	44	334	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 T. I. Energy, Inc. Lease Kramer Well No. 1

Depth Interval, Feet	916.0 - 925.4
Feet of Core Analyzed	4.0
Average Percent Porosity	21.6
Average Percent Original Oil Saturation	40.8
Average Percent Oil Recovery	5.3
Average Percent Residual Oil Saturation	35.5
Average Percent Residual Water Saturation	51.3
Average Percent Total Residual Fluid Saturation	86.8
Average Original Oil Content, Bbls./A. Ft.	687.
Average Oil Recovery, Bbls./A. Ft.	88.
Average Residual Oil Content, Bbls./A. Ft.	599.
Total Original Oil Content, Bbls./Acre	2,746.
Total Oil Recovery, Bbls./Acre	352.
Total Residual Oil Content, Bbls./Acre	2,394.
Average Effective Permeability, Millidarcys	19.64
Average Initial Fluid Production Pressure, p.s.i.	17.5

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