

OILFIELD RESEARCH LABORATORIES

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

November 18, 1980

Tokan Oil, Inc.
Box 2343
Hutchinson, Kansas 67501

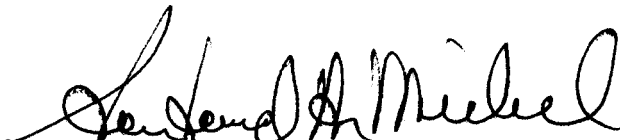
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Needham Lease, Well No. 6, located in Miami County, Kansas and submitted to our laboratory on August 29, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Sanford A. Michel

SAM/mkf

5 c to Hutchinson, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Token Oil, Inc. Lease Needham Well No. 6

Location -

Section 12 Twp. 18S Rge. 22E County Miami State Kansas

Elevation, Feet - - - - - -

Name of Sand - - - - - Peru

Top of Core - - - - - 255.0

Bottom of Core - - - - - 271.0

Top of Sand - - - - - 255.0

Bottom of Sand - - - - - 267.7

Total Feet of Permeable Sand - - (Tested) - - - - - 6.8

Total Feet of Floodable Sand - - - - - 7.0

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 50	0.5	0.5
100 - 300	2.3	2.8
300 - 600	3.0	5.8
700 - 800	1.0	6.8

Average Permeability Millidarcys - - - - - 348.1

Average Percent Porosity - - - - - 21.0

Average Percent Oil Saturation - - - - - 35.9

Average Percent Water Saturation - - - - - 41.0

Average Oil Content, Bbls./A. Ft. - - - - - 611.

Total Oil Content, Bbls./Acre - - - - - 5,502.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 8.8

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 161.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 1,130.

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

The core was sampled by a representative of Oilfield Research Laboratories. Salt water mud was used as a drilling fluid.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval,</u> <u>Feet</u>	<u>Description</u>
255.0 - 256.3	Light brown slightly calcareous sandstone.
256.3 - 262.0	Dark brown slightly calcareous sandstone.
262.0 - 263.2	Grayish brown hard very calcareous sandstone.
263.2 - 263.7	Brown calcareous sandstone.
263.7 - 267.4	Gray sandy shale.
267.4 - 267.7	Grayish brown very shaly sandstone.
267.7 - 271.0	Gray sandy shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 1130 barrels of oil per acre was obtained from 7.0 feet of sand. The weighted average percent oil saturation was reduced from 38.8 to 30.0, or represents an average recovery of 8.8 percent. The weighted average effective permeability of the samples is 27.28 millidarcys, while the average initial fluid production pressure is 12.1 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 10 samples tested, 7 produced water and oil. This indicates

that approximately 70 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 2450 barrels of oil per acre. This is an average recovery of 350 barrels per acre foot from 7.0 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.03
Reservoir water saturation, percent, estimated	30.0
Average porosity, percent	23.8
Oil saturation after flooding, percent	30.0
Performance factor, percent, estimated	50.0
Net floodable sand, feet	7.0

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Token Oil, Inc. Lease Needham Well No. 6

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	255.5	23.1	41	40	81	735	169.	1.3	1.3	956	219.70
2	256.5	22.7	39	30	69	687	*	0.7	2.0	481	*
3	257.5	25.9	33	31	64	663	203.	1.0	3.0	663	203.00
4	258.5	27.6	41	31	72	878	784	1.0	4.0	878	784.00
5	259.5	20.8	41	39	80	662	346.	1.0	5.0	662	346.00
6	260.5	26.1	38	35	73	769	415.	1.0	6.0	769	415.00
7	261.5	20.0	39	37	76	605	384.	1.0	7.0	605	384.00
8	262.5	9.5	15	70	85	111	Imp.	1.2	8.2	133	0.00
9	263.5	13.4	30	58	78	312	31.	0.5	8.7	156	15.50
10	267.5	14.5	59	32	91	664	Imp.	0.3	9.0	199	0.00

Note: * No Permeability sample obtainable.

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Token Oil, Inc. Lease Needham Well No. 6

Depth Interval, Feet	Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
255.0 - 262.0	255.0 - 262.0	6.3	373.3	2,351.70	23.8	38.9	35.1	716	5,014
262.0 - 267.7	262.0 - 267.7	0.5	31.0	15.50	11.3	25.4	61.3	244	488
255.0 - 267.7	255.0 - 267.7	6.8	348.1	2,367.20	21.0	35.9	41.0	611	5,502

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Tokan Oil, Inc. Lease Needham Well No. 6

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.
			%	Bbbs./A. Ft.	%	Bbbs./A. Ft.	% Oil	% Water			
1	255.5	23.1	41	735	12	215	29	62	378	17.99	10
2	256.5	23.2	38	684	10	180	28	62	380	25.70	15
3	257.5	26.1	33	668	5	101	28	63	238	32.61	10
4	258.5	27.7	41	881	8	172	33	58	436	58.10	10
5	259.5	20.6	41	655	9	144	32	63	358	31.49	10
6	260.5	26.2	38	772	9	183	29	67	258	12.16	20
7	261.5	20.0	39	605	8	124	31	59	244	15.24	10
8	262.5	9.9	14	108	0	0	14	73	0	Imp.	-
9	263.5	13.9	29	313	0	0	29	60	0	Imp.	-
10	267.5	14.1	60	656	0	0	60	33	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

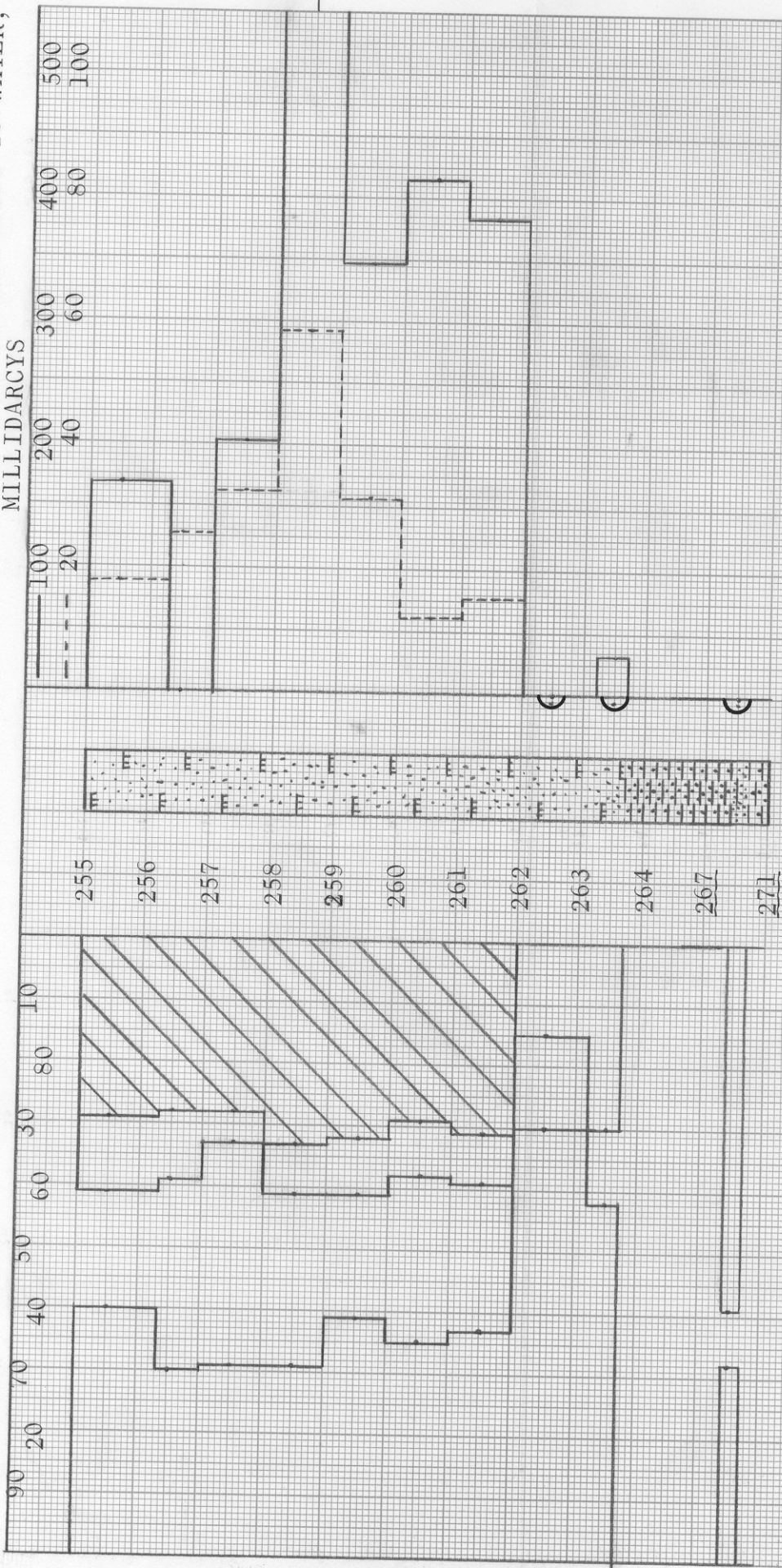
Company	Token Oil, Inc.	Lease	Needham	Well No.	6
Depth Interval, Feet	255.0 - 262.0				
Feet of Core Analyzed	7.0				
Average Percent Porosity	23.8				
Average Percent Original Oil Saturation	38.8				
Average Percent Oil Recovery	8.8				
Average Percent Residual Oil Saturation	30.0				
Average Percent Residual Water Saturation	62.0				
Average Percent Total Residual Fluid Saturation	92.0				
Average Original Oil Content, Bbls./A. Ft.	716.				
Average Oil Recovery, Bbls./A. Ft.	161.				
Average Residual Oil Content, Bbls./A. Ft.	555.				
Total Original Oil Content, Bbls./Acre	5,016.				
Total Oil Recovery, Bbls./Acre	1,130.				
Total Residual Oil Content, Bbls./Acre	3,886.				
Average Effective Permeability, Millidarcys	27.28				
Average Initial Fluid Production Pressure, p.s.i.	12.1				

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

K#E 10 X 10 TO THE CENTIMETER #25 X 38 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.

47 1512
PERMEABILITY, IN MILLIDARCYS
EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYS

WATER SAT., PERCENT
OIL SAT., PERCENT



- KEY:
- CALCAREOUS SANDSTONE
 - SHALY SANDSTONE
 - SANDY SHALE
 - FLOODPOT RESIDUAL OIL SATURATION
 - IMPERMEABLE TO WATER

TOKAN OIL, INC.

NEEDHAM LEASE

WELL NO. 6

MIAMI 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
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255.0 - 262.0

7.0

23.8

38.9

35.1

373.3

262.0 - 267.7

2.0

11.3

25.4

61.3

31.0

255.0 - 267.7

9.0

21.0

35.9

41.0

348.1

2450

(PRIMARY AND
WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
NOVEMBER, 1980

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