

OILFIELD RESEARCH LABORATORIES

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

November 20, 1980

Tokan Oil, Inc.
Box 2343
Hutchinson, Kansas 67501

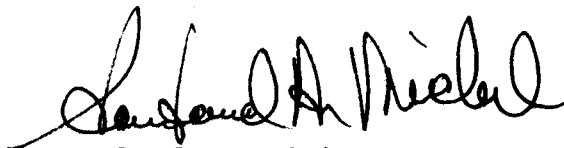
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Needham Lease, Well No. 7, located in Miami County, Kansas and submitted to our laboratory on September 3, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

A handwritten signature in black ink, appearing to read "Sanford A. Michel". The signature is fluid and cursive, with the first name "Sanford" and last name "Michel" clearly distinguishable.

Sanford A. Michel

SAM/kas

5 c to Hutchinson, Kansas

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GENERAL INFORMATION & SUMMARY

Company Tokan Oil, Inc. Lease Needham Well No. 7

Location -

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

Elevation, Feet -

Name of Sand - Peru

Top of Core - 260.0

Bottom of Core - 272.0

Top of Sand - 260.0

Bottom of Sand - 272.0

Total Feet of Permeable Sand - 9.3

Total Feet of Floodable Sand -

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 50	2.3	2.3
115 - 130	1.7	4.0
200 - 500	2.5	6.5
1225 & Above	2.8	9.3

Average Permeability Millidarcys - 502.2

Average Percent Porosity - 18.0

Average Percent Oil Saturation - 41.2

Average Percent Water Saturation - 47.3

Average Oil Content, Bbls./A. Ft. - 589.

Total Oil Content, Bbls./Acre - 6,828.

Average Percent Oil Recovery by Laboratory Flooding Tests - 8.9

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - 140.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - 1,077.

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. Salt water was used as a drilling fluid.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
260.0 - 261.6	Grayish brown shaly sandstone.
261.6 - 264.9	Brown slightly calcareous sandstone.
264.9 - 265.3	Gray sandy shale.
265.3 - 266.0	Brown slightly calcareous sandstone.
266.0 - 267.1	Hard grayish light brown limestone.
267.1 - 270.8	Brown slightly calcareous sandstone.
270.8 - 272.0	Grayish light brown very shaly sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 1077 barrels of oil per acre was obtained from 7.7 feet of sand. The weighted average percent oil saturation was reduced from 40.9 to 32.0, or represents an average recovery of 8.9 percent. The weighted average effective permeability of the samples is 18.71 millidarcys, while the average initial fluid production pressure is 11.1 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 12 samples tested, 9 produced water and oil. This indicates that approximately 75 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 2170 barrels of oil per acre. This is an average recovery of 282 barrels per acre foot from 7.7 feet of 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	20.2
Oil saturation after flooding, percent	32.0
Performance factor, percent, estimated	50.0
Net floodable sand, feet	7.7

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Tokan Oil, Inc. Lease Needham Well No. 7

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	260.5	20.0	58	39	97	900	4.5	1.6	1.6	1440	7.20
2	261.9	24.0	23	45	68	428	127.	1.0	2.6	428	127.00
3	262.8	22.0	24	59	83	410	478.	0.5	3.1	205	239.00
4	263.5	22.8	31	49	80	548	1363.	0.8	3.9	438	1090.40
5	264.5	25.6	32	52	84	636	1426.	1.0	4.9	636	1426.00
6	265.5	17.4	44	45	89	594	48.	0.7	5.6	416	33.60
7	266.6	3.6	16	70	86	45	Imp.	1.1	6.7	50	0.00
8	267.5	14.7	25	61	86	285	118.	0.7	7.4	200	82.60
9	268.5	23.5	55	31	86	1003	1226.	1.0	8.4	1003	1226.00
10	269.5	15.4	59	38	97	705	236.	1.0	9.4	705	236.00
11	270.5	14.7	61	37	98	696	203.	1.0	10.4	696	203.00
12	271.5	14.9	44	53	97	509	Imp.	1.2	11.6	611	0.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		Token Oil, Inc.		Lease		Needham		Well No.		7
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				
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				
260.0 - 264.9	4.9	22.6	37.7	46.6	642	3,147				
265.3 - 272.0	6.7	14.6	43.8	47.9	549	3,681				
260.0 - 272.0	11.6	18.0	41.2	47.3	589	6,828				

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Well No. 7

Lease Needham

Token Oil, Inc.

Company

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			
1	260.5	20.1	58	904	0	0	58	39	0	Imp.	-
2	261.9	24.2	23	432	3	56	20	69	304	14.99	10
3	262.8	22.0	24	410	4	68	20	67	430	24.20	10
4	263.5	23.1	31	556	9	161	22	61	268	20.24	10
5	264.5	25.7	32	638	11	219	21	66	304	41.23	10
6	265.5	17.2	44	587	4	53	40	56	372	9.66	15
7	266.6	3.9	15	45	0	0	15	73	0	Imp.	-
8	267.5	14.8	25	287	4	46	21	75	392	21.85	10
9	268.5	23.4	55	998	16	290	39	52	362	22.49	10
10	269.5	15.4	59	705	13	155	46	44	188	4.00	25
11	270.5	14.6	61	691	11	125	50	37	318	10.99	15
12	271.5	15.4	43	514	0	0	43	54	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

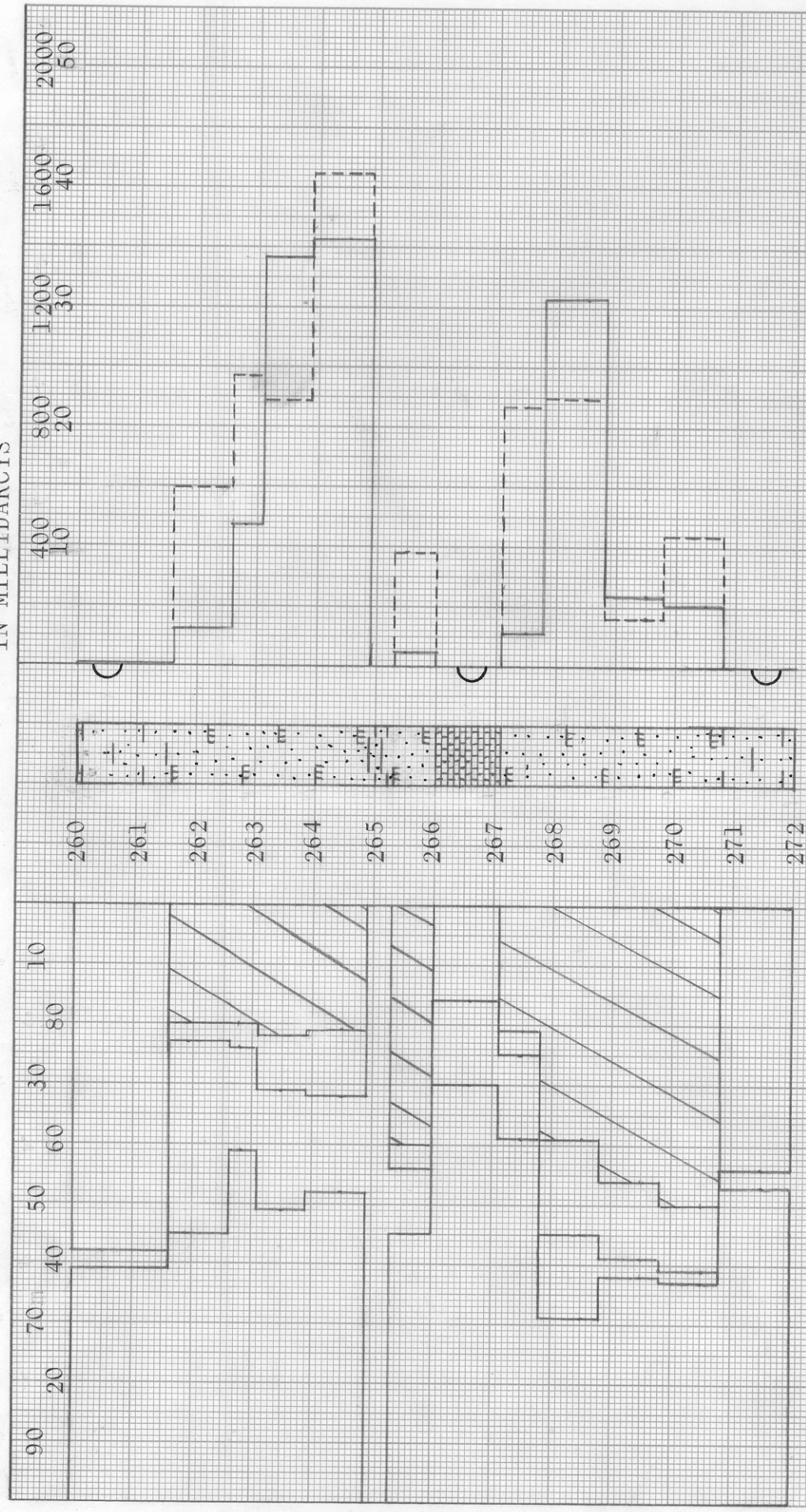
TABLE V

Company	Token Oil, Inc.	Lease	Needham	Well No.	7
Depth Interval, Feet	260.0 - 264.9	265.3 - 272.0	260.0 - 272.0		
Feet of Core Analyzed	3.3	4.4	7.7		
Average Percent Porosity	24.1	17.2	20.2		
Average Percent Original Oil Saturation	27.5	50.8	40.9		
Average Percent Oil Recovery	7.0	10.4	8.9		
Average Percent Residual Oil Saturation	20.5	40.4	32.0		
Average Percent Residual Water Saturation	65.8	51.1	57.4		
Average Percent Total Residual Fluid Saturation	86.3	91.5	89.4		
Average Original Oil Content, Bbls./A. Ft.	521.	683.	614.		
Average Oil Recovery, Bbls./A. Ft.	133.	145.	140.		
Average Residual Oil Content, Bbls./A. Ft.	388.	538.	474.		
Total Original Oil Content, Bbls./Acre	1,720.	3,006.	4,726.		
Total Oil Recovery, Bbls./Acre	438.	639.	1,077.		
Total Residual Oil Content, Bbls./Acre	1,282.	2,367.	3,649.		
Average Effective Permeability, Millidarcys	25.61	13.53	18.71		
Average Initial Fluid Production Pressure, p.s.i.	10.0	12.0	11.1		

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:

SHALY SANDSTONE

SANDY SHALE

IMPERMEABLE TO WATER

FLOODPOT RESIDUAL OIL SATURATION

CALCAREOUS SANDSTONE

LIMESTONE

TOKAN OIL, INC.

MIAMI COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE POROSITY PERCENT	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY MILLIDARCS	CALCULATED OIL RECOVERY BBLs./ACRE
260.0 - 264.9	4.9	22.6	37.7	46.6	589.7	
265.3 - 272.0	6.7	14.6	43.8	47.9	404.8	
260.0 - 272.0	11.6	18.0	41.2	47.3	502.2	2,170 (PRIMARY & WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
NOVEMBER, 1980

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