

OILFIELD RESEARCH LABORATORIES

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

September 30, 1980

Oaks Petroleum, Inc.
c/o Calvin T. Oaks, Jr.
R R # 2
Stoystown, PA 15563

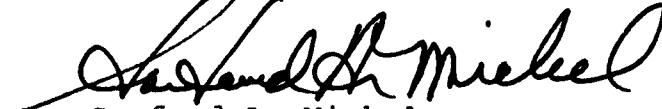
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary cores taken from the N. Freeman Lease, Well No. LO-19, Franklin County, Kansas and submitted to our laboratory on August 28, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Sanford A. Michel

SAM/ks

2 c to Stoystown, PA
2 c to Paola, KS

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Oaks Petroleum, Inc. Lease N. Freeman Well No. LO-19

Location 945' WEL & 600' NSL - SW $\frac{1}{2}$

Section 15 Twp. 17S Rge. 21E County Franklin State Kansas

Elevation, Feet - - - - -

Name of Sand - - - - -	Peru	Upper Squirrel
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Top of Core - - - - -	365.0	516.0
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Bottom of Core - - - - -	375.0	524.6
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Top of Sand - - - - -	365.0	516.0
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Bottom of Sand - - - - -	375.0	523.9
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Total Feet of Permeable Sand - - - - -	10.0	5.4
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Total Feet of Floodable Sand - - - - -	6.2	0.0
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Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

PERU SAND

0 - 20	5.6	5.6
50 - 100	3.3	8.9
320 - 330	1.0	10.0

UPPER SQUIRREL SAND

0 - 5	3.3	3.3
5 - 10	0.8	4.1
10 - 20	1.3	5.4

Average Permeability Millidarcys - - - - -	50.1	5.5
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Average Percent Porosity - - - - -	15.7	17.3
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Average Percent Oil Saturation - - - - -	42.0	29.6
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Average Percent Water Saturation - - - - -	36.5	50.2
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Average Oil Content, Bbls./A. Ft. - - - - -	528.	394.
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Total Oil Content, Bbls./Acre - - - - -	5278.	2878.
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Average Percent Oil Recovery by Laboratory Flooding Tests - - - - -	11.5	0.0
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Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - -	187.	0.0
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Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - -	1159.	0.0
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Total Calculated Oil Recovery, Bbls./Acre - - - - -	See "Calculated Recovery" Section	0.0
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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.

Since only the Peru sand portion of the core responded to flooding susceptibility tests, a calculated recovery is given for the Peru sand only.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval,</u> <u>Feet</u>	<u>Description</u>	<u>PERU SAND</u>
365.0 - 369.3	Brown slightly calcareous sandstone.	
369.3 - 370.0	Hard grayish brown very calcareous sandstone.	
370.0 - 371.1	Brown calcareous sandstone.	
371.1 - 373.2	Hard brown very calcareous sandstone.	
373.2 - 375.0	Grayish brown calcareous sandstone.	

	<u>UPPER SQUIRREL SAND</u>
516.0 - 516.8	Grayish brown slightly shaly sandstone.
516.8 - 517.7	Brown sandstone.
517.7 - 519.0	Grayish light brown very shaly sandstone.
519.0 - 520.6	Light brown very shaly sandstone.
520.6 - 521.2	Gray sandy shale.
521.2 - 523.5	Grayish light brown shaly sandstone.
523.5 - 523.9	Light brown sandstone.
523.9 - 524.6	Gray sandy shale.

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LABORATORY FLOODING TESTSPERU SAND

The Peru sand in this core responded to laboratory flooding tests, as a total recovery of 1159 barrels of oil per acre was obtained from 6.2 feet of sand. The weighted average percent oil saturation was reduced from 44.3 to 32.8, or represents an average recovery of 11.5 percent. The weighted average effective permeability of the samples is 2.93 millidarcys, while the average initial fluid production pressure is 25.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 9 samples tested, 5 produced water and oil. This indicates that approximately 56 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 2330 barrels of oil per acre. This is an average recovery of 376 barrels per acre foot from 6.2 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	15.0
Average porosity, percent	19.5
Oil saturation after flooding, percent	32.8
Performance factor, percent, estimated	50.0
Net floodable sand, feet	6.2

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

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.		
						PERU SAND					
1	365.5	10.4	36	30	66	291	11.	1.0	1.0	291	11.00
2	366.6	19.7	29	36	65	443	69.	1.0	2.0	443	69.00
3	367.5	21.7	32	36	68	539	62.	1.0	3.0	539	62.00
4	368.6	20.0	57	37	94	884	54.	1.3	4.3	1149	70.20
5	369.6	11.9	19	28	47	175	0.65	0.7	5.0	123	0.46
6	370.5	22.6	76	16	92	1333	324.	1.1	6.1	1466	356.40
7	371.5	10.0	37	30	67	287	8.2	0.9	7.0	258	7.38
8	372.4	6.8	52	46	98	274	2.4	1.2	8.2	329	2.88
9	374.6	15.7	31	53	84	378	12.	1.8	10.0	680	21.60
						UPPER SQUIRREL SAND					
10	516.5	14.8	49	47	96	563	8.0	0.8	0.8	450	6.40
11	517.5	16.0	35	44	79	434	11.	0.9	1.7	391	9.90
12	518.5	19.6	34	36	70	517	Imp.	1.3	3.0	672	0.00
13	519.4	16.1	36	53	89	450	0.37	1.0	4.0	450	0.37
14	520.5	16.4	19	62	81	242	Imp.	0.6	4.6	145	0.00
15	521.6	17.4	3	71	74	41	3.1	0.8	5.4	33	2.48
16	522.5	19.5	28	44	72	424	3.3	1.5	6.9	636	4.95
17	523.7	14.2	23	74	97	253	13.3	0.4	7.3	101	5.32

Company Oaks Petroleum, Inc.

Lease N. Freeman

Well No. LO-19

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		Lease		N. Freeman		Well No. LO-19	
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.				
				<u>PERU SAND</u>			
365.0 - 775.0	10.0	50.1	500.92				
				<u>UPPER SQUIRREL SAND</u>			
516.0 - 523.9	5.4	5.5	29.24				
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre		
				<u>PERU SAND</u>			
365.0 - 775.0	10.0	15.7	42.0	36.5	528	5,278	
				<u>UPPER SQUIRREL SAND</u>			
516.0 - 523.9	7.3	17.3	29.6	50.2	394	2,878	

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Oaks Petroleum, Inc. Lease N. Freeman Well No. LO-19

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	365.5	10.5	36	293	PERU SAND	0	36	33	0	Imp.	-
2	366.6	19.5	29	439	2	30	27	60	22	0.15	35
3	367.5	21.6	32	536	5	84	27	61	43	1.60	20
4	368.6	20.0	57	884	20	310	37	45	53	0.52	25
5	369.6	12.3	18	172	0	0	18	32	0	Imp.	-
6	370.5	22.5	76	1327	30	523	46	42	447	12.74	10
7	371.5	10.4	36	290	0	0	36	33	0	Imp.	-
8	372.4	6.8	52	274	0	0	52	47	0	Imp.	-
9	374.6	16.0	31	385	3	37	28	56	12	0.40	35
10	516.5	15.3	48	570	UPPER SQUIRREL SAND	0	48	48	0	Imp.	-
11	517.5	16.0	35	434	0	0	35	49	0	Imp.	-
12	518.5	19.2	35	521	0	0	35	40	0	Imp.	-
13	519.4	16.0	36	447	0	0	36	55	0	Imp.	-
14	520.5	16.3	19	240	0	0	19	62	0	Imp.	-
15	521.6	17.1	3	40	0	0	3	74	5	0.20	45
16	522.5	19.0	29	427	0	0	29	46	0	Imp.	-
17	523.7	14.2	23	253	0	0	23	74	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	Oaks Petroleum, Inc.	Lease	N. Freeman	Well No.	LO-19
			UPPER SQUIRREL SAND		
Depth Interval, Feet	365.0	-	775.0		
Feet of Core Analyzed	6.2				
Average Percent Porosity	19.5				
Average Percent Original Oil Saturation	44.3				
Average Percent Oil Recovery	11.5				
Average Percent Residual Oil Saturation	32.8				
Average Percent Residual Water Saturation	52.7				
Average Percent Total Residual Fluid Saturation	85.5				
Average Original Oil Content, Bbls./A. Ft.	690.				
Average Oil Recovery, Bbls./A. Ft.	187.				
Average Residual Oil Content, Bbls./A. Ft.	503.				
Total Original Oil Content, Bbls./Acre	4277.				
Total Oil Recovery, Bbls./Acre	1159.				
Total Residual Oil Content, Bbls./Acre	3118.				
Average Effective Permeability, Millidarcys	2.93				
Average Initial Fluid Production Pressure, p.s.i.	25.0				

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