



OILFIELD RESEARCH LABORATORIES

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October 15, 1979

Chas. A. Neal & Company
P.O. Box 707
Chanute, Kansas 66720

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Tarter Lease, Well No. T-3, Wilson County, Kansas, and submitted to our laboratory on October 2, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman
Benjamin R. Pearman

SAM:km
5 c to Chanute, Kansas

- REGISTERED ENGINEERS -

CORE ANALYSIS - WATER ANALYSIS - REPRESSURING ENGINEERING - SURVEYING & MAPPING - PROPERTY EVALUATION & OPERATION

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GENERAL INFORMATION & SUMMARY

Company Chas. A. Neal & Company Lease Tarter Well No. T-3

Location _____

Section 21 Twp. 28S Rge. 15E County Wilson State Kansas

Name of Sand - - - - - Bartlesville

Top of Core - - - - - 1004.0

Bottom of Core - - - - - 1036.5

Top of Sand - - - - - 1004.0

Bottom of Sand - - - - - 1036.5

Total Feet of Permeable Sand - - - - - 12.9

Total Feet of Floodable Sand - - - - - 3.7

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 100	4.7	4.7
100 - 200	3.9	8.6
300 - 500	2.0	10.6
1000 - 1500	1.0	11.6
1500 - 2500	1.3	12.9

Average Permeability Millidarcys - - - - - 413.0

Average Percent Porosity - - - - - 16.5

Average Percent Oil Saturation - - - - - 29.7

Average Percent Water Saturation - - - - - 55.2

Average Oil Content, Bbls./A. Ft. - - - - - 336.

Total Oil Content, Bbls./Acre - - - - - 5,101.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 4.8

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 73.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 271.

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

Packer Setting, Feet - - - - -

Viscosity, Centipoises @ - - - - -

A. P. I. Gravity, degrees @ 60 °F - - - - -

Elevation, Feet - - - - -

The core was sampled by a representative of Oilfield Research Laboratories. 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:

<u>Depth Interval, Feet</u>	<u>Description</u>
1004.0 - 1005.3	Gray and light brown laminated sandstone and shale.
1005.3 - 1006.3	Brown sandstone with fine shale partings.
1006.3 - 1010.0	Brown sandstone.
1010.0 - 1012.0	Gray sandy shale.
1012.0 - 1012.7	Light brown very shaly sandstone.
1012.7 - 1013.4	Gray shale.
1013.4 - 1014.0	Brown and gray laminated sandstone and shale.
1014.0 - 1015.0	Brown and gray laminated sandstone and shale.
1015.0 - 1024.0	Loss.
1024.0 - 1024.4	Brown slightly shaly sandstone.
1024.4 - 1025.7	Gray sandy shale.
1025.7 - 1026.0	Grayish very shaly sandstone.
1026.0 - 1026.6	Gray sandy shale.
1026.6 - 1029.3	Brown sandstone.
1029.3 - 1033.0	Gray sandy shale.
1033.0 - 1036.5	Light brown sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 271 barrels of oil per acre was obtained from 3.7 feet of sand. The weighted average percent oil saturation was reduced from 37.1 to 32.3, or represents an average

recovery of 4.8 percent. The weighted average effective permeability of the samples is 2.56 millidarcys, while the average initial fluid production pressure is 26.3 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 18 samples tested, 4 produced water and oil, and 11 samples produced water only. This indicates that approximately 22 percent of the sand represented by these samples is floodable pay sand. The tests also show that the sand has a wide range of permeability profile.

CALCULATED RECOVERY

It would appear from a study of the data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 1,010 barrels of oil per acre. This is an average recovery of 273 barrels per acre foot from 3.7 feet of floodable sand analyzed in this core.

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

Original formation volume factor	1.07
Reservoir water saturation, percent	20.0
Average porosity, percent	18.4
Oil saturation after flooding, percent	32.3
Performance factor, percent	45.0
Net floodable pay sand, feet	3.7

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

T-3

Well No.

Tarter

Lease

Company Chas. A. Neal & Company

Company

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 m.d.
			Oil	Water			Ft.	Cum. Ft.		
1	1004.5	8.7	30	64	202	Imp.	1.3	1.3	263	0.00
2	1005.5	18.4	32	21	457	72.	1.0	2.3	457	72.00
3	1006.7	16.0	39	42	484	38.	0.7	3.0	339	26.60
4	1007.6	19.5	40	46	605	407.	1.0	4.0	605	407.00
5	1008.6	17.3	35	43	470	141.	1.0	5.0	470	141.00
6	1009.5	20.6	35	38	559	62.	1.0	6.0	559	62.00
7	1012.6	9.4	30	64	219	Imp.	0.7	6.7	153	0.00
8	1013.6	8.6	74	20	494	24.	0.6	7.3	296	14.40
9	1014.5	7.9	42	53	257	13.	1.0	8.3	257	13.00
10	1024.2	17.6	25	51	341	5.4	0.4	8.7	136	2.16
11	1025.9	27.6	11	73	236	Imp.	0.3	9.0	71	0.00
12	1026.7	22.3	21	53	363	173.	0.4	9.4	145	69.20
13	1027.6	25.4	12	83	256	2,044.	1.0	10.4	256	2044.00
14	1028.5	28.4	9	86	198	1,226.	1.0	11.4	198	1226.00
15	1029.1	22.3	14	69	242	1,752.	0.3	11.7	73	525.60
16	1033.2	19.7	14	67	214	382.	1.0	12.7	214	382.00
17	1034.5	17.3	21	63	282	173.	1.0	13.7	282	173.00
18	1035.9	7.8	36	57	218	113.	1.5	15.2	327	169.50

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Chas. A. Neal & Company

Lease Tarter

Well No. T-3

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation		Volume of Water Recovered cc ^a	Effective Permeability Millidarcys ^b	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water			
1	1004.5	8.8	30	205	0	0	30	66	0	Imp.	40
2	1005.5	18.4	32	457	0	0	32	65	7	0.22	30
3	1006.7	16.4	39	496	4	51	35	63	88	1.87	20
4	1007.6	19.0	40	590	7	103	33	60	53	0.75	35
5	1008.6	17.6	35	478	4	55	31	67	38	0.90	20
6	1009.5	20.1	35	546	4	62	31	66	337	6.52	20
7	1012.6	9.4	29	211	0	0	29	64	0	Imp.	-
8	1013.6	8.6	72	480	0	0	72	22	0	Imp.	-
9	1014.5	8.1	41	258	0	0	41	57	310	5.40	10
10	1024.2	18.0	25	349	0	0	25	71	115	57.40	10
11	1025.9	27.2	12	253	0	0	12	84	304	86.83	5
12	1026.7	22.3	22	381	0	0	22	74	194	12.85	20
13	1027.6	25.9	13	261	0	0	13	83	377	221.16	5
14	1028.5	28.7	11	245	0	0	11	85	173	97.46	5
15	1029.1	22.3	16	277	0	0	16	81	272	15.49	5
16	1033.2	20.0	16	248	0	0	16	80	183	41.23	10
17	1034.5	17.6	23	314	0	0	23	73	294	13.92	10
18	1035.9	8.0	34	211	0	0	34	64	229	17.99	10

Notes: cc—cubic centimeter.

^a—Volume of water recovered at the time of maximum oil recovery.

^b—Determined by passing water through sample which still contains residual oil.

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company Chas. A. Neal & Company

Lease Tarter

Well No. T-3

Depth Interval, Feet 1004.0 - 1010.0

Feet of Core Analyzed 3.7

Average Percent Porosity 18.4

Average Percent Original Oil Saturation 37.1

Average Percent Oil Recovery 4.8

Average Percent Residual Oil Saturation 32.3

Average Percent Residual Water Saturation 64.1

Average Percent Total Residual Fluid Saturation 96.4

Average Original Oil Content, Bbls./A. Ft. 534.

Average Oil Recovery, Bbls./A. Ft. 73.

Average Residual Oil Content, Bbls./A. Ft. 461.

Total Original Oil Content, Bbls./Acre 1,977.

Total Oil Recovery, Bbls./Acre 271.

Total Residual Oil Content, Bbls./Acre 1,706.

Average Effective Permeability, Millidarcys 2.56

Average Initial Fluid Production Pressure, p.s.i. 26.3

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