OIL FIELD RESEARCH LABORATORIES
CHANUTE, KANSAS

February 27, 1952

12-31-16E

Layton Oil Company
P. O. Box 263
Independence, Kansas

Gentlemen:

Enclosed herewith is the report of the analysis of the Cable Tool core taken from the Barsch Lease, Well No. 102, Montgomery County, Kansas, and submitted to our laboratory on February 20, 1952.

Very truly yours,

OIL FIELD RESEARCH LABORATORIES

Carl L. Pate

Carl L. Pate

CLP:eda
o.c.

102

Barsch

LAYTON OIL COMPANY

CORE ANALYSIS REPORT

BARSCH LEASE WELL NO. 102

MONTGOMERY COUNTY, KANSAS

OIL FIELD RESEARCH LABORATORIES

CHANUTE, KANSAS

FEBRUARY 27, 1952

Oil Field Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Layton Oil Company Lease Barsch Well No. 102

Location SE¼

Section 12 Twp. 31S Rge. 16E County Montgomery State Kansas

Name of Sand	Bartlesville
Top of Core	916.65
Bottom of Core	938.50
Top of Sand Pay	925.30
Bottom of Sand Pay	935.80
Total Feet of Permeable Sand	15.55
Total Feet of Floodable Sand	10.50

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 4	4.05	4.05
4 - 8	2.75	6.80
8 - 12	3.50	10.30
12 - 18	3.30	13.60
18 & above	1.95	15.55

Average Permeability Millidarcys	9.27
Average Percent Porosity	17.10
Average Percent Oil Saturation	42.95
Average Percent Water Saturation	35.02
Average Oil Content, Bbls./A. Ft.	583.
Total Oil Content, Bbls./Acre	11,191.
Average Percent Oil Recovery by Laboratory Flooding Tests	22.48
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	316.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	3,315.
Total Calculated Oil Recovery, Bbls./Acre	3,150.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

In order to get a true water saturation of the sand, oil was used as the circulating fluid during the cutting of this core.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
916.65 - 917.00	Limestone.
917.00 - 917.30	Gray sandy shale.
917.30 - 917.40	Limestone.
917.40 - 920.95	Gray sandy shale.
920.95 - 922.30	Brown fine grained micaceous sandstone.
922.30 - 922.55	Gray sandy shale.
922.55 - 928.00	Brown fine grained micaceous sandstone.
928.00 - 929.50	Dark fine grained micaceous sandstone.
929.50 - 930.00	Brown fine grained micaceous sandstone.
930.00 - 935.80	Dark fine grained micaceous sandstone.
935.80 - 938.40	Dark fine grained micaceous carbonaceous sandstone.
938.40 - 938.50	Gray sandy shale.

Coring was started at a depth of 916.65 feet in limestone and completed at 938.50 feet in gray sandy shale. This core shows a total of 19.20 feet of formation containing oil, however, 17.90 feet is sandstone. The pay is made up of fine grained micaceous sandstone.

PERMEABILITY

For the sake of distribution, the core was divided into three sections. The weighted average permeability of the upper, middle

and lower sections is 3.56, 12.45 and 2.33 millidarcys respectively; the overall average being 9.27 (See Table II). By observing the data given on the coregraph, it is noticeable that the pay sand has a fairly uniform permeability profile.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a good weighted average percent oil saturation, namely, 42.95. The weighted average percent oil saturation of the upper, middle and lower sections is 33.74, 50.08 and 35.77 respectively. The weighted average percent water saturation of the upper, middle and lower sections is 43.41, 30.58 and 32.38 respectively; the overall average being 35.02 (See Table IV). This gives an overall weighted average total fluid saturation of 77.97 percent. This comparatively low total fluid saturation indicates that an appreciable amount of fluid was lost during coring, which was probably oil.

For future reference, all of the saturation samples were analyzed for chloride content. The reason for this was to determine the true average chloride content of the pay sand.

The weighted average oil content of the upper, middle and lower sections is 396, 706 and 522 barrels per acre respectively; the overall average being 583. The total oil content, as shown by this core, is 11,191 barrels per acre (See Table IV).

LABORATORY FLOODING TESTS

The sand in this core responded very well to laboratory flooding tests, as a total recovery of 3,315 barrels of oil per acre was obtained

from 10.50 feet of sand. The weighted average percent oil saturation was reduced from 49.09 to 26.61, or represents an average recovery of 22.48 percent. The weighted average effective permeability of the samples is 0.589 millidarcys, while the average initial fluid production pressure is 42.5 pounds per square inch (See Table VI).

By observing the data given in Table V, you will note that of the 19 samples tested, 10 produced water and 10 oil. This indicates that approximately 52.5 percent of the formation representing these samples is floodable. The tests also show that fairly high pressures were required to force the sand to take water.

CONCLUSION

From a study of the above data, we believe that an efficient water flood within the vicinity of this well will recover approximately 3,150 barrels of oil per acre, or an average of 300 barrels per acre foot from the 10.50 feet of floodable sand analyzed. In calculating this recovery, an allowance was made for oil lost during coring and it was assumed that the primary production is 10 percent.

The principle drawback of this core is the fact that it contains only 10.50 feet of good floodable sand. The sand is fairly tight, however, it is not to tight for its depth.

Oil Field Research Laboratories

RESULTS OF PERMEABILITY TESTS

TABLE I

Company Layton Oil Company Lease Barsch Well No. 102

Sample No.	Depth, Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
1	916.90	Imp.	0.35	0.35	0.00
2	917.35	Imp.	0.10	0.45	0.00
3	917.80	Imp.	0.55	1.00	0.00
4	918.10	Imp.	0.25	1.25	0.00
5	918.30	Imp.	0.40	1.65	0.00
6	918.90	Imp.	0.60	2.25	0.00
7	919.55	Imp.	0.60	2.85	0.00
8	921.53	1.2	0.75	3.60	0.90
9	922.00	2.5	0.60	4.20	1.50
10	922.77	Imp.	0.35	4.55	0.00
11	923.10	1.7	0.40	4.95	0.68
12	923.47	3.3	0.30	5.25	0.99
13	923.80	3.9	0.50	5.75	1.95
14	924.35	8.3	0.60	6.35	4.98
15	925.00	4.1	0.50	6.85	2.05
16	925.50	2.9	0.40	7.25	1.16
17	925.75	9.5	0.40	7.65	3.80
18	926.30	7.9	0.55	8.20	4.35
19	926.80	8.9	0.55	8.75	4.90
20	927.35	5.5	0.40	9.15	2.20
21	927.70	4.3	0.50	9.65	2.15
22	928.35	11.	0.60	10.25	6.60
23	928.75	21.	0.30	10.55	6.30
24	929.05	Imp.	0.30	10.85	0.00
25	929.40	7.9	0.30	11.15	2.37
26	929.85	17.	0.50	11.65	9.50
27	930.07	12.	0.30	11.95	3.60
28	930.45	9.7	0.40	12.35	3.88
29	930.90	19.	0.40	12.75	7.60
30	931.40	18.	0.50	13.25	9.00
31	931.80	8.4	0.40	13.65	3.36
32	932.15	13.	0.30	13.95	3.90
33	932.45	15.	0.35	14.30	5.25
34	932.85	16.	0.35	14.65	5.60
35	933.15	18.	0.30	14.95	5.40
36	933.45	16.	0.35	15.30	5.60
37	933.85	11.	0.35	15.65	3.85
38	934.25	20.	0.45	16.10	9.00
39	934.65	12.	0.40	16.50	4.80
40	935.05	17.	0.40	16.90	6.80

Oil Field Research Laboratories

RESULTS OF PERMEABILITY TESTS

TABLE I

Company Layton Oil Company Lease Baresh Well No. 102

Sample No.	Depth, Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
41	935.40	12.	0.35	17.25	4.20
42	935.75	11.	0.20	17.45	2.20
43	936.10	4.9	0.50	17.95	2.45
44	936.50	0.87	0.40	18.35	0.35
45	936.95	Imp.	0.55	18.90	0.00
46	937.50	Imp.	0.45	19.35	0.00
47	937.85	1.2	0.40	19.75	0.48
48	938.33	1.5	0.30	20.05	0.45

Oil Field Research Laboratories

SUMMARY OF PERMEABILITY TESTS

TABLE II

Company Layton Oil Company Lease Barsch Well No. 102

Depth Interval Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity, Ft. x Md.
916.65 - 925.30	3.75	3.56	13.34
925.30 - 935.80	10.20	12.45	127.08
935.80 - 938.40	1.60	2.33	3.73
916.65 - 938.40	15.55	9.27	144.15

Oil Field Research Laboratories

RESULTS OF SATURATION TESTS

TABLE III

Company Layton Oil Company Lease Barsch Well No. 102

Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum. Ft.	
3	918.45	13.8	14.6	62.7	82.3	156	0.90	0.90	140
4	919.40	12.3	15.4	64.6	80.0	147	1.10	2.00	162
5	921.05	14.7	39.2	35.8	75.0	447	0.75	2.75	335
6	922.20	15.1	47.0	28.6	75.6	551	0.60	3.35	331
8	923.30	15.9	54.5	27.8	82.3	673	1.15	4.50	774
9	924.10	16.8	41.7	29.6	71.3	543	0.70	5.20	380
10	924.70	14.4	29.4	45.0	74.4	328	0.90	6.10	295
11	925.98	16.8	56.7	30.2	86.9	740	1.25	7.35	925
12	927.15	17.2	45.9	30.6	76.5	613	0.95	8.30	582
F-12A	927.95	17.4	30.3	-	-	409	0.50	8.80	205
13	928.85	18.7	55.2	24.4	79.6	801	1.50	10.30	1,202
14	929.60	19.0	54.2	32.7	869	800	0.50	10.80	400
15	930.60	18.2	56.5	28.6	85.1	799	1.25	12.05	999
16	931.95	19.4	45.3	33.6	78.9	684	1.25	13.30	855
17	933.00	18.2	49.5	30.3	79.8	700	1.00	14.30	700
18	934.05	18.0	41.4	37.1	78.5	578	1.10	15.40	636
19	935.25	18.3	53.5	31.0	84.5	760	1.20	16.60	912
20	936.30	19.0	27.2	39.2	66.4	402	0.65	17.25	261
21	936.65	18.9	48.0	27.9	75.9	705	0.75	18.00	529
22	938.05	18.6	32.8	31.5	64.3	473	1.20	19.20	568
						Total - - - -	- - - -		11,191

Note: "A" Sample was taken from core after it was received in the laboratory.

Oil Field Research Laboratories

SUMMARY OF SATURATION TESTS

TABLE IV

Company Layton Oil Company Lease Barsch Well No. 102

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
918.00-925.30	6.10	14.61	33.74	43.41	396	2,417
925.30-935.80	10.50	18.13	50.08	30.58	706	7,416
935.80-938.40	2.60	18.81	35.77	32.38	522	1,358
918.00-938.40	19.20	17.10	42.95	35.02	583	11,191

Oil Field Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE V

Company Layton Oil Company Lease Barsch Well No. 102

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.
			Percent	Bbls./A. Ft.	Percent	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
3	918.45	13.9	13.0	140	0.0	0	13.0	68.6	140	0	Imp.	50#
4	919.40	11.9	14.7	136	0.0	0	14.7	70.0	136	0	Imp.	50#
6	922.20	14.5	44.8	505	0.0	0	44.8	40.4	505	0	Imp.	50#
8	923.30	15.8	55.2	677	0.0	0	55.2	40.0	677	0	Imp.	50#
9	924.10	16.5	43.3	556	0.0	0	43.3	47.2	556	0	Imp.	50#
10	924.70	14.4	31.0	346	0.0	0	31.0	55.0	346	0	Imp.	50#
11	925.98	16.4	56.9	724	24.8	316	32.1	57.2	408	4	0.213	50
12	927.15	17.2	45.8	612	14.4	192	31.4	61.0	420	3	0.104	50
12A	927.95	17.4	30.3	409	7.2	97	23.1	60.4	312	11	0.273	50
13	928.85	18.5	53.5	769	27.4	394	26.1	65.6	375	8	0.282	50
14	929.60	19.4	52.8	796	29.2	440	23.6	67.2	356	29	0.697	25
15	930.60	17.8	56.9	785	32.4	447	24.5	69.5	338	17	0.446	50
16	931.95	19.6	43.1	656	19.3	294	23.8	70.1	362	52	1.38	25
17	933.00	18.7	48.2	700	26.0	378	22.2	65.2	322	55	1.65	25
18	934.05	17.5	39.8	541	14.2	193	25.6	65.0	348	11	0.629	50
19	935.25	18.0	51.7	723	21.5	301	30.2	62.3	422	10	0.247	50
20	936.30	18.8	28.0	409	0.0	0	28.0	42.5	409	0	Imp.	50#
21	936.65	18.5	49.3	709	0.0	0	49.3	30.4	709	0	Imp.	50#
22	938.05	18.8	30.7	448	0.0	0	30.7	39.5	448	0	Imp.	50#

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.
"A" - Sample was taken from core after it was received in the laboratory.

Oil Field Research Laboratories

SUMMARY OF LABORATORY FLOODING TESTS

TABLE VI

Company Layton Oil Company Lease Baresch Well No. 102

Depth Interval Feet	925.30 - 935.80
Feet of Core Analyzed	10.50
Average Percent Porosity	18.03
Average Percent Original Oil Saturation	49.09
Average Percent Oil Recovery	22.48
Average Percent Residual Oil Saturation	26.61
Average Percent Residual Water Saturation	64.25
Average Percent Total Residual Fluid Saturation	90.86
Average Original Oil Content, Bbls./A. Ft.	686.
Average Oil Recovery, Bbls./A. Ft.	316.
Average Residual Oil Content, Bbls./A. Ft.	370.
Total Original Oil Content, Bbls./Acre	7,205.
Total Oil Recovery, Bbls./Acre	3,315.
Total Residual Oil Content, Bbls./Acre	3,890.
Average Effective Permeability, Millidarcys	0.589
Average Initial Fluid Production Pressure, p.s.i.	42.5

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

Oil Field Research Laboratories

RESULTS OF WATER DIFFERENTIATION TESTS

TABLE VII

Company Layton Oil Company Lease Barsch Well No. 102

Sample No.	Depth, Feet	Chloride Content of Brine in Sand ppm	Percent Water Saturation Connate	Drilling & Foreign	Total
3	918.45	41,900			
4	919.40	41,600			
5	921.05	49,400			
6	922.20	52,600			
8	923.30	49,000			
9	924.10	48,000			
10	924.70	47,300			
11	925.98	49,600			
12	927.15	51,100			
13	928.85	56,200			
14	929.60	46,300			
15	930.60	54,900			
16	931.95	40,900			
17	933.00	46,400			
18	934.05	49,200			
19	935.25	51,100			
20	936.30	45,100			
21	936.65	56,800			
22	938.05	51,400			

Note: ppm - parts per million.

Oil Field Research Laboratories

SUMMARY OF WATER DIFFERENTATION TESTS

TABLE VIII

Company Layton Oil Company Lease Baresh Well No. 102

Depth Interval, Feet	Chloride Content of Brine in Sand, ppm	Average Percent Connate Water	Average Percent Drilling & Foreign Water
918.00 - 925.30	46,656		
925.30 - 935.80	49,959		
935.80 - 938.40	51,383		
918.00 - 938.40	48,960		

Note: ppm - parts per million.