

OILFIELD RESEARCH LABORATORIES

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January 18, 1962

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

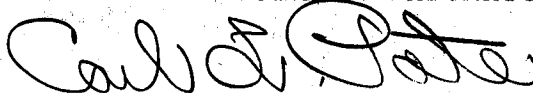
Gentlemen:

Enclosed herewith is the report of the analysis of the Rotary core taken from the Schaal Lease, Well No. N-7, Neosho County, Kansas, and submitted to our laboratory on January 13, 1962.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Carl L. Pate

CLP:rf

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GENERAL INFORMATION & SUMMARY

Company Layton Oil Co. Lease Schaal Well No. N-7

Location SE NE SW

Section 19 Twp. 27S Rge. 13E County Neosho State Kansas

Name of Sand - - - - - Bartlesville

Top of Core - - - - - 746.0

Bottom of Core - - - - - 802.0

Top of ^{Pay} Sand - - - - - 794.7

Bottom of Sand - - - - - 800.5

Total Feet of Permeable Sand - - - - - 9.5

Total Feet of Floodable Sand - - - - - 5.3

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

0 - 5	3.2	3.2
5 - 10	2.0	5.2
10 - 20	1.9	7.1
20 & above	2.4	9.5

Average Permeability Millidarcys - - - - - 12.1

Average Percent Porosity - - - - - 16.8

Average Percent Oil Saturation - - - - - 41.2

Average Percent Water Saturation - - - - - 33.2

Average Oil Content, Bbls./A. Ft. - - - - - 539.

Total Oil Content, Bbls./Acre - - - - - 5,391.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 13.9

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 187.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 971.

Total Calculated Oil Recovery, Bbls./Acre - - - - - 1,865.

Packer Setting, Feet - - - - -

Viscosity, Centipoises @ - - - - -

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

Elevation, Feet - - - - -

Fresh water was used as a circulating fluid in the coring of the sand in this well. This well was drilled in a virgin area.

The core was sampled and sealed in plastic bags by a representative of the client.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval,</u>	<u>Description</u>
<u>Feet</u>	

746.0 - 747.5	- Grayish brown shaley sandstone.
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747.5 - 748.5	- Shale.
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748.5 - 749.0	- Brown to dark shaley, carbonaceous sandstone.
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749.0 - 790.0	- Drilled.
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790.0 - 790.5	- Shale.
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790.5 - 800.5	- Fine grained, brown, slightly shaley sandstone.
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800.5 - 802.0	- Shale.
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Coring was started at a depth of 746.0 feet in grayish brown shaley sandstone and completed at 802.0 feet in shale. This core shows a total of 13.0 feet of sandstone. For the most part, the pay is made up of brown fine grained slightly shaley sandstone.

PERMEABILITY

For the sake of distribution, the core was divided into two sections. The weighted average permeability of the upper and lower sections is 2.2 and 19.9 millidarcys respectively; the overall average being 12.1 (See Table III). By observing the data given on the coregraph, it is noticeable that the sand has a rather wide variation in permeability. The permeability of the sand varies from 0.40 to a maximum of 35. millidarcys. The two samples taken above a depth of 790.5 feet were not included in the above averages.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a good weighted average percent oil

saturation, namely, 41.2. The weighted average percent oil saturation of the upper and lower sections is 39.3 and 42.6 respectively. The weighted average percent water saturation of the upper and lower sections is 37.8 and 29.5 respectively; the overall average being 33.2 (See Table III). This gives an overall weighted average total fluid saturation of 74.4 percent. This low total fluid saturation indicates considerable fluid was lost during coring which probably was oil.

The weighted average oil content of the upper and lower sections is 486 and 578 barrels per acre foot respectively; the overall average being 539. The total oil content, as shown by this core, is 5,391 barrels per acre (See Table III).

LABORATORY FLOODING TESTS

Part of the sand in this core responded very well to laboratory flooding tests, as a total recovery of 971 barrels of oil per acre was obtained from 5.2 feet of sand. The weighted average percent oil saturation was reduced from 42.4 to 28.5, or represents an average recovery of 13.9 percent. The weighted average effective permeability of the samples is 0.31 millidarcys, while the average initial fluid production pressure is 33.8 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 10 samples tested, 5 produced water and 6 oil. This indicates that approximately 60 percent of the sand represented by these samples is floodable pay sand. The tests also show that the sand has a comparatively uniform effective permeability. The tests show that the pay sand section extends from 794.7 to 800.5 feet (lower section).

CONCLUSION

From a study of the above data, it is evident that approximately 482 barrels of oil per acre can be recovered, from the area represented by this core, by efficient primary production methods. An additional

recovery of approximately 1,383 barrels per acre or an average of 261 barrels per acre foot can be expected by efficient water repressuring. This gives a total recovery of 1,865 barrels of oil per acre. The following data and assumptions were used in calculating the above recovery values:

Formation volume factor	1.06
Irreducible water saturation, percent	26.0
Primary oil recovery	None.
Present oil saturation, percent	71.2
Oil saturation after flooding, percent	28.5
Percent porosity	17.5
Performance factor	0.55
Pay sand thickness, feet	5.3
Reported A.P.I. gravity, degrees	30.0

This core shows a thin pay sand section having a good oil saturation and a fairly low water saturation and permeability.

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.		
A	746.5						0.42	0.5	0.5		0.21
B	748.8						Imp.	0.5	1.0		0.00
1	791.2	15.5	34	44	78	409	1.0	1.2	2.2	491	1.20
2	792.2	17.3	37	33	70	497	1.5	1.0	3.2	497	1.50
3	793.2	14.5	44	41	85	495	0.40	1.0	4.2	495	0.40
4	794.2	16.7	43	32	75	557	6.3	1.0	5.2	557	6.30
5	795.2	17.3	42	29	71	564	9.4	1.0	6.2	564	9.40
6	796.2	17.0	44	29	73	580	12.	0.9	7.1	522	10.80
F-7	797.0	16.3	39	-	-	493	-	0.5	7.6	246	-
7	797.2	17.6	44	28	72	601	22.	0.6	8.2	361	13.20
8	798.2	17.2	41	30	71	547	19.	1.0	9.2	547	19.00
9	799.2	17.6	44	32	76	601	25.	1.0	10.2	601	25.00
10	800.2	19.1	43	28	71	637	35.	0.8	11.0	510	28.00
							Total			5,391	

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company <u>Layton Oil Co.</u>		Lease <u>Schaal</u>		Well No. <u>N-7</u>	
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
790.5 - 794.7	4.2	2.2	9.40		
794.7 - 800.5	5.3	19.9	105.40		
790.5 - 800.5	9.5	12.1	114.80		

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 Bbbl./Acre
790.5 - 794.7	4.2	16.0	39.3	37.8	486	2,040
794.7 - 800.5	5.8	17.5	42.6	29.5	578	3,351
790.5 - 800.5	10.0	16.8	41.2	33.2	539	5,391

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Well No. N-7

Schall

Lease

Layton Oil Co.

Company

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation		Volume of Water Recovered cc.	Effective Permeability mDarcy-cm.	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water			
1	791.2	16.0	30	372	0	0	30	52	0	Imp.	-
2	792.2	16.8	34	443	0	0	34	43	0	Imp.	-
3	793.2	14.3	42	466	0	0	42	46	0	Imp.	-
4	794.2	16.4	40	509	0	0	40	45	0	Imp.	-
5	795.2	16.9	42	551	14	184	28	59	4	0.200	40
6	796.2	16.7	44	570	15	194	29	58	2	0.200	50
7	797.0	16.3	39	493	6	76	33	55	0	0.075	50
8	798.2	17.1	41	543	13	172	28	65	16	0.500	20
9	799.2	17.2	44	587	15	200	29	66	10	0.300	30
10	800.2	19.2	43	640	17	253	26	65	22	0.500	20

Notes: cc—cubic centimeter.

*—Volumes of water recovered at the time of maximum oil recovery.

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Layton Oil Co.	Lease	Schaal	Well No.	N-7
Depth Interval, Feet	794.7 - 800.5				
Feet of Core Analyzed	5.2				
Average Percent Porosity	17.2				
Average Percent Original Oil Saturation	42.4				
Average Percent Oil Recovery	13.9				
Average Percent Residual Oil Saturation	28.5				
Average Percent Residual Water Saturation	61.9				
Average Percent Total Residual Fluid Saturation	90.4				
Average Original Oil Content, Bbls./A. Ft.	568.				
Average Oil Recovery, Bbls./A. Ft.	187.				
Average Residual Oil Content, Bbls./A. Ft.	381.				
Total Original Oil Content, Bbls./Acre	2,952.				
Total Oil Recovery, Bbls./Acre	971.				
Total Residual Oil Content, Bbls./Acre	1,981.				
Average Effective Permeability, Millidarcys	0.31				
Average Initial Fluid Production Pressure, p.s.i.	33.8				

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