● CORE ANALYSIS ● WATER REPRESSURING ENGINEERING ● WATER ANALYSIS ● FLOODING WATER TREATMENT ● SURVEYING

OILFIELD RESEARCH LABORATORIES

- REGISTERED ENGINEERS -

813 EAST SIXTH
OKMULGEE, OKLAHOMA
PHONE: 1486

Chanute, Kansas

536 N. HIGHLAND
CHANUTE, KANSAS
PHONE: 728

May 18, 1959

C. W. & Edna M. Staats
Box 151
Bartlesville, Oklahoma

Gentlemen:

Enclosed herewith is the report of the analysis of the Cable Tool core samples taken from the Staats Lease, Well No. 1, Chautauqua County, Kansas, and shipped to our laboratory on May 10, 1959.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Carl L. McElrea

CLM:jh

5 c.

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company C. W. & Edna M. Staats Lease Staats Well No. 1

Location NE¼, NE¼, NW¼

Section 25 Twp. 33S Rge. 10E County Chautauqua State Kansas

Name of Sand	Layton
Top of Core	898.0
Bottom of Core	914.0
Top of Sand (According to driller)	896.0
Bottom of Sand	?
Total Feet of Permeable Sand	12.0
Total Feet of Floodable Sand	

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 25	3.3	3.3
25 - 50	2.7	6.0
50 - 75	2.6	8.6
75 & above	3.4	12.0

Average Permeability Millidarcys	51.7
Average Percent Porosity	20.8
Average Percent Oil Saturation	18.0
Average Percent Water Saturation	61.4
Average Oil Content, Bbls./A. Ft.	286.
Total Oil Content, Bbls./Acre	4,013.
Average Percent Oil Recovery by Laboratory Flooding Tests	
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	
Total Calculated Oil Recovery, Bbls./Acre	
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

The sand was cored in water.

This core was sampled and the samples were sealed in plastic bags by a representative of the client.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
898.0 - 900.0	Light brown sandstone.
900.0 - 901.0	Gray and light brown calcarceous sandstone.
901.0 - 912.0	Grayish light brown slightly shaley sandstone.
912.0 - 914.0	Limey sand according to field log.

Coring was started at a depth of 898.0 feet in light brown sandstone and completed at 914.0 feet in limey sand. This core shows a total of 14.0 feet of sandstone. For the most part, the pay is made up of grayish light brown 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 85.3 and 30.1 millidarcys respectively; the overall average being 51.7 (See Table III). By observing the data given on the coregraph, it is noticeable that the sand has a rather irregular permeability profile. The permeability of the sand varies from 3.5 to a maximum of 107 millidarcys.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a low weighted average percent oil saturation, namely, 18.0. The weighted average percent oil saturation of the upper and lower sections is 23.2 and 13.2 respectively. The

weighted average percent water saturation of the upper and lower sections is 56.8 and 65.5 respectively; the overall average being 61.4 (See Table III). This gives an overall weighted average total fluid saturation of 79.4 percent.

The weighted average oil content of the upper and lower sections is 355 and 224 barrels per acre foot respectively; the overall average being 286. The total oil content, as shown by this core, is 4,013 barrels per acre (See Table III).

LABORATORY FLOODING TESTS

The sand in this core did not respond satisfactorily to laboratory flooding tests as none of the samples tested produced oil. It is evident that this was due to the low oil saturation of the sand.

By observing the data given in Table IV, you will note that of the 10 samples tested, 9 produced water. This indicates that approximately 90 percent of the sand represented by these samples will take water. The tests also show that the sand has a comparatively uniform effective permeability.

CONCLUSION

This core shows a slightly shaley sand section having low oil and high water saturations. The sand for the most part has good effective permeability. The low oil and high water saturations may be partly due to flushing of the sand during coring.

The sand did not respond satisfactorily to laboratory flooding tests as none of the samples tested produced oil. However, the results of these tests indicate that no difficulty should be encountered in forcing the sand to take water. These tests indicate that the cored section has 7.6 feet of sand with good effective permeability.

Oilfield Research Laboratories

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company C. W. & Edna M. Staats Lease Staats Well No. 1

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	898.2	21.8	21	49	70	354	58.	0.6	0.6	212	34.80
2	899.2	21.8	25	50	75	422	107.	1.4	2.0	591	149.80
3	900.2	10.3	26	62	88	208	Imp.	1.0	3.0	208	0.00
4	901.2	20.0	20	59	79	310	32.	0.7	3.7	217	22.40
5	902.2	21.2	22	59	81	362	95.	1.0	4.7	362	95.00
6	903.2	22.0	23	59	82	392	99.	1.0	5.7	392	99.00
7	904.2	22.2	23	60	83	396		1.0	6.7	396	
8	905.2	20.5	4	84	88	64	3.5	1.0	7.7	64	3.50
9	906.2	23.1	17	64	81	304	32.	1.0	8.7	304	32.00
10	907.2	22.1	17	55	72	291	50.	1.0	9.7	291	50.00
11	908.2	21.5	16	59	75	266	59.	1.0	10.7	266	59.00
12	909.2	21.4	13	70	83	216	40.	1.0	11.7	216	40.00
13	910.2	21.6	14	62	76	234	9.4	1.0	12.7	234	9.40
14	911.2	21.5	12	65	77	200	20.	1.3	14.0	260	26.00
								Total	- - -	4,013	

Oilfield Research Laboratories

SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III - B

Company C. W. & Edna M. Staats Lease Staats Well No. 1

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
898.0 - 903.7	4.7	85.3	401.00
904.7 - 912.0	7.3	30.1	219.90
898.0 - 912.0	12.0	51.7	620.90

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
898.0 - 904.7	6.7	19.9	23.2	56.8	355	2,378
904.7 - 912.0	7.3	21.7	13.2	65.5	224	1,635
898.0 - 912.0	14.0	20.8	18.0	61.4	286	4,013

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company C. W. & Edna M. Staats Lease Staats Well No. 1

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	Bbls./A. Ft.			
1	898.2	21.8	22	372	0	0	22	72	372	158	4.65	20
3	900.2	10.4	29	234	0	0	29	61	234	2	0.124	50
4	901.2	19.8	21	322	0	0	21	69	322	71	1.99	20
5	902.2	21.0	24	391	0	0	24	68	391	92	8.24	10
7	904.2	21.8	26	439	0	0	26	70	439	182	4.07	10
10	907.2	22.1	17	291	0	0	17	81	291	131	3.99	10
11	908.2	21.6	17	284	0	0	17	80	284	140	7.32	10
12	909.2	20.8	15	242	0	0	15	78	242	77	3.44	20
13	910.2	21.9	13	220	0	0	13	83	220	-	Fractured	-
14	911.2	22.0	15	256	0	0	15	81	256	127	6.82	10

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.