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

OILFIELD RESEARCH LABORATORIES

- REGISTERED ENGINEERS -

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Chanute, Kansas

June 23, 1961

Ward A. McGinnis
114 West 4th
Eureka, Kansas

Dear Sir:

Enclosed herewith is the report of the analysis of the Rotary core taken from the Favour Lease, Well No. 1, Greenwood County, Kansas, and submitted to our laboratory on June 17, 1961.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman

Benjamin R. Pearman

BRP:rf

1 c. - James E. Lewis

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GENERAL INFORMATION & SUMMARY

Company Ward McGinnis Lease Favour Well No. 1

Location $E\frac{1}{2}$ SW

Section 7 Twp. 24S Rge. 10E County Greenwood State Kansas

Name of Sand	Bartlesville
Top of Core	2244.0
Bottom of Core	2259.0
Top of Sand	2246.5
Bottom of Sand (Tested)	2259.0
Total Feet of Permeable Sand	10.5
Total Feet of Floodable Sand	0.0

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 1	4.3	4.3
1 - 3	5.0	9.3
3 & above	1.2	10.5

Average Permeability Millidarcys	1.5
Average Percent Porosity	14.7
Average Percent Oil Saturation	34.4
Average Percent Water Saturation	39.0
Average Oil Content, Bbls./A. Ft.	398.
Total Oil Content, Bbls./Acre	4,175.
Average Percent Oil Recovery by Laboratory Flooding Tests	0.
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	0.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	0.
Total Calculated Oil Recovery, Bbls./Acre (Primary)	1,190.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F (Reported)	41.0
Elevation, Feet	

This core was taken with a rotary core barrel. The well was drilled in virgin territory. The core was exposed to air about three hours prior to sampling and was submitted to the laboratory by a representative of the client.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
2244.0 - 2245.0	Shale.
2245.0 - 2246.5	Gray shaley sandstone.
2246.5 - 2250.0	Grayish brown slightly calcareous sandstone.
2250.0 - 2252.0	Gray shaley sandstone.
2252.0 - 2259.0	Grayish brown slightly calcareous sandstone.

Coring was started at a depth of 2244.0 feet in shale and completed at 2259.0 feet in slightly calcareous sandstone. This core shows a total of 10.5 feet of sandstone. For the most part, the pay is made up of grayish light brown, slightly calcareous 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 2.1 and 1.3 millidarcys respectively; the overall average being 1.5 (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 0.29 to a maximum of 3.2 millidarcys.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a fairly good weighted average percent oil saturation, namely, 34.4. The weighted average percent oil saturation of the upper and lower sections is 34.2 and 34.5 respectively. The weighted average percent water saturation of the upper and lower sections is 37.0 and 40.1 respectively; the overall average being 39.0 (See Table III). This gives an overall weighted average total fluid saturation of 73.4 percent. This low total fluid saturation indicates considerable fluid was lost during or after coring most of which was probably oil.

The weighted average oil content of the upper and lower sections is 386 and 405 barrels per acre foot respectively; the overall average being 398. The total oil content, as shown by this core, is 4,175 barrels per acre (See Table III).

LABORATORY FLOODING TESTS

The sand in this core responded poorly to laboratory flooding tests. The weighted average effective permeability of the samples is zero.

By observing the data given in Table IV, you will note that of the 10 samples tested, none produced water or oil.

CONCLUSION

This core indicates a reservoir more or less calcareous in character, having a fairly good oil saturation, a moderate water saturation and very low permeability.

Based on the results of the laboratory tests, it does not appear that the area in the vicinity of this well would make a profitable waterflood, because of the low permeability. However, efficient primary operations should recover approximately 1,190 barrels of oil per acre. This represents an average recovery of 113 barrels of oil per acre foot from the 10.5 feet of pay sand analyzed in this core.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Ward McGinnis Lease Favour 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	2247.0	13.2	31	51	82	317	2.2	1.1	1.1	348	2.42
2	2248.3	14.7	40	31	71	456	0.86	1.2	2.3	547	1.03
3	2249.3	15.5	31	30	61	373	3.2	1.2	3.5	448	3.84
4	2252.4	14.4	35	44	79	391	0.74	1.0	4.5	391	0.74
5	2253.5	17.2	42	37	79	560	0.86	0.9	5.4	504	0.77
6	2254.3	17.4	46	37	83	621	2.4	0.9	6.3	560	2.16
7	2255.3	14.6	34	43	77	385	2.2	1.0	7.3	385	2.20
8	2256.3	14.0	31	33	64	337	1.2	1.0	8.3	337	1.20
9	2257.3	12.3	29	40	69	277	1.5	1.0	9.3	277	1.50
10	2258.3	14.5	28	45	73	315	0.29	1.2	10.5	378	0.35

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Ward McGinnis Lease Favour Well No. 1

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
2246.5 - 2250.0	3.5	2.1	7.29
2252.0 - 2259.0	7.0	1.3	8.92
2246.5 - 2259.0	10.5	1.5	16.21

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
2246.5 - 2250.0	3.5	14.5	34.2	37.0	386	1,343
2252.0 - 2259.0	7.0	14.8	34.5	40.1	405	2,832
2246.5 - 2259.0	10.5	14.7	34.4	39.0	398	4,175

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Ward McGinnis Lease Favour 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	2247.0	13.0	29	394	0	0	29	54	394	0	Imp.	50+
2	2248.3	14.8	41	471	0	0	41	30	471	0	Imp.	50+
3	2249.3	15.4	31	370	0	0	31	28	370	0	Imp.	50+
4	2252.4	14.6	37	419	0	0	37	41	419	0	Imp.	50+
5	2253.5	17.0	43	566	0	0	43	38	566	0	Imp.	50+
6	2254.3	17.6	46	628	0	0	46	35	628	0	Imp.	50+
7	2255.3	14.5	31	349	0	0	31	47	349	0	Imp.	50+
8	2256.3	14.4	34	380	0	0	34	32	380	0	Imp.	50+
9	2257.3	12.0	30	279	0	0	30	38	279	0	Imp.	50+
10	2258.3	14.7	29	331	0	0	29	46	331	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.