

OILFIELD RESEARCH LABORATORIES

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June 29, 1961

Ward A. McGinnis
114 West 4th
Eureka, Kansas

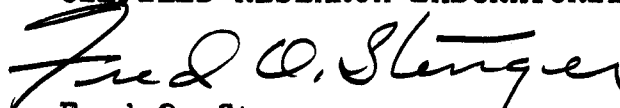
Dear Sir:

Enclosed herewith is the report of the analysis of the Rotary core taken from the Burke Lease, Well No. B-3, Greenwood County, Kansas, and submitted to our laboratory on June 26, 1961.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Fred O. Stenger

FOS:rf

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GENERAL INFORMATION & SUMMARY

Company Ward McGinnis Lease Burke Well No. B-3

Location _____

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

Name of Sand	-	Bartlesville
Top of Core	-	2237.0
Bottom of Core	-	2250.0
Top of ^{Pay} / _{Sand}	-	2237.0
Bottom of ^{Pay} / _{Sand}	-	2250.0
Total Feet of Permeable Sand	-	13.0
Total Feet of Floodable Sand	-	10.0

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 2	3.0	3.0
2 - 4	6.0	9.0
4 - 8	1.0	10.0
8 & above	3.0	13.0

Average Permeability Millidarcys	-	4.3
Average Percent Porosity	-	14.3
Average Percent Oil Saturation	-	31.1
Average Percent Water Saturation	-	49.4
Average Oil Content, Bbls./A. Ft.	-	344.
Total Oil Content, Bbls./Acre	-	4,476.
Average Percent Oil Recovery by Laboratory Flooding Tests	-	5.5
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	-	65.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	-	651.
Total Calculated Oil Recovery, Bbls./Acre	-	1,210.
Packer Setting, Feet	-	-
Viscosity, Centipoises @	-	-
A. P. I. Gravity, degrees @ 60 °F	-	41.0
Elevation, Feet	-	-

(Reported)

This core was taken with a rotary core barrel using fresh water mud as the circulating fluid. The well was drilled in non-virgin territory. The core was exposed to air about five 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:

<u>Depth Interval,</u> <u>Feet</u>	<u>Description</u>
2237.0 - 2243.0	Light brown slightly shaley sandstone.
2243.0 - 2246.0	Light brown laminated shaley sandstone.
2246.0 - 2248.0	Light brown calcareous sandstone.
2248.0 - 2249.0	Light brown slightly shaley sandstone.
2249.0 - 2250.0	Light brown laminated shaley sandstone.

Coring was started at a depth of 2237.0 feet in slightly shaley sandstone and completed at 2250.0 feet in laminated shaley sandstone. This core shows a total of 13.0 feet of sandstone. For the most part, the pay is made up of 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 5.5 and 3.3 millidarcys respectively; the overall average being 4.3 (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 1.3 to a maximum of 12. millidarcys.

PERCENT SATURATION & OIL CONTENT

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

saturation, namely, 31.1. The weighted average percent oil saturation of the upper and lower sections is 32.5 and 29.9 respectively. The weighted average percent water saturation of the upper and lower sections is 42.7 and 55.2 respectively; the overall average being 49.4 (See Table III). This gives an overall weighted average total fluid saturation of 80.5 percent.

The weighted average oil content of the upper and lower sections is 386 and 309 barrels per acre foot respectively; the overall average being 344. The total oil content, as shown by this core, is 4,476 barrels per acre (See Table III).

LABORATORY FLOODING TESTS

In view of the fact that the core showed only a fair oil saturation it responded fairly well to laboratory flooding tests, as a total recovery of 651 barrels of oil per acre was obtained from 10.0 feet of sand. The weighted average percent oil saturation was reduced from 32.5 to 27.0, or represents an average recovery of 5.5 percent. The weighted average effective permeability of the samples is 0.245 millidarcys, while the average initial fluid production pressure is 48.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 12 samples tested, 9 produced water and oil. This indicates that approximately 75 percent of the sand represented by these samples is floodable pay sand. The tests also show that the sand has a very low effective permeability to water.

CONCLUSION

Based on the results of the laboratory tests, it appears that an efficient water-flood in the vicinity of this well should produce approximately 1,210 barrels of oil per acre. This represents an average recovery of 121 barrels per acre foot from the 10.0 feet of floodable pay

sand analyzed in this core.

The above recovery values were calculated using the following data and assumptions:

Original formation volume factor	1.21
Present formation volume factor	1.12
Reservoir water saturation, percent	35.0
Primary production, percent, estimated	12.0
Average porosity, percent	15.0
Abandonment oil saturation, percent	27.0
Performance factor, percent	55.0
Net floodable pay sand, feet	10.0

This core indicates a more or less shaley sand section having a fair oil saturation, a moderate water saturation and a low effective permeability to water.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Ward McGinnis Lease Burke Well No. B-3

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			Ft.	Cum. Ft.		
1	2237.5	15.2	42	38	495	3.0	1.5	1.5	741	4.50
2	2239.5	15.9	29	43	358	2.3	1.5	3.0	536	3.45
3	2240.5	15.2	30	43	354	8.6	1.0	4.0	354	8.60
4	2241.5	14.8	31	45	356	7.6	1.0	5.0	356	7.60
5	2242.5	15.0	28	47	326	9.1	1.0	6.0	326	9.10
6	2243.5	16.5	25	44	320	2.5	1.0	7.0	320	2.50
7	2244.5	12.3	32	62	306	2.0	1.0	8.0	306	2.00
8	2245.5	10.6	16	76	132	1.4	1.0	9.0	132	1.40
9	2246.5	9.2	39	53	278	1.4	1.0	10.0	278	1.40
10	2247.5	13.8	36	57	385	1.3	1.0	11.0	385	1.30
11	2248.5	15.5	33	48	397	12.	1.0	12.0	397	12.00
12	2249.5	15.9	28	46	345	2.4	1.0	13.0	<u>345</u>	2.40
Total									4,476	

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III - B

Company	Lease	Well No.										
Ward McGinnis	Burke	B-3										
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.							Average Oil Content Bbl./A. Ft.	Total Oil Content Bbl./Acre	
2237.0 - 2243.0	6.0	5.5	33.25							386	2,313	
2243.0 - 2250.0	7.0	3.3	23.00							309	2,163	
2237.0 - 2250.0	13.0	4.3	56.25							344	4,476	
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 Bbl./Acre
2237.0 - 2243.0	6.0	15.3	32.5	42.7							386	2,313
2243.0 - 2250.0	7.0	13.4	29.9	55.2							309	2,163
2237.0 - 2250.0	13.0	14.3	31.1	49.4							344	4,476

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Ward McGinnis Lease Burke Well No. B-3

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	2237.5	15.5	42	505	14	168	28	60	337	4	0.200	50
2	2239.5	15.6	29	351	2	24	27	58	327	1	0.100	50
3	2240.5	15.0	30	349	7	81	23	70	268	5	0.500	40
4	2241.5	15.0	31	361	2	23	29	59	338	10	0.700	40
5	2242.5	14.9	28	324	3	35	25	66	289	4	0.200	50
6	2243.5	16.2	25	314	2	25	23	62	289	1	0.100	50
7	2244.5	12.9	32	320	2	20	30	62	300	4	0.200	50
8	2245.5	11.0	15	128	0	0	15	66	128	0	Imp.	50+
9	2246.5	9.0	41	286	0	0	41	52	286	0	Imp.	50+
10	2247.5	14.0	36	391	2	22	34	60	369	1	0.100	50
11	2248.5	15.6	33	400	13	157	20	71	243	4	0.200	50
12	2249.5	16.0	26	322	0	0	26	52	322	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.

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Lease	Burke	Well No.
Ward McGinnis	2237.0 - 2243.0	2243.0 - 2249.0	2237.0 - 2249.0
Depth Interval, Feet	6.0	4.0	10.0
Feet of Core Analyzed	15.3	14.7	15.0
Average Percent Porosity	33.0	31.8	32.5
Average Percent Original Oil Saturation	6.0	4.8	5.5
Average Percent Oil Recovery	27.0	27.0	27.0
Average Percent Residual Oil Saturation	62.0	64.0	63.0
Average Percent Residual Water Saturation	89.0	91.0	90.0
Average Percent Total Residual Fluid Saturation	386.	356.	374.
Average Original Oil Content, Bbls./A. Ft.	71.	56.	65.
Average Oil Recovery, Bbls./A. Ft.	315.	300.	309.
Average Residual Oil Content, Bbls./A. Ft.	2,317.	1,425.	3,742.
Total Original Oil Content, Bbls./Acre	427.	224.	651.
Total Oil Recovery, Bbls./Acre	1,890.	1,201.	3,091.
Total Residual Oil Content, Bbls./Acre	0.308	0.150	0.245
Average Effective Permeability, Millidarcys	46.0	50.0	48.0
Average Initial Fluid Production Pressure, p.s.i.			

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