

OILFIELD RESEARCH LABORATORIES

- REGISTERED ENGINEERS -

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September 6, 1962

Harold E. Marconda
Box 247
Caney, Kansas

Dear Sir:

Enclosed herewith is the report of the analysis of the Rotary core taken from the Johnson Lease, Well No. 2, Montgomery County, Kansas, and submitted to our laboratory on August 29, 1962.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman
Benjamin R. Pearman

BRP:rf

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Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Harold E. Marconda Lease Johnson Well No. 2

Location NE NE SE

Section 8 Twp. 35S Rge. 14E County Montgomery State Kansas

Name of Sand	Bartlesville
Top of Core	1350.0
Bottom of Core	1377.0
Top of Sand	1358.0
Bottom of Sand	1375.8
Total Feet of Permeable Sand	17.8
Total Feet of Floodable Sand	4.0

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

1 - 5	4.2	4.2
5 - 10	3.6	7.8
10 - 50	10.0	17.8

Average Permeability Millidarcys	12.8
Average Percent Porosity	15.9
Average Percent Oil Saturation	16.9
Average Percent Water Saturation	59.4
Average Oil Content, Bbls./A. Ft.	205.
Total Oil Content, Bbls./Acre	3,659.
Average Percent Oil Recovery by Laboratory Flooding Tests	1.8
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	22.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	87.
Total Calculated Oil Recovery, Bbls./Acre	370.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

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Fresh water mud was used as the circulating fluid. The core was sampled and the samples sealed in cans by a representative of Oilfield Research Laboratories. The well was drilled in non-virgin territory.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
1350.0 - 1358.0	Shale.
1358.0 - 1370.0	Light brown, slightly shaly sandstone.
1370.0 - 1375.8	Brown to dark, slightly shaly, slightly carbonaceous sandstone.
1375.8 - 1377.0	Sandy shale.

Coring was started at a depth of 1350.0 feet in shale and completed at 1377.0 feet in sandy shale. This core shows a total of 17.8 feet of sandstone. For the most part, the pay is made up of light brown, slightly shaly 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 9.4 and 16.0 millidarcys respectively; the overall average being 12.8 (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 1.1 to a maximum of 43. millidarcys.

PERCENT SATURATION & OIL CONTENT

For the most part the sand in this core shows a low weighted average percent oil saturation, namely, 16.9. The weighted average percent oil saturation of the upper and lower sections is 20.6 and 13.5 respectively. The weighted average percent water saturation of the upper and lower sections is 56.7 and 61.5 respectively; the overall average being 59.4 (See

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Table III). This gives an overall weighted average total fluid saturation of 76.3 percent. This low total fluid saturation indicates considerable fluid was lost during coring most of which probably was oil.

The weighted average oil content of the upper and lower sections is 244 and 170 barrels per acre foot respectively; the overall average being 205. The total oil content, as shown by this core, is 3,659 barrels per acre (See Table III).

LABORATORY FLOODING TESTS

Only a portion of the sand in this core responded to laboratory flooding tests, as a total recovery of 87 barrels of oil per acre was obtained from 4.0 feet of sand. The weighted average percent oil saturation was reduced from 21.6 to 19.8, or represents an average recovery of 1.8 percent. The weighted average effective permeability of the samples is 0.775 millidarcys, while the average initial fluid production pressure is 25.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 18 samples tested, 16 produced water and 4 oil. This indicates that approximately 22 percent of the sand represented by these samples is floodable pay sand. The tests also show that the sand has a wide variation in 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 recover approximately 370 barrels of oil per acre or an average of 93 barrels per acre foot from the 4.0 feet of floodable pay sand found in this core. These recovery values were calculated using the following data and assumptions:

Original formation volume factor	1.10
Present formation volume factor	1.04
Reservoir water saturation, percent	50.0

Primary recovery, estimated, percent	12.0
Present oil saturation, percent	35.3
Average porosity, percent	16.1
Oil saturation after flooding, percent	19.8
Performance factor, percent	50.0
Net floodable pay sand, feet	4.0

This core shows a sand section having a somewhat low oil saturation, a high water saturation and a wide variation in effective permeability to water.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Harold E. Marconda

Lease Johnson

Well No. 2

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	1358.1	17.3	17	57	228	22.	0.6	0.6	137	13.20
2	1359.1	16.9	23	68	301	12.	1.0	1.6	301	12.00
3	1360.1	15.8	19	52	232	12.	1.0	2.6	232	12.00
4	1361.1	16.6	21	53	270	11.	1.0	3.6	270	11.00
5	1362.1	15.3	23	54	273	7.4	1.0	4.6	273	7.40
6	1363.1	10.2	23	62	182	2.1	1.0	5.6	182	2.10
7	1364.1	14.2	24	52	264	1.1	1.0	6.6	264	1.10
8	1365.1	16.4	17	58	216	4.1	1.0	7.6	216	4.10
9	1366.1	16.4	17	55	216	18.	1.0	8.6	216	18.00
10	1367.1	15.4	15	60	179	6.2	1.0	9.6	179	6.20
11	1368.1	15.9	11	65	136	14.	1.0	10.6	136	14.00
12	1369.1	18.2	13	63	183	43.	1.4	12.0	256	60.20
13	1370.1	16.3	12	53	152	10.	0.6	12.6	91	6.00
14	1371.1	15.1	13	59	152	19.	1.0	13.6	152	19.00
15	1372.1	16.1	11	66	137	22.	1.0	14.6	137	22.00
16	1373.1	16.9	16	61	210	12.	1.0	15.6	210	12.00
17	1374.1	16.6	17	63	219	5.8	1.0	16.6	219	5.80
18	1375.1	15.6	13	60	157	2.2	1.2	17.8	188	2.64
Total							-----		3,659	

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Harold E. Marconda Lease Johnson Well No. 2

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, millidarcys	Permeability Capacity Ft. x Md.
1358.0 - 1366.6	8.6	9.4	80.90
1366.6 - 1375.8	9.2	16.0	147.84
1358.0 - 1375.8	17.8	12.8	228.74

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
1358.0 - 1366.6	8.6	15.4	20.6	56.7	244	2,091
1366.6 - 1375.8	9.2	16.3	13.5	61.5	170	1,568
1358.0 - 1375.8	17.8	15.9	16.9	59.4	205	3,659

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Harold E. Marconda Lease Johnson Well No. 2

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation		Volume of Water Recovered cc ^a	Effective Permeability Millidarcys ^{cc}	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water			
1	1358.1	17.0	15	198	0	0	15	58	0	Imp.	-
2	1359.1	16.7	23	298	2	26	21	76	45	1.30	25
3	1360.1	15.7	19	231	2	24	17	79	21	0.500	25
4	1361.1	16.4	21	267	1	13	20	70	34	0.700	25
5	1362.1	15.7	23	280	2	24	21	70	21	0.600	25
6	1363.1	10.7	21	174	0	0	21	63	0	Imp.	-
7	1364.1	14.6	23	260	0	0	23	71	19	0.500	25
8	1365.1	16.4	18	229	0	0	18	63	25	0.500	25
9	1366.1	16.5	15	192	0	0	15	75	62	1.20	20
10	1367.1	15.0	16	186	0	0	16	65	6	0.200	45
11	1368.1	16.0	11	136	0	0	11	77	115	2.00	20
12	1369.1	18.0	15	209	0	0	15	76	140	4.80	20
13	1370.1	16.5	14	179	0	0	14	76	34	0.800	20
14	1371.1	15.5	11	132	0	0	11	66	38	0.700	20
15	1372.1	16.4	15	191	0	0	15	80	90	1.70	20
16	1373.1	17.2	14	187	0	0	14	83	128	3.20	20
17	1374.1	16.8	14	182	0	0	14	80	38	0.800	20
18	1375.1	15.7	14	170	0	0	14	75	10	0.330	30

Notes: cc—cubic centimeter.

a.—Volume of water recovered at the time of maximum oil recovery.

cc.—Determined by passing water through sample which still contains residual oil.

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Harold E. Marconda	Lease	Johnson	Well No.	2
Depth Interval, Feet	1358.6 - 1362.6				
Feet of Core Analyzed	4.0				
Average Percent Porosity	16.1				
Average Percent Original Oil Saturation	21.6				
Average Percent Oil Recovery	1.8				
Average Percent Residual Oil Saturation	19.8				
Average Percent Residual Water Saturation	73.8				
Average Percent Total Residual Fluid Saturation	93.6				
Average Original Oil Content, Bbls./A. Ft.	276.				
Average Oil Recovery, Bbls./A. Ft.	22.				
Average Residual Oil Content, Bbls./A. Ft.	254.				
Total Original Oil Content, Bbls./Acre	1,102.				
Total Oil Recovery, Bbls./Acre	87.				
Total Residual Oil Content, Bbls./Acre	1,015.				
Average Effective Permeability, Millidarcys	0.775				
Average Initial Fluid Production Pressure, p.s.i.	25.0				

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