

OILFIELD RESEARCH LABORATORIES

- REGISTERED ENGINEERS -

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September 20, 1961

E. J. Dunigan Jr.
Box 261
Pampa, Texas

Dear Sir:

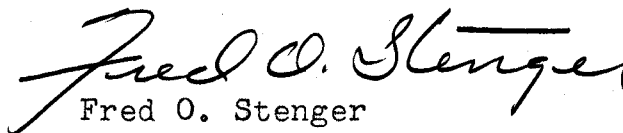
Enclosed herewith is the report of the analysis of the Cable Tool core taken from the J. Mitchell Lease, Well No. 1, Crawford County, Kansas, and submitted to our laboratory on September 15, 1961.

This core was sampled and the samples sealed in cans by a representative of Oilfield Research Laboratories.

Your business is greatly appreciated.

Yours very truly,

OILFIELD RESEARCH LABORATORIES


Fred O. Stenger

FOS:rf

6 c. - Pampa
1 c. - Jess Miller
1 c. - Jim Guinotte

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

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval,</u> <u>Feet</u>	<u>Description</u>
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196.0 - 203.0	- Brown slightly shaley sandstone.
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203.0 - 203.5	- Coal.
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Coring was started at a depth of 196.0 feet in brown slightly shaley sandstone and completed at 203.5 feet in coal. This core shows a total of 7.0 feet of sandstone. For the most part, the pay is made up of brown 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 17. and 21. millidarcys respectively; the overall average being 19 (See Table III). By observing the data given on the coregraph, it is noticeable that the sand has a fairly uniform permeability profile. The permeability of the sand varies from 7.5 to a maximum of 36. millidarcys.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a fair weighted average percent oil saturation, namely, 26.4. The weighted average percent oil saturation of the upper and lower sections is 24.1 and 28.7 respectively. The weighted average percent water saturation of the upper and lower sections is 60.4 and 59.8 respectively; the overall average being 60.2 (See Table III). This gives an overall weighted average total fluid saturation of 86.6 percent. This low total fluid saturation indicates considerable fluid was lost during coring which was probably oil.

The weighted average oil content of the upper and lower sections is 368 and 405 barrels per acre foot respectively; the overall average being 387. The total oil content, as shown by this core, is 2,705 barrels per acre (See Table III).

LABORATORY FLOODING TESTS

The sand in this core did not respond to laboratory flooding tests, as no recovery of oil was obtained from the 7.0 feet of sand. The weighted average effective permeability of the samples is 0.382 millidarcys, while the average initial fluid production pressure is 42 pounds per square inch.

By observing the data given in Table IV, you will note that of the 7 samples tested, 5 produced water and none oil. This indicates that none of the sand represented by these samples is floodable pay sand. The tests also show that the sand has a low effective air permeability.

CONCLUSION

Based upon the above calculations, it is believed that it would not be economically feasible to attempt oil recovery by water flooding within the near vicinity of this well.

It is further believed that this well should show a primary recovery of approximately 100 barrels per acre foot or 590 barrels per acre for the 5.9 feet of sand with a permeability greater than 10. millidarcys.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company E. J. Dunigan Jr.

Lease J. Mitchell

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			Ft.	Cum. Ft.		
1	196.1	19.1	27	64	400	17.	0.6	0.6	240	10.20
2	197.1	20.3	28	58	441	16.	0.9	1.5	397	14.40
3	198.1	18.2	17	68	240	10.	1.0	2.5	240	10.00
4	199.1	20.4	26	53	411	24.	1.0	3.5	411	24.00
5	200.1	18.9	27	60	395	16.	1.0	4.5	395	16.00
6	201.1	18.3	31	62	440	7.5	1.1	5.6	484	8.25
7	202.1	17.7	28	58	384	36.	1.4	7.0	538	50.40
							Total		2,705	

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company E.J. Dunigan Jr. Lease J. Mitchell Well No. 1

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
196.0 - 199.5	3.5	17.	58.60
199.5 - 203.0	3.5	21.	74.65
196.0 - 203.0	7.0	19.	133.25

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
196.0 - 199.5	3.5	19.5	24.1	60.4	368	1,288
199.5 - 203.0	3.5	18.2	28.7	59.8	405	1,417
196.0 - 203.0	7.0	18.9	26.4	60.2	387	2,705

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company E. J. Dunigan Jr. Lease J. Mitchell Well No. 1

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation		Volume of Water Recovered cc ^a	Effective Permeability Millidarcys ^{b,c}	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Ehbl./A. Ft.	%	Ehbl./A. Ft.	% Oil	% Water			
1	196.1	19.0	27	397	0	0	27	64	2	0.125	50
2	197.1	20.2	28	438	0	0	28	58	6	0.315	40
3	198.1	18.1	17	239	0	0	17	80	10	0.910	40
4	199.1	20.3	26	409	0	0	26	68	4	0.119	40
5	200.1	18.8	27	394	0	0	27	60	0	Imp.	50+
6	201.1	18.4	31	442	0	0	31	62	0	Imp.	50+
7	202.1	17.5	28	384	0	0	28	63	8	0.348	40

Notes: cc—cubic centimeter.

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

^{b,c}—Determined by passing water through sample which still contains residual oil.