OILFIELD RESEARCH LABORATORIES
536 NORTH HIGHLAND - CHANUTE, KANSAS - PHONE HE1-2650

May 6, 1966

Hinks Petroleum Company, Inc.
3125 East Boston
Wichita, Kansas

Gentlemen:

Enclosed herewith is the report of the analysis of the Rotary core taken from the Eggleston Lease, Well No. 1, Franklin County, Kansas, and submitted to our laboratory on May 3, 1966.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Benjamin R. Pearman

Benjamin R. Pearman

BRP:rf

1 c. - N.R. Cole

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Hinks Petroleum Co, Inc. Lease Eggleston Well No. 1

Location 17?

Section 3 Twp. 16S Rge. 21E County Franklin State Kansas

Name of Sand	Squirrel
Top of Core	551.0
Bottom of Core	601.0
Top of Sand (Analyzed)	577.6
Bottom of Sand (Analyzed)	596.6
Total Feet of Permeable Sand	15.2
Total Feet of Floodable Sand	10.9

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 1	3.3	3.3
1 - 5	2.2	5.5
5 - 10	4.7	10.2
10 - 15	5.0	15.2

Average Permeability Millidarcys	7.4
Average Percent Porosity	18.6
Average Percent Oil Saturation	47.3
Average Percent Water Saturation	40.4
Average Oil Content, Bbls./A. Ft.	699.
Total Oil Content, Bbls./Acre	10,609.
Average Percent Oil Recovery by Laboratory Flooding Tests	13.9
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	208.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	2,277.
Total Calculated Oil Recovery, Bbls./Acre (Primary & Secondary)	2,930.
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

Water was used as the circulating fluid while taking this core. 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:

Depth Interval, Feet	Description
551.0 - 555.0	Brown, fossiliferous limestone.
555.0 - 557.0	Gray limestone.
557.0 - 560.0	Shale.
560.0 - 575.0	Brownish gray shale and sandstone.
575.0 - 577.0	Brown shaly sandstone.
577.0 - 585.4	Brown and gray, laminated sandstone and shale.
585.4 - 594.3	Brown, laminated, shaly sandstone.
594.3 - 601.0	Dark, carbonaceous, laminated, shaly sandstone.
601.0 - 603.0	Loss.

Coring was started at a depth of 551.0 feet in limestone and completed at 603.0 feet, the bottom of the core being lost. For the most part, the pay is made up of brown, laminated, 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 6.5 and 7.7 millidarcys respectively; the overall average being 7.4 (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 impermeable to a maximum of 14. millidarcys.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a good weighted average percent oil saturation, namely, 47.3. The weighted average percent oil saturation of the upper and lower sections is 38.5 and 50.5 respectively. The weighted average percent water saturation of the upper and lower sections is 58.0 and 34.0 respectively; the overall average being 40.4 (See Table III). This gives an overall weighted average total fluid saturation of 87.7 percent.

The weighted average oil content of the upper and lower sections is 469 and 779 barrels per acre foot respectively; the overall average being 699. The total oil content, as shown by this core, is 10,609 barrels per acre of which 7,604 barrels are in the pay sand section (See Table III).

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 2,277 barrels of oil per acre was obtained from 10.9 feet of sand. The weighted average percent oil saturation was reduced from 47.5 to 33.6, or represents an average recovery of 13.9 percent. The weighted average effective permeability of the samples is 0.274 millidarcys, while the average initial fluid production pressure is 38.2 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 15 samples tested, 7 produced water and 11 oil. The tests also show that the sand has a wide variation in effective permeability to water.

CONCLUSION

The results of the laboratory tests indicate that efficient primary and secondary operations in the vicinity of this well should recover approximately 2,930 barrels of oil per acre or an average of 269 barrels per acre foot from the 10.9 feet of floodable pay sand analyzed in this core. These recovery values were calculated using the following data and assumptions:

Original formation volume factor	1.04
Reservoir water saturation, percent	28.0
Average porosity, percent	18.8
Oil saturation after flooding, percent	33.6
Performance factor, percent	50.0
Net floodable pay sand, feet	10.9

This core shows a pay sand section having a good oil saturation, a moderate water saturation and a wide variation in effective permeability to water. The above recovery values were calculated assuming that satisfactory water injection rates will be maintained throughout the flood life of the property.

Any primary oil already recovered from the area represented by this core should be subtracted from these recovery values.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Hinks Petroleum Company, Inc. Lease Eggleston 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	578.1	15.0	44	54	98	514	9.0	1.0	1.0	514	9.00
2	580.1	16.6	42	55	97	542	14.	1.0	2.0	542	14.00
3	582.1	14.0	26	71	97	282	0.39	1.0	3.0	282	0.39
4	584.1	16.6	42	52	94	541	2.7	1.0	4.0	541	2.70
5	586.1	24.6	55	24	79	1,052	3.0	1.2	5.2	1,263	3.60
6	587.1	17.2	47	51	98	628	7.9	1.0	6.2	628	7.90
7	588.1	19.0	60	35	95	885	14.	1.0	7.2	885	14.00
8	589.1	20.7	48	30	78	774	14.	1.0	8.2	774	14.00
9	590.1	18.4	44	41	85	630	9.4	1.0	9.2	630	9.40
10	591.1	17.7	37	40	77	509	7.0	1.0	10.2	509	7.00
11	592.1	18.6	48	35	83	692	11.	1.0	11.2	692	11.00
12	593.1	20.0	47	32	79	731	12.	1.0	12.2	731	12.00
13	594.1	19.5	50	37	87	759	9.4	0.7	12.9	531	6.58
14	595.1	20.8	59	25	84	955	0.62	1.3	14.2	1,242	0.81
15	596.1	19.1	57	30	87	845	0.43	1.0	15.2	845	0.43
								Total		10,609	

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Hinks Petroleum Company, Inc. Lease Eggleston Well No. 1

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
577.6 - 584.6	4.0	6.5	26.09
584.6 - 596.6	11.2	7.7	86.72
577.6 - 596.6	15.2	7.4	112.81

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
577.6 - 584.6	4.0	15.6	38.5	58.0	469	1,879
584.6 - 596.6	11.2	19.7	50.5	34.0	779	8,730
577.6 - 596.6	15.2	18.6	47.3	40.4	699	10,609

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Hinks Petroleum Company, Inc. Lease Eggleston 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	578.1	15.4	44	524	14	167	30	67	357	6	0.400	40
2	580.1	16.9	42	550	8	105	34	64	445	36	1.00	30
3	582.1	14.1	28	306	0	0	28	70	306	0	Imp.	-
4	584.1	16.6	42	540	0	0	42	55	540	0	Imp.	-
5	586.1	24.1	55	1,028	24	449	31	66	579	22	0.600	30
6	587.1	17.7	47	645	12	165	35	62	480	6	0.200	40
7	588.1	18.6	60	864	20	288	40	56	576	8	0.300	40
8	589.1	20.4	48	759	16	253	32	60	506	4	0.200	40
9	590.1	18.0	44	614	14	196	30	69	418	0	0.020	40
10	591.1	17.6	37	505	5	68	32	65	437	0	0.010	40
11	592.1	18.1	48	673	12	168	36	63	505	2	0.100	40
12	593.1	19.7	47	718	12	183	35	54	535	0	0.020	40
13	594.1	19.1	50	740	14	207	36	58	533	0	0.020	40
14	595.1	20.6	60	957	0	0	60	27	957	0	Imp.	-
15	596.1	19.5	57	861	0	0	57	33	861	0	Imp.	-

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 Hinks Petroleum Company, Inc. Lease Eggleston Well No. 1

Depth Interval, Feet	577.6 - 596.6
Feet of Core Analyzed	10.9
Average Percent Porosity	18.8
Average Percent Original Oil Saturation	47.5
Average Percent Oil Recovery	13.9
Average Percent Residual Oil Saturation	33.6
Average Percent Residual Water Saturation	62.2
Average Percent Total Residual Fluid Saturation	95.8
Average Original Oil Content, Bbls./A. Ft.	696.
Average Oil Recovery, Bbls./A. Ft.	208.
Average Residual Oil Content, Bbls./A. Ft.	488.
Total Original Oil Content, Bbls./Acre	7,604.
Total Oil Recovery, Bbls./Acre	2,277.
Total Residual Oil Content, Bbls./Acre	5,327.
Average Effective Permeability, Millidarcys	0.274
Average Initial Fluid Production Pressure, p.s.i.	38.2

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