

OIL FIELD RESEARCH LABORATORIES
CHANUTE, KANSAS

November 7, 1951

Mr. A. W. Bailey
Neodesha, Kansas

Gentlemen:

Enclosed herewith is the report of the analysis of the Cable Tool core taken from your Graham Lease, Well No. 25, Wilson County, Kansas, and submitted to our laboratory on October 11th and 26th, 1951.

Very truly yours,

OIL FIELD RESEARCH LABORATORIES

Carl L. Pate

CLP:mm

C.C.

7-3046E

Graham 25

A. W. BAILEY

CORE ANALYSIS REPORT

GRAHAM LEASE

WELL NO. 25

WILSON COUNTY, KANSAS

OIL FIELD RESEARCH LABORATORIES

CHANUTE, KANSAS

NOVEMBER 7, 1951

Oil Field Research Laboratories

GENERAL INFORMATION & SUMMARY

Company A. W. Bailey Lease Graham Well No. 25

Location SE 1/4

Section 7 Twp. 30 S Rge. 16 E County Wilson State Kansas

Name of Sand UPPER SAND Squirrel (?)

Top of Core 826.90

Bottom of Core 839.85

Top of Sand ?

Bottom of Sand ?

Total Feet of Permeable Sand 12.25

Total Feet of Floodable Sand -

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
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0 - 2	1.30	1.30
2 - 4	0.55	1.85
4 - 8	2.40	4.25
8 - 100	4.05	8.30
100 - 300	0.60	8.90
300 - 500	1.45	10.35
500 & above	1.90	12.25

Average Permeability Millidarcys 220.13

Average Percent Porosity 19.84

Average Percent Oil Saturation 21.22

Average Percent Water Saturation 44.56

Average Oil Content, Bbls./A. Ft. 297.

Total Oil Content, Bbls./Acre 8,810.

Average Percent Oil Recovery by Laboratory Flooding Tests 1.08

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. 17.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre 41.

Total Calculated Oil Recovery, Bbls./Acre -

Packer Setting, Feet

Viscosity, Centipoises @

A. P. I. Gravity, degrees @ 60 °F

Elevation, Feet

Oil Field Research Laboratories

GENERAL INFORMATION & SUMMARY

Company A. W. Bailey Lease Graham Well No. 25

Location SE 1

Section 7 Twp. 30 S Rge. 16 E County Wilson State Kansas

Name of Sand LOWER SAND Bartlesville (?)

Top of Core 908.10

Bottom of Core 930.00

Top of Sand ?

Bottom of Sand 929.50

Total Feet of Permeable Sand (Analyzed) 17.85

Total Feet of Floodable Sand (Analyzed) 14.45

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 5	3.95	3.95
5 - 15	2.50	6.45
15 - 30	2.80	9.25
30 - 60	2.35	11.60
60 - 90	1.55	13.15
90 - 120	3.00	16.15
120 & above	1.70	17.85

Average Permeability Millidarcys 56.92

Average Percent Porosity 16.92

Average Percent Oil Saturation 30.71

Average Percent Water Saturation 42.14

Average Oil Content, Bbls./A. Ft. 398.

Total Oil Content, Bbls./Acre 7,485.

Average Percent Oil Recovery by Laboratory Flooding Tests 5.58

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. 78.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre 1,104.

Total Calculated Oil Recovery, Bbls./Acre 3,450.

Packer Setting, Feet

Viscosity, Centipoises @

A. P. I. Gravity, degrees @ 60 °F

Elevation, Feet

Fresh water was used as the circulating fluid in the coring of the sand in this well.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
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UPPER SAND

826.90 - 827.65	- Brown fine grained micaceous slightly shaley sandstone.
827.65 - 829.65	- Soft brown fine grained micaceous sandstone.
829.65 - 835.20	- Brown fine grained micaceous slightly shaley sandstone.
835.20 - 836.65	- Hard brown fine grained micaceous sandstone.
836.65 - 839.70	- Hard dark brown fine grained micaceous sandstone.
839.70 - 839.85	- Hard dark carbonaceous micaceous sandstone.

LOWER SAND

908.10 - 910.60	- Brown fine grained micaceous sandstone.
910.60 - 911.00	- Brown fine grained micaceous shaley sandstone.
911.00 - 911.20	- Dark fine grained micaceous carbonaceous shaley sandstone.
911.20 - 912.10	- Brown fine grained micaceous shaley sandstone.
912.10 - 912.30	- Laminated shaley sandstone.
912.30 - 913.45	- Brown fine grained micaceous slightly shaley sandstone.
913.45 - 915.20	- Brown fine grained micaceous sandstone.
915.20 - 915.45	- Dark fine grained micaceous carbonaceous sandstone.
915.45 - 915.60	- Brown fine grained micaceous slightly shaley sandstone.
915.60 - 915.80	- Dark fine grained micaceous sandstone.
915.80 - 916.95	- Brown fine grained micaceous slightly shaley sandstone.
916.95 - 924.50	- Brown fine grained micaceous sandstone.

924.50 - 924.90 - Dark fine grained micaceous carbonaceous sandstone.
924.90 - 925.20 - Brown fine grained micaceous sandstone.
925.20 - 927.25 - Dark fine grained micaceous sandstone.
927.25 - 927.75 - Brown fine grained micaceous slightly carbonaceous shaley sandstone.
927.75 - 928.30 - Dark fine grained micaceous carbonaceous sandstone.
928.30 - 929.50 - Dark fine grained micaceous slightly shaley sandstone.
929.50 - 930.00 - Gray shale.

Coring of the upper sand was started at a depth of 826.90 feet in fine grained micaceous slightly shaley sandstone and completed at 839.85 feet in hard micaceous carbonaceous sandstone. The upper sand contains 12.95 feet of sandstone. For the most part, the sand section is made up of fine grained micaceous to shaley sandstone. The coring of the lower sand was started at a depth of 908.10 feet in fine grained micaceous sandstone and completed at 930.00 feet in gray shale. The lower sand shows a total of 20.50 feet of sandstone. For the most part, the pay is made up of fine grained micaceous sandstone.

PERMEABILITY

For the sake of distribution, each core was divided into two sections. The weighted average permeability of the upper and lower sections of the upper sand is 322.55 and 4.91 millidarcys respectively; the overall average being 220.13. The weighted average permeability of the upper and lower sections of the lower sand is 24.43 and 87.47 millidarcys respectively; the overall average being 56.92 (See Table II). By observing the data given on the coregraph, it is noticeable that both sands have a very irregular permeability profile and that the upper part of the upper

sand is very loose.

PERCENT SATURATION & OIL CONTENT

The overall weighted average percent oil saturation of the upper and lower sands is 21.22 and 30.71 respectively, while the average percent water saturation of the corresponding sands is 44.66 and 42.14 respectively (See Table IV). This gives an overall weighted average total fluid saturation of 65.78 and 72.85 for the upper and lower sands. This low total fluid saturation indicates that an appreciable amount of fluid was lost during coring, which in the case of the second sand was probably oil. We are inclined to believe that the upper part of the upper sand, or that part of the core extending from 826.90 to 830.90 feet is gas sand.

In order to determine whether or not any flushing of the sand occurred during coring, all of the saturation samples were analyzed for chloride content. The results of these tests are given in Tables VII and VIII. From the data given in these tables and on the coregraph, it is evident that some flushing of the sand did occur during coring. However, we are of the opinion that most of the oil lost during coring was due to the expansion of gas carried in solution by the oil.

The overall weighted average oil content of the upper and lower sands is 297 and 398 barrels per acre foot respectively. The total oil content of the upper and lower sands, as shown by the cores, is 3,810 and 7,485 barrels per acre respectively (See Table IV).

LABORATORY FLOODING TESTS

According to laboratory flooding tests, the upper sand contained very little recoverable oil. The lower sand responded fairly well to laboratory flooding tests, as a total recovery of 1,104 barrels of oil per acre was obtained from 14.15 feet of sand. The weighted average percent oil saturation was reduced from 29.03 to 23.45, or represents an average recovery of 5.58 percent. The weighted average effective permeability of the samples is 7.08 millidarcys, while the average initial fluid production pressure is 81.3 pounds per square inch (See Table VI).

By observing the data given in Table V, you will note that of the 9 samples taken in the upper sand, 7 produced water and 2 oil. This indicates that only 2 of the samples contained any recoverable oil. The tests also show that the sand has a wide variation in effective permeability. As far as the lower sand is concerned, 16 samples were tested, of which 12 produced water and oil. This indicates that most of the sand represented by these samples is floodable. The tests also show that the sand has a fairly uniform effective permeability.

CONCLUSION

From a study of the above data, we believe that an efficient water flood of the lower sand will recover approximately 3,450 barrels of oil per acre, or an average of 239 barrels per acre foot from the 14.45 feet of floodable sand analyzed. In calculating this recovery, an allowance was made for oil lost during coring, and it was assumed that the true water saturation of the sand is 38 percent. As far as the upper sand is concerned, it is doubtful whether it would produce sufficient oil to justify the completion of same as an injection well.

Oil Field Research Laboratories
RESULTS OF PERMEABILITY TESTS
TABLE I

Company A. W. Bailey Lease Graham Well No. 25

Sample No.	Depth, Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
1	827.60	485.	0.75	0.75	363.75
2	827.95	67.	0.85	1.60	56.95
3	829.10	800.	0.80	2.40	640.00
4	829.45	835.	0.35	2.75	292.25
5	829.75	900.	0.75	3.50	675.00
6	830.90	9.7	0.65	4.15	6.31
7	831.20	3.9	0.55	4.70	2.13
8	831.95	55.	0.55	5.25	30.25
9	832.33	94.	0.55	5.80	51.70
10	833.05	47.	0.50	6.30	23.50
11	833.40	36.	0.35	6.65	12.60
12	833.70	48.	0.35	7.00	16.80
13	834.05	481.	0.70	7.70	336.70
14	835.18	282.	0.60	8.30	169.20
15	835.46	1.6	0.30	8.60	0.48
16	835.55	8.2	0.25	8.85	2.05
17	835.90	Imp.	0.45	9.30	0.00
18	836.45	1.6	0.40	9.70	0.64
19	836.75	Imp.	0.25	9.95	0.00
20	837.50	5.1	0.95	10.90	4.85
21	838.50	7.5	0.90	11.80	6.75
22	839.16	6.5	0.55	12.35	3.58
23	839.40	1.7	0.45	12.80	0.77
24	839.80	1.9	0.15	12.95	0.29

Oil Field Research Laboratories
RESULTS OF PERMEABILITY TESTS
TABLE I

Company A. W. Bailey Lease Graham Well No. 25

Sample No.	Depth, Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
		<u>LOWER SAND</u>			
1	909.10	54.	0.50	0.50	27.00
2	909.36	42.	0.50	1.00	21.00
3	910.10	49.	0.90	1.90	44.10
4	910.68	14.	0.20	2.10	2.80
5	910.96	12.	0.20	2.30	2.40
6	911.47	Imp.	0.40	2.70	0.00
7	911.70	Imp.	0.50	3.20	0.00
8	912.60	3.0	0.50	3.70	1.50
9	912.97	1.3	0.40	4.10	0.52
10	913.40	3.6	0.25	4.35	0.90
11	913.90	18.	0.55	4.90	9.90
12	914.17	22.	0.40	5.30	8.80
13	914.78	27.	0.45	5.75	12.15
14	915.00	62.	0.35	6.10	21.70
15	915.50	2.2	0.15	6.25	0.33
16	916.25	12.	0.55	6.80	6.60
17	916.50	1.4	0.25	7.05	0.35
18	916.70	1.1	0.35	7.40	0.39
19	917.30	21.	0.60	8.00	12.60
20	917.80	56.	0.45	8.45	25.20
21	918.20	13.	0.50	8.95	6.50
22	918.80	11.	0.60	9.55	6.60
23	919.35	Imp.	0.70	10.25	0.00
24	920.20	210.	0.70	10.95	147.00
25	920.70	163.	0.50	11.45	81.50
26	921.40	116.	0.90	12.35	104.40
27	922.37	20.	0.80	13.15	16.00
28	923.05	116.	0.55	13.70	63.80
29	923.40	105.	0.45	14.15	47.25
30	923.90	93.	0.50	14.65	46.50
31	924.47	100.	0.30	14.95	30.00
32	924.70	3.6	0.40	15.35	1.44
33	924.95	109.	0.30	15.65	32.70
34	925.45	12.	0.45	16.10	5.40
35	925.85	2.9	0.45	16.55	1.31
36	926.30	252.	0.50	17.05	126.00
37	926.90	86.	0.40	17.45	34.40
38	927.17	83.	0.25	17.70	20.75
39	927.90	81	0.55	18.25	44.55
40	928.50	0.76	0.45	18.70	0.34
41	929.00	1.9	0.75	19.45	1.43

Oil Field Research Laboratories
SUMMARY OF PERMEABILITY TESTS

TABLE II

Company	A. W. Bailey	Lease	Graham	Well No.	25
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity, Ft. x Md.		
<u>UPPER SAND</u>					
826.90 - 835.20	8.30	322.55	2,677.16		
835.20 - 839.85	3.95	4.91	19.41		
826.90 - 839.85	12.85	220.13	2,696.57		
<u>LOWER SAND</u>					
908.10 - 919.10	8.65	24.43	211.34		
919.10 - 929.50	9.20	87.47	804.77		
908.10 - 929.50	17.85	56.92	1,016.11		

RESULTS OF SATURATION TESTS

Company A. W. Bailey Lease Graham Well No. 25

Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum. Ft.	
					UPPER SAND				
1	827.04	17.1	14.9	41.5	56.4	198	0.75	0.75	149
F-2	828.34	25.9	11.4	-	-	229	0.95	1.70	218
2	828.84	24.3	6.9	47.3	54.2	130	1.05	2.75	137
3	830.32	23.4	13.2	51.1	64.3	240	1.25	4.00	300
4	831.58	22.2	20.6	48.3	68.9	355	1.15	5.15	408
5	832.84	18.7	17.9	54.4	72.3	260	1.25	6.40	325
6	833.92	24.9	15.7	51.1	66.8	304	1.90	8.30	579
7	835.30	15.8	32.1	42.9	75.0	394	0.55	8.85	217
F-7A	836.04	14.4	28.6	-	-	320	1.10	9.95	352
8	837.00	14.4	32.0	35.3	67.3	358	0.95	10.90	340
9	838.60	14.4	37.0	29.7	66.7	413	1.90	12.80	785
							Total - - - - -		3,810
							Note: "A" - Sample was taken after core was received in the laboratory.		

Oil Field Research Laboratories

RESULTS OF SATURATION TESTS

TABLE III

Company A. S. Bailey Lease Graham Well No. 25

Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum. Ft.	
						<u>LOWER SAND</u>			
1	908.23	19.3	22.9	58.9	81.8	343	1.10	1.10	378
2	909.70	18.0	24.9	60.9	85.8	348	1.40	2.50	487
3	911.10	13.7	20.0	41.3	61.3	213	0.20	2.70	43
4	912.20	12.8	20.0	51.4	71.4	199	0.20	2.90	40
F-4	912.39	17.1	28.4	-	-	377	1.15	4.05	433
5	913.55	17.9	26.9	43.3	70.2	374	0.45	4.50	168
6	914.30	18.8	27.4	39.0	66.4	400	1.30	5.80	520
7	915.70	12.2	30.2	31.1	61.3	286	0.20	6.00	57
F-7	915.90	12.1	32.5	-	-	305	0.55	6.55	168
8	916.85	10.9	34.7	61.1	95.8	294	0.60	7.15	176
F-8	917.05	15.8	26.9	-	-	330	0.85	8.00	280
9	918.35	16.8	29.8	37.6	67.4	339	1.30	9.30	505
10	919.60	19.4	29.8	34.6	64.4	449	1.10	10.40	494
11	920.85	17.5	28.9	38.5	67.4	393	1.50	11.90	590
12	922.65	18.9	34.5	46.2	80.7	506	1.70	13.60	860
13	924.10	17.5	32.6	42.7	75.3	443	1.10	14.70	487
14	925.10	19.0	28.4	49.3	77.7	419	0.30	15.00	126
F-14	925.30	16.4	30.7	-	-	391	0.80	15.80	313

Oil Field Research Laboratories

RESULTS OF SATURATION TESTS

TABLE III

Company A. W. Bailey Lease Graham Well No. 25

Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum. Ft.	
15	926.50	17.6	30.6	31.3	61.9	416	1.25	17.05	523
16	928.08	14.7	40.5	26.2	66.7	462	0.55	17.60	254
17	929.23	12.8	48.9	26.2	75.1	486	1.20	18.80	<u>583</u>
							Total - - - - -		7,485

Oil Field Research Laboratories

SUMMARY OF SATURATION TESTS

TABLE IV

Company A. W. Bailey Lease Graham Well No. 28

Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbls./A. Ft.	Total Oil Content Bbls./Acre
<u>UPPER SAND</u>						
826.90 - 835.20	8.30	22.70	14.66	49.70	255	2,116
835.20 - 839.70	4.50	14.58	33.31	33.44	376	1,694
826.90 - 839.70	12.80	19.84	21.22	44.56	297	3,810
<u>LOWER SAND</u>						
908.10 - 919.10	9.30	16.63	27.38	48.90	350	3,255
919.10 - 929.50	9.50	17.20	33.98	36.90	445	4,230
908.10 - 929.50	18.80	16.92	30.71	42.14	398	7,485

Oil Field Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE V

Company A. W. Bailey

Lease Graham

Well No. 25

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.
			Percent	Bbls./A. Ft.	Percent	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
1	908.45	19.5	24.3	368	4.9	<u>LOWER SAND</u> 74	19.4	70.5	294	147	9.85	15
2	909.90	17.9	23.4	325	4.4	61	19.0	70.8	264	155	7.75	15
4	912.39	17.1	26.4	377	3.0	40	25.4	66.8	337	6	0.270	40
5	913.75	17.6	27.4	374	4.6	63	22.8	70.9	311	36	1.50	30
6	914.50	18.8	29.1	425	5.2	76	23.9	67.3	349	120	9.33	15
7	915.90	12.1	32.5	305	0.0	0	32.5	58.5	305	0	Imp.	50+
8	917.05	15.8	26.9	330	0.0	0	26.9	58.0	330	0	Imp.	50+
9	918.55	16.9	30.1	395	7.3	96	22.8	56.6	299	1	0.081	50
10	819.80	19.4	28.7	432	4.9	74	23.8	58.5	358	131	8.67	15
11	821.20	17.9	28.5	396	5.8	81	22.7	58.0	315	431	10.58	10
12	922.85	19.1	33.0	489	6.5	96	26.5	66.0	393	20	11.60	10
13	924.30	18.0	31.3	437	3.6	50	27.7	62.6	387	98	13.71	10
14	925.30	16.4	30.7	391	4.9	63	25.8	64.3	326	28	0.808	25
15	926.70	17.6	31.9	435	9.9	135	22.0	66.0	300	140	2.86	20
16	928.25	14.5	43.0	484	0.0	0	43.0	25.0	484	0	Imp.	50+
17	929.40	12.7	47.8	471	0.0	0	47.8	29.4	471	0	Imp.	50+

Notes:

cc - cubic centimeter

* Volume of water recovered at the time of maximum oil recovery.

** Determined by passing water through a sample which still contains residual oil.

Oil Field Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE V

Company A. W. Bailey

Lease Graham

Well No. 25

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.
			Percent	Bbls./A. Ft.	Percent	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
						<u>UPPER SAND</u>						
1	827.33	17.2	13.5	180	0.0	0	13.5	77.5	180	105	3.81	15
2	828.34	25.9	11.4	229	0.0	0	11.4	70.8	229	323	87.40	5
3A	830.17	23.6	12.6	231	0.0	0	12.6	72.0	321	245	54.90	5
4	831.28	22.3	21.5	372	1.3	22	20.2	72.4	350	101	5.29	15
5	832.54	18.7	17.5	254	0.9	13	16.6	71.6	241	148	5.33	20
6	834.22	24.6	16.8	321	0.0	0	16.8	73.5	321	235	21.19	5
7	835.30	15.6	33.2	402	0.0	0	33.2	57.5	402	4	0.163	40
7A	836.04	14.4	28.6	320	0.0	0	28.6	45.7	320	0	Imp.	50+
9	838.90	14.3	38.6	428	0.0	0	38.6	47.2	428	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.

"A" Sample was taken from core after it was received in the laboratory.

Oil Field Research Laboratories
SUMMARY OF LABORATORY FLOODING TESTS

TABLE VI

Company	<u>A. W. Bailey</u>		Lease	<u>Graham</u>		Well No.	<u>25</u>
	<u>UPPER SAND</u>			<u>LOWER SAND</u>			
Depth Interval, Feet	<u>830.90 - 833.30</u>	<u>908.10 - 919.10</u>		<u>919.10-927.25</u>	<u>908.10-927.25</u>		
Feet of Core Analyzed	<u>2.40</u>	<u>6.70</u>		<u>7.45</u>	<u>14.15</u>		
Average Percent Porosity	<u>20.42</u>	<u>17.97</u>		<u>18.19</u>	<u>18.08</u>		
Average Percent Original Oil Saturation	<u>19.41</u>	<u>27.10</u>		<u>30.77</u>	<u>29.03</u>		
Average Percent Oil Recovery	<u>1.08</u>	<u>5.00</u>		<u>6.11</u>	<u>5.58</u>		
Average Percent Residual Oil Saturation	<u>18.33</u>	<u>22.10</u>		<u>24.66</u>	<u>23.45</u>		
Average Percent Residual Water Saturation	<u>71.87</u>	<u>66.60</u>		<u>64.60</u>	<u>65.55</u>		
Average Percent Total Residual Fluid Saturation	<u>90.20</u>	<u>88.70</u>		<u>89.26</u>	<u>89.00</u>		
Average Original Oil Content, Bbls./A. Ft.	<u>310.</u>	<u>377.</u>		<u>434.</u>	<u>407.</u>		
Average Oil Recovery, Bbls./A. Ft.	<u>17.</u>	<u>69.</u>		<u>86.</u>	<u>78.</u>		
Average Residual Oil Content, Bbls./A. Ft.	<u>293.</u>	<u>308.</u>		<u>348.</u>	<u>329.</u>		
Total Original Oil Content, Bbls./Acre	<u>745.</u>	<u>2,525.</u>		<u>3,236.</u>	<u>5,764.</u>		
Total Oil Recovery, Bbls./Acre	<u>41.</u>	<u>464.</u>		<u>640.</u>	<u>1,104.</u>		
Total Residual Oil Content, Bbls./Acre	<u>704.</u>	<u>2,064.</u>		<u>2,596.</u>	<u>4,660.</u>		
Average Effective Permeability, Millidarcys	<u>5.31</u>	<u>5.20</u>		<u>8.66</u>	<u>7.02</u>		
Average Initial Fluid Production Pressure, p.s.i.	<u>17.5</u>	<u>27.5</u>		<u>15.0</u>	<u>21.3</u>		

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

Oil Field Research Laboratories
RESULTS OF WATER DIFFERENTIATION TESTS
TABLE VII

Company A. W. Bailey Lease Graham Well No. 25

Sample No.	Depth, Feet	Chloride Content of Brine in Sand ppm	Connate	Percent Water Saturation Drilling & Foreign	Total
		<u>UPPER SAND</u>			
1	827.04	32,200			
2	828.84	21,300			
3	830.32	14,600			
4	831.58	27,000			
5	832.84	20,400			
6	833.92	27,400			
7	835.30	28,400			
8	837.00	38,300			
9	838.60	42,100			
Note: ppm - parts per million.					

Oil Field Research Laboratories
RESULTS OF WATER DIFFERENTIATION TESTS
TABLE VII

Company A. W. Bailey Lease Graham Well No. 25

Sample No.	Depth, Feet	Chloride Content of Brine in Sand ppm	Connate	Percent Water Saturation Drilling & Foreign	Total
<u>LOWER SAND</u>					
1	908.23	25,000			
2	909.70	19,800			
3	911.10	30,800			
4	912.20	25,400			
5	913.55	24,400			
6	914.30	25,900			
7	915.70	31,200			
8	916.85	30,800			
9	918.35	27,400			
10	919.60	17,000			
11	920.85	19,800			
12	922.55	26,400			
13	924.10	14,800			
14	925.10	13,900			
15	926.50	17,100			
16	928.08	31,200			
17	929.23	27,500			
Note: ppm - parts per million.					

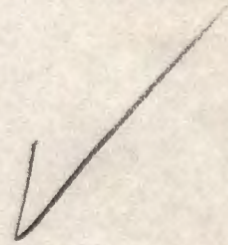
Oil Field Research Laboratories
SUMMARY OF WATER DIFFERENTIATION TESTS
TABLE VIII

Company A. W. Bailey Lease Graham Well No. 25

Depth Interval, Feet	Chloride Content of Brine in Sand, ppm	Average Percent Connate Water	Average Percent Drilling & Foreign Water
<u>UPPER SAND</u>			
826.90 - 835.20	23,452		
835.20 - 839.70	38,822		
826.90 - 839.70	28,313		
<u>LOWER SAND</u>			
908.10 - 919.10	25,061		
919.10 - 929.50	21,293		
908.10 - 929.50	22,940		

Note: ppm - parts per million.

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OIL FIELD RESEARCH LABORATORIES

LOG

WILSON COUNTY, KANSAS

Company Ernest Barry Investment Company Lease Hatfield Well No. 1

<u>Depth Interval, Feet</u>	<u>Description</u>
883.40 - 887.30	- Gray shale (discarded at well).
887.30 - 890.75	- Two inches of coal, the rest gray shale (discarded at well).
890.75 - 891.60	- Brown fine grained micaceous sandstone.
891.60 - 892.00	- Laminated sandstone and shale.
892.00 - 892.25	- Gray sandy carbonaceous shale.
892.25 - 893.15	- Gray sandy shale.
893.15 - 893.35	- Brown fine grained finely laminated micaceous sandstone.
893.35 - 893.45	- Gray sandy shale.
893.45 - 900.75	- Gray shale (discarded at well).