

OILFIELD RESEARCH LABORATORIES

813 EAST SIXTH
OKMULGEE, OKLAHOMA
PHONE: 1486

- REGISTERED ENGINEERS -

Chanute, Kansas

536 N. HIGHLAND
CHANUTE, KANSAS
PHONE: 728

August 29, 1957

Creek Oil & Gas Company, Inc.
P. O. Box 377
Chanute, Kansas

Gentlemen:

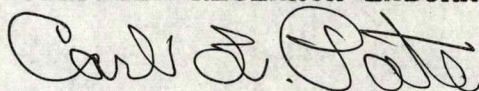
Enclosed herewith is the report of the analysis of the 3" Rotary core taken from the Wells Lease, Well No. 6, Neosho County, Kansas, and submitted to our laboratory on August 23, 1957, by Mr. Larry Smith and Mr. Jack McKelvey.

This core was sampled and the samples sealed in cans by a representative of Creek Oil & Gas Company, Inc.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Carl L. Pate

CLP:cb

4 c.c.

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Creek Oil & Gas Company, Inc Lease Wells Well No. 6

Location _____

Section 27 Twp 28S Rge. 18E County Neosho State Kansas

Name of Sand - - - - - Bartlesville

Top of Core - - - - - 791.2

Bottom of Core - - - - - 836.2

Top of Sand - - - - - 798.5

Bottom of Sand - - - - - 831.5

Total Feet of Permeable Sand - - - (Analyzed) - - - 23.3

Total Feet of Floodable Sand - - - (Analyzed) - - - 5.0

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 1	6.0	6.0
1 - 2	3.6	9.6
2 - 5	3.3	12.9
5 - 15	5.3	18.2
15 & above	5.1	23.3

Average Permeability Millidarcys - - - - - 11.7

Average Percent Porosity - - - - - 15.7

Average Percent Oil Saturation - - - - - 37.6

Average Percent Water Saturation - - - - - 40.1

Average Oil Content, Bbls./A. Ft. - - - - - 462.

Total Oil Content, Bbls./Acre - - - - - 13,007.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 5.2

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 76.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 380.

Total Calculated Oil Recovery, Bbls./Acre - - - - - 900.

Packer Setting, Feet - - - - -

Viscosity, Centipoises @ - - - - -

A. P. I. Gravity, degrees @ 60 °F - - - - -

Elevation, Feet - - - - -

981

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

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
-------------------------	-------------

791.2 - 796.4	- Gray laminated sandy shale.
796.4 - 798.5	- Laminated sandstone and shale.
798.5 - 799.3	- Brown fine grained micaceous sandstone.
799.3 - 801.0	- Laminated sandstone and shale.
801.0 - 802.2	- Alternate thin layers of sandstone and shale.
802.2 - 803.0	- Brown fine grained shaley sandstone.
803.0 - 806.8	- Gray shale.
806.8 - 808.3	- Dark brown fine grained micaceous sandstone.
808.3 - 808.8	- Laminated sandstone and shale.
808.8 - 809.4	- Brown fine grained micaceous sandstone.
809.4 - 810.6	- Brown fine grained shaley sandstone.
810.6 - 811.6	- Gray laminated sandy shale.
811.6 - 812.3	- Brown fine grained micaceous shaley sandstone.
812.3 - 812.9	- Alternate layers of sandstone and shale.
812.9 - 814.7	- Brown fine grained micaceous shaley sandstone.
814.7 - 815.1	- Gray sandy shale.
815.1 - 817.1	- Dark fine grained sandstone.
817.1 - 818.4	- Light brown fine grained micaceous shaley sandstone.
818.4 - 818.9	- Finely laminated sandy shale.
818.9 - 820.8	- Dark brown fine grained micaceous sandstone.
820.8 - 822.3	- Dark fine grained micaceous shaley sandstone.

- 822.3 - 825.0 - Dark brown fine grained micaceous sandstone.
825.0 - 826.8 - Dark fine grained micaceous shaley sandstone.
826.8 - 828.8 - Light brown laminated micaceous shaley sandstone.
828.8 - 830.5 - Brown fine grained micaceous sandstone.
830.5 - 831.5 - Dark fine grained micaceous sandstone.
831.5 - 832.0 - Gray laminated sandstone and shale.
832.0 - 832.7 - Gray shaley sandstone.
832.7 - 834.1 - Gray laminated sandy shale.
834.1 - 835.8 - Dark micaceous carbonaceous sandstone.
835.8 - 836.2 - Conglomeratic sandstone.

Coring was started at a depth of 791.2 feet in gray laminated sandy shale and completed at 836.2 feet in conglomeratic sandstone. This core shows a total of 26.1 feet of sandstone. For the most part, the pay is made up of brown fine grained micaceous to shaley sandstone.

PERMEABILITY

For the sake of distribution, the core was divided into three sections. The weighted average permeability of the upper, middle and lower sections is 2.6, 15.4 and 11.1 millidarcys respectively; the overall average being 11.7 (See Table III). By observing the data given on the core-graph, it is noticeable that the sand has a very irregular permeability profile. The permeability of the sand varies from impermeable to a maximum of 112 millidarcys.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a fairly good weighted average percent oil saturation, namely, 37.6. The weighted average percent oil saturation of the upper, middle and lower sections is 33.2, 39.5 and 38.2 respectively.

The weighted average percent water saturation of the upper, middle and lower sections is 40.1, 37.1 and 43.0 respectively; the overall average being 40.1 (See Table III). This gives an overall weighted average total fluid saturation of 77.7 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, middle and lower sections is 372, 494 and 483 barrels per acre foot respectively; the overall average being 462. The total oil content, as shown by this core, is 13,007 barrels per acre (See Table III).

LABORATORY FLOODING TESTS

The sand in this core did not respond very well to laboratory flooding tests, as a total recovery of 380 barrels of oil per acre was obtained from 5.0 feet of sand. The weighted average percent oil saturation was reduced from 39.5 to 34.3, or represents an average recovery of 5.2 percent. The weighted average effective permeability of the samples is 1.79 millidarcys, while the average initial fluid production pressure is 33.3 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 30 samples tested, 10 produced water and 6 oil. This indicates that approximately 20 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.

CONCLUSION

On the basis of the above data, it is evident that an efficient waterflood, within the vicinity of this well, will recover approximately 900 barrels of oil per acre or an average of 180 barrels per acre foot from

-5-

the 5.0 feet of floodable pay sand analyzed. In calculating this recovery, an allowance was made for oil lost during coring and for permeability distribution but not for sweep efficiency. Furthermore, it was assumed that the primary production and the true water saturation of the sand are 5 and 36 percent respectively.

This core shows a rather shaley sand section having a fairly good oil saturation, a fair water saturation and a low permeability. Only 8.6 feet of the sand analyzed was permeable to water.

Oilfield Research Laboratories
RESULTS OF PERMEABILITY TESTS

TABLE I

Company Creek Oil & Gas Company, Inc. Lease Wells Well No. 6

Sample No.	Depth Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
1	796.3	Imp.	0.4	0.4	0.00
2	797.8	Fractured	0.7	1.1	-
3	798.4	Fractured	0.5	1.6	-
4	798.8	10.	0.5	2.1	5.00
5	799.2	0.50	0.3	2.4	0.15
6	799.6	Imp.	0.7	3.1	0.00
7	800.3	1.6	0.6	3.7	0.96
8	800.9	Imp.	0.4	4.1	0.00
9	801.4	0.41	0.6	4.7	0.25
10	801.8	0.55	0.6	5.3	0.33
11	802.4	2.9	0.4	5.7	1.16
12	802.9	Imp.	0.4	6.1	0.00
13	806.7	Fractured	0.6	6.7	-
14	807.2	31.	0.6	7.3	1.86
15	807.7	25.	0.5	7.8	12.50
16	808.1	69.	0.4	8.2	27.60
17	808.7	Imp.	0.5	8.7	0.00
18	809.1	3.8	0.6	9.3	2.28
19	809.5	0.36	0.4	9.7	1.44
20	810.1	1.6	0.5	10.2	0.80
21	810.5	1.6	0.3	10.5	0.48
22	810.9	Imp.	0.6	11.1	0.00
23	811.5	Imp.	0.4	11.5	0.00
24	812.0	0.48	0.7	12.2	0.34
25	812.4	0.56	0.3	12.5	0.17
26	812.8	Imp.	0.3	12.8	0.00
27	813.3	1.8	0.7	13.5	1.26
28	813.9	1.2	0.6	14.1	0.72
29	814.4	2.3	0.5	14.6	1.15
30	814.9	0.75	0.4	15.0	0.30
31	815.4	0.89	0.5	15.5	0.44
32	815.8	112.	0.6	16.1	67.20
33	816.4	53.	0.4	16.5	21.20
34	816.8	5.8	0.5	17.0	2.90
35	817.4	Imp.	0.5	17.5	0.00
36	817.8	0.86	0.8	18.3	0.69
37	819.0	2.7	0.3	18.6	0.81
38	819.5	3.1	0.6	19.2	1.86
39	820.1	20.	0.5	19.7	10.00
40	820.5	11.	0.5	20.2	5.50

Oilfield Research Laboratories
RESULTS OF PERMEABILITY TESTS

TABLE I

Company Creek Oil & Gas Company, Inc. Lease Wells Well No. 6

Sample No.	Depth Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
41	821.0	6.6	0.5	20.7	3.30
42	821.5	4.9	0.5	21.2	2.45
43	822.1	10.	0.5	21.7	5.00
44	822.6	56.	0.5	22.2	28.00
45	823.2	6.9	0.6	22.8	4.14
46	823.7	22.	0.5	23.3	11.00
47	824.1	21.	0.5	23.8	10.50
48	824.8	21.	0.6	24.4	12.60
49	825.2	11.	0.5	24.9	5.50
50	825.7	3.9	0.4	25.3	1.56
51	826.1	1.1	0.4	25.7	0.44
52	826.5	1.7	0.5	26.2	0.85
53	827.4	0.67	0.9	27.1	0.60
54	827.9	0.97	0.5	27.6	0.48
55	828.4	Imp.	0.6	28.2	0.00
56	828.9	7.6	0.5	28.7	3.80
57	830.4	14.	0.5	29.2	7.00
58	830.9	10.	0.7	29.9	7.00

Oilfield Research Laboratories

RESULTS OF SATURATION TESTS

TABLE II

Company Creek Oil & Gas Company, Inc. Lease Wells Well No. 6

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.	
1	796.6	12.0	21	55	76	195	0.7	0.7	136
2	797.6	14.4	28	40	68	313	1.4	2.1	438
3	798.6	16.5	36	30	66	462	0.8	2.9	370
4	799.4	14.5	39	33	72	439	0.7	3.6	307
5	800.6	12.9	38	45	83	380	1.0	4.6	380
6	801.6	13.8	30	37	67	321	1.2	5.8	385
7	802.6	16.2	44	42	86	553	0.8	6.6	443
8	806.9	18.3	40	33	73	568	0.6	7.2	341
9	807.9	16.8	36	35	71	469	0.9	8.1	422
10	808.9	16.9	39	36	75	512	0.6	8.7	307
11	809.9	14.1	43	40	83	470	1.2	9.9	564
12	810.7	12.0	37	47	84	344	1.0	10.9	344
13	811.7	13.9	42	37	79	453	0.7	11.6	317
14	812.6	13.1	28	49	77	285	0.6	12.2	171
15	813.6	13.6	39	46	85	412	1.2	13.4	495
16	814.6	14.8	39	47	86	448	0.6	14.0	269
17	815.6	20.2	42	29	71	658	1.0	15.0	658
18	816.6	19.8	45	22	67	692	1.0	16.0	692
19	817.6	18.2	39	30	69	550	1.3	17.3	715
20	819.3	16.5	41	44	85	525	0.9	18.2	473
21	820.3	15.0	38	44	82	442	1.0	19.2	442
22	821.3	15.7	41	39	80	499	1.5	20.7	748
23	822.4	16.5	41	39	80	525	0.6	21.3	315
24	823.4	16.9	39	40	79	511	1.0	22.3	511
25	824.5	16.9	43	45	88	564	1.1	23.4	620

Oilfield Research Laboratories

RESULTS OF SATURATION TESTS

TABLE II

Company Creek Oil & Gas Company, Inc. Lease Wells Well No. 6

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.	
26	825.5	17.4	39	34	73	526	0.9	24.3	474
27	826.3	17.4	46	36	82	621	0.9	25.2	559
28	827.6	13.9	34	52	86	368	1.4	26.6	516
29	828.6	14.0	22	56	78	239	0.6	27.2	143
30	830.6	18.2	32	45	77	452	1.0	28.2	452
							Total	- - - -	13,007

Oilfield Research Laboratories

SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Creek Oil & Gas Company, Inc. Lease Wells Well No. 6

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
798.5 - 802.6	3.0	2.6	7.85
806.8 - 818.4	9.3	15.4	143.33
818.9 - 831.2	11.0	11.1	122.39
798.5 - 831.2	23.3	11.7	273.57

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
796.4 - 803.0	6.6	14.3	33.2	40.1	372	2,459
806.8 - 818.4	10.7	16.0	39.5	37.1	494	5,295
818.9 - 831.5	10.9	16.2	38.2	43.0	483	5,253
796.4 - 831.5	28.2	15.7	37.6	40.1	462	13,007

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Creek Oil & Gas Company, Inc. Lease Wells Well No. 6

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	796.6	12.4	19	183	0	0	19	62	183	0	Imp.	50+
2	797.6	14.2	25	275	0	0	25	54	275	0	Imp.	50+
3	798.6	16.7	36	467	3	39	33	58	428	15	0.397	45
4	799.4	14.2	37	408	0	0	37	41	408	0	Imp.	50+
5	800.6	13.1	35	356	0	0	35	55	356	0	Imp.	50+
6	801.6	13.5	33	346	0	0	33	50	346	0	Imp.	50+
7	802.6	16.1	41	512	0	0	41	51	512	0	Imp.	50+
8	806.9	18.0	40	559	8	112	32	62	447	18	0.407	35
9	807.9	16.9	36	471	4	52	32	64	419	87	2.32	25
10	808.9	16.7	37	479	0	0	37	55	479	0	Imp.	50+
11	809.9	13.7	41	436	0	0	41	47	436	0	Imp.	50+
12	810.7	12.3	33	315	0	0	33	54	315	0	Imp.	50+
13	811.7	13.8	44	471	0	0	44	43	471	0	Imp.	50+
14	812.6	13.1	27	274	0	0	27	60	274	0	Imp.	50+
15	813.6	13.8	36	385	0	0	36	58	385	0	Imp.	50+
16	814.6	15.1	39	457	2	23	37	54	434	8	0.172	45
17	815.6	20.5	42	668	12	191	30	63	477	112	3.43	25
18	816.6	19.9	41	633	0	0	41	29	633	0	Imp.	50+
19	817.6	17.9	37	514	0	0	37	41	514	0	Imp.	50+
20	819.3	16.7	37	479	0	0	37	52	479	0	Imp.	50+
21	820.3	15.3	36	427	0	0	36	54	427	5	0.305	50
22	821.3	15.8	37	453	0	0	37	50	453	0	Imp.	50+
23	822.4	16.7	38	492	0	0	38	56	492	5	0.295	50
24	823.4	17.0	42	554	0	0	42	52	554	3	0.202	50
25	824.5	17.2	43	574	2	27	41	53	547	78	2.16	25

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.

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Creek Oil & Gas Company, Inc. Lease Wells Well No. 6

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.			
26	825.5	17.2	37	494	0	0	37	44	494	0	Imp.	50+
27	826.3	17.0	47	620	0	0	47	45	620	0	Imp.	50+
28	827.6	14.2	31	341	0	0	31	58	341	0	Imp.	50+
29	828.6	14.2	24	264	0	0	24	61	264	0	Imp.	50+
30	830.6	17.9	30	417	0	0	30	58	417	7	0.100	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.

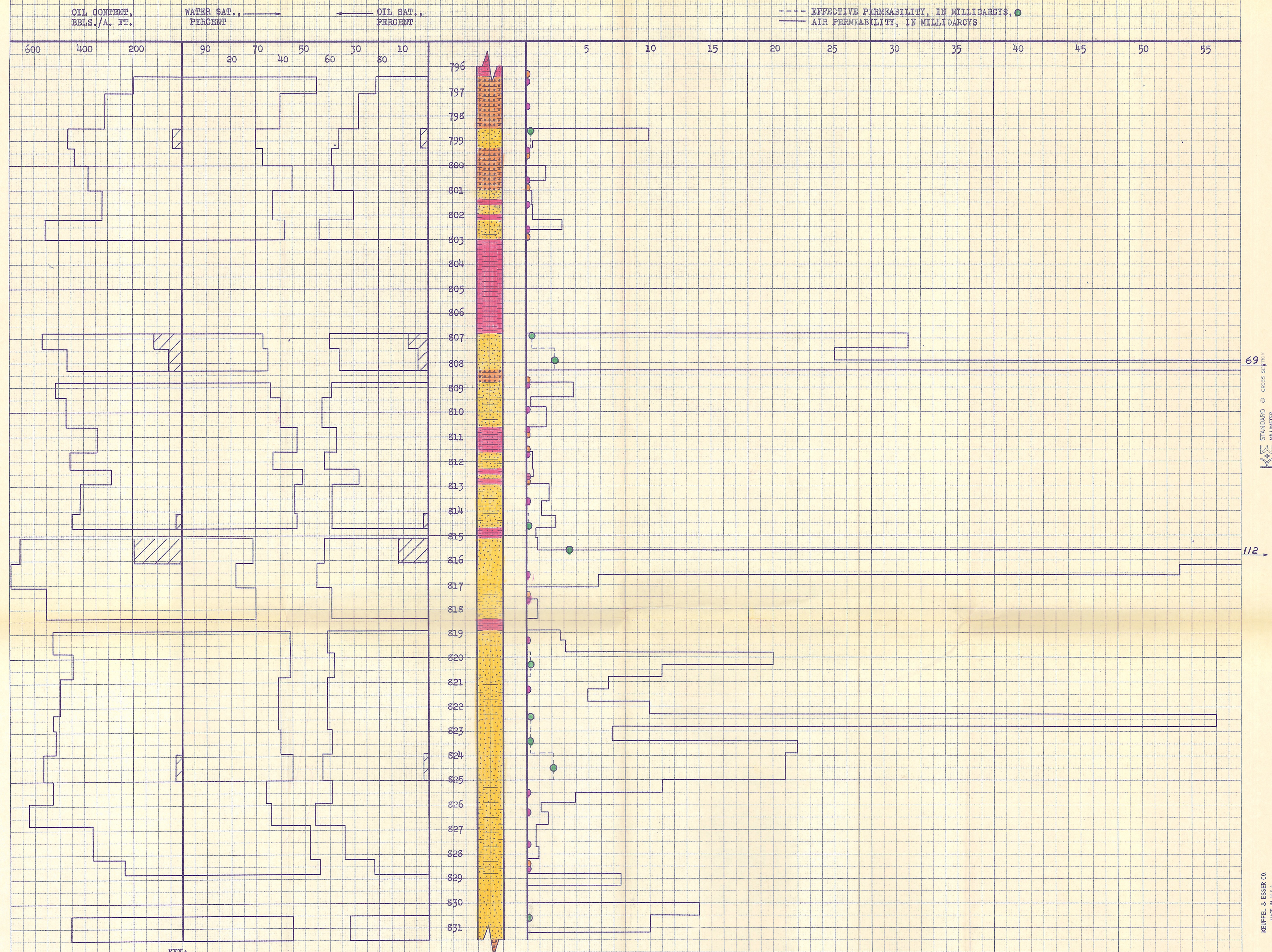
Oilfield Research Laboratories
SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company Creek Oil & Gas Company, Inc. Lease Wells Well No. 6

Depth Interval, Feet	798.5 - 825.0
Feet of Core Analyzed	5.0
Average Percent Porosity	17.6
Average Percent Original Oil Saturation	39.5
Average Percent Oil Recovery	5.2
Average Percent Residual Oil Saturation	34.3
Average Percent Residual Water Saturation	59.0
Average Percent Total Residual Fluid Saturation	93.3
Average Original Oil Content, Bbls./A. Ft.	541.
Average Oil Recovery, Bbls./A. Ft.	76.
Average Residual Oil Content, Bbls./A. Ft.	465.
Total Original Oil Content, Bbls./Acre	2,707.
Total Oil Recovery, Bbls./Acre	380.
Total Residual Oil Content, Bbls./Acre	2,327.
Average Effective Permeability, Millidarcys	1.79
Average Initial Fluid Production Pressure, p.s.i.	33.3

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



KEY:
FLOOD POT RECOVERY
SANDSTONE
SHALEY SANDSTONE

LAMINATED SANDSTONE AND SHALE
ALTERNATE LAYERS OF SANDSTONE AND SHALE
SANDY SHALE

SHALE
IMPERMEABLE TO AIR
IMPERMEABLE TO WATER

CREEK OIL & GAS COMPANY, INCORPORATED

WELLS LEASE

NEOSHO COUNTY, KANSAS

WELL NO. 6

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE POROSITY, PERCENT	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVG. OIL CONTENT BBLs./A. FT.	TOTAL OIL CONTENT BBLs./ACRE	AVG. AIR PERMEABILITY, MILLIDARCYs	CALCULATED OIL RECOVERY, BBLs./ACRE
796.4 - 803.0	6.6	14.3	33.2	40.1	372	2,459	2.6	
806.8 - 818.4	10.7	16.0	39.5	37.1	494	5,295	15.4	
818.9 - 831.5	10.9	16.2	38.2	43.0	483	5,253	11.1	
796.4 - 831.5	28.2	15.7	37.6	40.1	462	13,007	11.7	900

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
AUGUST, 1957