

OIL FIELD RESEARCH LABORATORIES
CHANUTE, KANSAS

September 25, 1951

Hardesty & Schoonover
Richart Hotel
Garnett, Kansas

Gentlemen:

Enclosed herewith is the report of the partial analysis of the Cable Tool core taken from your S. Kehl Lease, Well No. 4, Linn County, Kansas, and submitted to our laboratory on September 20, 1951.

In calculating the recovery for the area represented by this core, an allowance was made for oil lost during coring, and it is assumed that the well was drilled in virgin territory.

Very truly yours,

OIL FIELD RESEARCH LABORATORIES

Carl L. Pate

CLP:mm
G.S.

32-19-225

S. Kehl 4

HARDESTY & SCHOONOVER

CORE ANALYSIS REPORT

S. KEHL LEASE WELL NO. 4

LINN COUNTY, KANSAS

OIL FIELD RESEARCH LABORATORIES

CHANUTE, KANSAS

SEPTEMBER 25, 1951

Oil Field Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Hardesty & Schoonover Lease S. Kehl Well No. 4

Location NE₄

Section 32 Twp. 19S Rge. 22E County Linn State Kansas

	Feet	Cum. Ft.
Name of Sand		Bartlesville
Top of Core		636.00
Bottom of Core		663.75
Top of Sand		647.17
Bottom of Sand		?
Total Feet of Permeable Sand (Analyzed)		14.95
Total Feet of Floodable Sand (Analyzed)		14.95
Distribution of Permeable Sand:		
Permeability Range		
Millidarcys		

Average ^{Effective} Permeability Millidarcys		14.88
Average Percent Porosity		23.32
Average Percent Oil Saturation		32.52
Average Percent Water Saturation		-
Average Oil Content, Bbls./A. Ft.		591.
Total Oil Content, Bbls./Acre		8,831.
Average Percent Oil Recovery by Laboratory Flooding Tests		9.15
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.		169.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre		2,121.
Total Calculated Oil Recovery, Bbls./Acre		6,600.
Packer Setting, Feet		647.5
Viscosity, Centipoises @		
A. P. I. Gravity, degrees @ 60 °F		
Elevation, Feet		

LOG

Company Hardesty & Schoonover Lease S. Kehl Well No. 4

<u>Depth Interval, Feet</u>	<u>Description</u>
636.00 - 640.90	- Core not received by laboratory, no description given.
640.90 - 645.05	- Gray shale.
645.05 - 645.20	- Brown fine grained micaceous slightly shaley sandstone.
645.20 - 646.70	- Gray shale.
646.70 - 646.90	- Brown fine grained micaceous sandstone.
646.90 - 647.17	- Gray shale.
647.17 - 648.65	- Brown fine grained micaceous sandstone.
648.65 - 648.90	- Finely laminated sandy shale.
648.90 - 650.35	- Brown fine grained micaceous sandstone.
650.35 - 650.80	- Gray shale.
650.80 - 656.80	- Dark brown fine grained micaceous sandstone.
656.80 - 657.30	- Brown fine grained micaceous sandstone.
657.30 - 657.60	- Laminated sandy shale.
657.60 - 661.10	- Brown fine grained micaceous sandstone.
661.10 - 662.07	- Brown fine grained slightly laminated micaceous shaley sandstone.
662.07 - 662.20	- Laminated sandy shale.
662.20 - 663.10	- Brown fine grained slightly laminated micaceous shaley sandstone.
663.10 - 663.75	- Brown fine grained micaceous sandstone.

Oil Field Research Laboratories

SHOT RECOMMENDATION

Company Hardesty & Schoonover Lease S. Kehl Well No. 4

<u>Depth Interval, Feet</u>	<u>Feet of Sand</u>	<u>Size of Shell Inches</u>	<u>Qts./Ft.</u>	<u>Total Quarts</u>
651.5 - 662.0	10.5	3 $\frac{1}{2}$	2.0	21.0

Recommended Packer Setting 647.5 feet

Oil Field Research Laboratories
RESULTS OF PERMEABILITY TESTS
TABLE I

Company Hardesty & Schoonover Lease S. Kehl Well No. 4

Sample No.	Depth, Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
1	658.23	18.	0.50	0.50	9.00
2	658.77	19.	0.50	1.00	9.50
3	659.15	44.	0.30	1.30	13.20
4	659.45	23.	0.60	1.90	13.80
5	660.95	67.	0.50	2.40	33.50
6	661.93	16.	0.57	2.97	9.12
7	662.65	25.	0.60	3.57	13.00
8	663.05	18.	0.30	3.87	5.40

Oil Field Research Laboratories

SUMMARY OF PERMEABILITY TESTS

TABLE II

Company Hardesty & Schoonover	Lease S. Kehl	Well No. 4	
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity, Ft. x Md.
658.00 - 663.10	3.87	27.52	106.52

Oil Field Research Laboratories

RESULTS OF SATURATION TESTS

TABLE III

Company Hardesty & Schoonover Lease S. Kehl Well No. 4

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.	
F- 1	647.43	26.8	32.1	-	-	667	0.63	0.63	420
F- 2	648.15	24.6	36.2	-	-	690	0.85	1.48	587
F- 3	649.25	20.2	38.7	-	-	607	0.80	2.28	486
F- 4A	650.15	24.5	37.0	-	-	705	0.65	2.93	458
F- 5	651.30	27.5	34.3	-	-	732	0.90	3.83	659
F- 6	652.10	25.1	32.8	-	-	639	0.80	4.63	511
F- 7	652.90	23.1	40.6	-	-	727	0.90	5.53	654
F- 8	653.80	24.3	38.8	-	-	732	0.65	6.18	476
F- 9	654.30	24.3	38.2	-	-	721	0.65	6.83	469
F-10	655.20	25.0	33.2	-	-	645	0.90	7.73	581
F-11	656.10	22.8	33.8	-	-	598	0.80	8.53	478
F-12	656.70	23.4	34.3	-	-	622	0.40	8.93	249
13	657.70	21.3	30.5	50.0	80.5	505	0.50	9.43	253
14	658.55	22.7	26.7	48.0	74.7	470	1.00	10.43	470
15	659.65	22.6	29.8	48.7	78.5	524	1.20	11.63	629
F-16	660.55	21.0	29.5	-	-	480	0.80	12.43	384
17	661.65	20.6	30.6	49.3	79.9	489	0.97	13.40	474
18	662.35	21.6	22.0	53.2	75.2	369	0.90	14.30	332
F-19	663.25	22.4	23.1	-	-	401	0.65	14.95	261
							Total - - - -		8,831

Oil Field Research Laboratories

SUMMARY OF SATURATION TESTS

TABLE IV

Company Hardesty & Schoonover Lease S. Kehl Well No. 4

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
647.17-656.80	8.93	24.33	35.86	-	675	6,028
657.60-663.75	6.02	21.81	27.56	49.69	466	2,803
647.17-663.75	14.95	23.32	32.52	-	591	8,831

Oil Field Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE V

Company Hardesty & Schoonover Lease S. Kehl Well No. 4

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	647.43	26.8	32.1	667	7.8	162	24.3	69.0	505	204	35.45	10
2	648.15	24.6	36.2	690	10.5	200	25.7	69.9	490	108	13.33	10
3	649.25	20.2	38.7	607	11.1	174	27.6	67.6	433	49	5.55	20
4A	650.15	24.5	37.0	705	12.6	240	24.4	67.4	465	115	20.25	5
5	651.30	27.5	34.3	732	9.6	205	24.7	69.3	527	734	22.40	5
6	652.10	25.1	32.8	639	9.3	181	23.5	67.3	458	130	25.58	10
7	652.90	23.1	40.6	727	13.3	238	27.3	69.1	489	118	14.65	10
8	653.80	24.3	38.8	732	14.3	270	24.5	67.8	462	115	25.46	10
9	654.30	24.3	38.2	721	13.5	255	24.7	68.9	466	100	6.90	10
10	655.20	25.0	33.2	645	9.0	175	24.2	68.7	470	195	17.97	10
11	656.10	22.8	33.8	598	7.7	136	26.1	65.8	462	166	12.44	15
12	656.70	23.4	34.3	622	8.2	149	26.1	66.0	473	179	17.10	10
15A	659.95	23.0	27.6	510	6.8	121	20.8	73.8	389	93	9.13	10
16	660.55	21.0	29.8	480	5.3	86	24.2	69.2	394	111	6.07	10
17A	661.22	20.5	29.4	468	4.9	78	24.5	70.0	390	143	5.41	10
19	663.25	22.4	23.1	401	4.5	78	18.6	71.8	323	110	7.85	10

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" samples were taken from core after it was received in the laboratory.

Oil Field Research Laboratories
SUMMARY OF LABORATORY FLOODING TESTS

TABLE VI

Company Hardesty & Schoonover Lease S. Kehl Well No. 4

Depth Interval, Feet	647.17 - 656.80	659.10 - 663.75	647.17 - 663.75
Feet of Core Analyzed	8.93	3.62	12.55
Average Percent Porosity	24.33	21.80	23.60
Average Percent Original Oil Saturation	35.91	27.73	33.55
Average Percent Oil Recovery	10.60	5.55	9.15
Average Percent Residual Oil Saturation	25.31	22.18	24.40
Average Percent Residual Water Saturation	68.17	71.38	69.09
Average Percent Total Residual Fluid Saturation	93.48	93.56	93.49
Average Original Oil Content, Bbls./A. Ft.	675.	472.	616.
Average Oil Recovery, Bbls./A. Ft.	199.	94.	169.
Average Residual Oil Content, Bbls./A. Ft.	476.	378.	447.
Total Original Oil Content, Bbls./Acre	6,028.	1,711.	7,739.
Total Oil Recovery, Bbls./Acre	1,780.	341.	2,121.
Total Residual Oil Content, Bbls./Acre	4,248.	1,370.	5,618.
Average Effective Permeability, Millidarcys	17.98	7.24	14.88
Average Initial Fluid Production Pressure, p.s.i.	10.4	10.0	10.3

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