



OILFIELD RESEARCH LABORATORIES

536 NORTH HIGHLAND - CHANUTE, KANSAS 66720 - PHONE (316) 431-2650

November 21, 1979

Highview Properties
15 South Highland
Chanute, Kansas 66720

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary cores taken from the Highview Properties Lease, Well No. 1, Allen County, Kansas, and submitted to our laboratory on October 31, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Benjamin R. Pearman

SAM/tm
5 c to Chanute, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Highview Properties Lease Highview Properties Well No. 1

Location SW $\frac{1}{4}$

Section 25 Twp. 26S Rge. 17E County Allen State Kansas

Name of Sand	Squirrel
Top of Core	695.5
Bottom of Core	709.0
Top of Sand	(Tested) 695.6
Bottom of Sand	700.8
Total Feet of Permeable Sand	4.7
Total Feet of Floodable Sand	

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

0 - 100	2.3	2.3
100 - 200	2.4	4.7

Average Permeability Millidarcys	95.9
Average Percent Porosity	20.8
Average Percent Oil Saturation	
Average Percent Water Saturation	
Average Oil Content, Bbls./A. Ft.	
Total Oil Content, Bbls./Acre	
Average Percent Oil Recovery by Laboratory Flooding Tests	
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	
Total Calculated Oil Recovery, Bbls./Acre	
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet	

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Highview Properties Lease Highview Properties Well No. 1

Location SW $\frac{1}{4}$

Section 25 Twp. 26S Rge. 17E County Allen State Kansas

Name of Sand - - - - - Bartlesville

Top of Core - - - - - 923.0

Bottom of Core - - - - - 944.0

Top of Sand - - - - - (Tested) 924.5

Bottom of Sand - - - - - (Tested) 944.0

Total Feet of Permeable Sand - - - - - (Tested) 8.4

Total Feet of Floodable Sand - - - - - (Tested) 3.2

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

0 - 100

4.2

4.2

100 - 200

4.2

8.4

Average Permeability Millidarcys - - - - - 102.2

Average Percent Porosity - - - - - 20.5

Average Percent Oil Saturation - - - - - 17.9

Average Percent Water Saturation - - - - - 61.2

Average Oil Content, Bbls./A. Ft. - - - - - 288.

Total Oil Content, Bbls./Acre - - - - - 2,417.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 2.3

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 38.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 120.

Total Calculated Oil Recovery, Bbls./Acre - - - - - See "Calculated Recovery" Section.

Packer Setting, Feet - - - - -

Viscosity, Centipoises @ - - - - -

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

Elevation, Feet - - - - -

The core was sampled and the samples sealed in plastic bags by a representative of the client. Fresh water mud was used as a drilling fluid.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
<u>SQUIRREL SAND</u>	
695.0 - 695.4	Gray shale.
695.4 - 695.6	Gray and brown laminated shale and sandstone.
695.6 - 699.8	Light brown sandstone.
699.8 - 700.3	Gray sandy shale.
700.3 - 700.8	Brown shaly sandstone.
700.8 - 702.5	Gray sandy shale with thin widely scattered streaks of oil saturated sandstone.
702.5 - 706.1	Gray shale.
706.1 - 709.0	Gray sandy shale with thin scattered streaks of oil saturated sandstone.
<u>BARTLESVILLE SAND</u>	
923.0 - 923.3	Light brown shaly sandstone.
923.3 - 923.5	Gray sandy shale.
923.5 - 924.1	Gray shaly sandstone.
924.1 - 924.3	Gray sandy shale.
924.3 - 931.7	Light brown slightly shaly sandstone.
931.7 - 932.8	Brown sandstone.
932.8 - 934.0	Light brown sandstone.
934.0 - 936.0	Brown sandstone.
936.0 - 936.7	Light brown sandstone.
936.7 - 942.8	Brown sandstone.
942.8 - 944.0	Light brown sandstone laminated with thin carbon partings.

LABORATORY FLOODING TESTS

At the request of the client, only the Bartlesville portion of this core was subjected to floodpot testing, and this sand responded to laboratory flooding tests, as a total recovery of 120 barrels of oil per acre was obtained from 3.2 feet of sand. The weighted average percent oil saturation was reduced from 24.5 to 22.2, or represents an average recovery of 2.3 percent. The weighted average effective permeability of the samples is 5.20 millidarcys, while the average initial fluid production pressure is 20.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 8 samples tested, 3 produced water and oil, and 5 samples produced water only. This indicates that approximately 38 percent of the sand represented by these samples is floodable pay sand.

CALCULATED RECOVERYBARTLESVILLE SAND

It would appear from a study of the data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 900 barrels of oil per acre. This is an average recovery of 280 barrels per acre foot from 3.2 feet of floodable sand analyzed in this core.

These recovery values were calculated using the following data and assumptions:

Original formation volume factor	1.06
Reservoir water saturation, percent	40.0
Average porosity, percent	21.0

OILFIELD RESEARCH LABORATORIES

-4-

Oil saturation after flooding, percent	22.2
Performance factor, percent	50.0
Net floodable pay sand, feet	3.2

Oilfield Research Laboratories
RESULTS OF PERMEABILITY AND POROSITY TESTS
TABLE I A

Company Highview Properties Lease Highview Properties Well No. 1

SQUIRREL SAND

Sample No.	Depth Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.	Percent Porosity
			Ft.	Cum. Ft.		
1	695.7	199.	0.4	0.4	79.60	23.2
2	696.5	104.	1.0	1.4	104.00	21.8
3	697.5	116.	1.0	2.4	116.00	20.3
4	698.7	74.	1.0	3.4	74.00	20.8
5	699.6	82.	0.8	4.2	65.60	19.5
6	700.5	23.	0.5	4.7	11.50	19.2

Oilfield Research Laboratories

SUMMARY OF PERMEABILITY & POROSITY TESTS

TABLE II A

Company.	Highview Properties	Lease	Highview Properties			Well No. 1
Depth Interval, Feet	Feet of Core Analyzed	Average Air Permeability, Millidarcys	Average Effective Permeability, Millidarcys	Permeability Capacity Ft. x Md.	Average Percent Porosity	
<u>SQUIRREL SAND</u>						
695.6 - 700.8	4.7	95.9		450.70	20.8	

RESULTS OF SATURATION & PERMEABILITY TESTS

Company	Highview Properties	Lease	Highview Properties	Well No.
Company	Highview Properties		Highview Properties	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.		
						BARTLESVILLE SAND					
1	925.0	16.8	10	71	81	130	84.	1.0	1.0	130	84.00
2	927.7	20.1	14	64	78	218	75.	1.0	2.0	218	75.00
3	930.9	19.9	18	63	81	278	85.	1.0	3.0	278	85.00
4	933.8	22.2	10	82	92	172	158.	1.2	4.2	206	189.60
5	937.5	20.5	24	49	73	382	107.	1.0	5.2	382	107.00
6	939.5	21.8	27	43	70	457	156.	1.0	6.2	457	156.00
7	941.5	22.0	18	55	73	307	113.	1.0	7.2	307	113.00
8	943.5	20.5	23	59	82	366	41.	1.2	8.4	439	49.20

Oilfield Research Laboratories
SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

BARTLESVILLE SAND

Company <u>Highview Properties</u>		Lease <u>Highview Properties</u>		Well No. <u>1</u>	
Depth Interval, Feet	Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.	
924.5 - 944.0	924.5 - 944.0	8.4	102.2	858.80	
Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
924.5 - 944.0	8.4	20.5	17.9	61.2	288
					2,417

Oilfield Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

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			
							BARTLESVILLE SAND				
1	925.0	17.3	10	134	0	0	10	87	229	3.52	20
2	927.7	19.7	15	229	0	0	15	83	75	1.20	30
3	930.9	20.0	17	264	0	0	17	70	416	5.55	10
4	933.8	21.8	12	203	0	0	12	85	232	15.62	10
5	937.5	20.8	25	403	3	48	22	74	343	7.50	15
6	939.5	21.9	27	459	2	34	25	70	470	7.27	20
7	941.5	22.3	17	294	0	0	17	77	270	11.52	15
8	943.5	20.5	22	350	2	32	20	77	89	1.57	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

SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

BARTLESVILLE SAND

Company Highview Properties Lease Highview Properties Well No. 1

Depth Interval, Feet	924.5 - 944.0
Feet of Core Analyzed	3.2
Average Percent Porosity	21.0
Average Percent Original Oil Saturation	24.5
Average Percent Oil Recovery	2.3
Average Percent Residual Oil Saturation	22.2
Average Percent Residual Water Saturation	73.9
Average Percent Total Residual Fluid Saturation	96.1
Average Original Oil Content, Bbls./A. Ft.	401.
Average Oil Recovery, Bbls./A. Ft.	38.
Average Residual Oil Content, Bbls./A. Ft.	363.
Total Original Oil Content, Bbls./Acre	1,282.
Total Oil Recovery, Bbls./Acre	120.
Total Residual Oil Content, Bbls./Acre	1,162.
Average Effective Permeability, Millidarcys	5.20
Average Initial Fluid Production Pressure, p.s.i.	20.0

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