

35-24-20E

Krieger R-1



OILFIELD RESEARCH LABORATORIES

536 NORTH HIGHLAND - CHANUTE, KANSAS - PHONE HE1-2650

February 22, 1966

Wheeler Oil Company
41st & Sheridan Road
Tulsa, Oklahoma 74135

Gentlemen:

Enclosed herewith is the report of the analysis of the Cable Tool core taken from the Krieger Lease, Well No. R-1, Allen County, Kansas, and submitted to our laboratory on February 22, 1966.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Benjamin R. Pearman

BRP:rf

3 c. - Tulsa, Oklahoma
2 c. - Moran, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company	<u>Wheeler Oil Company</u>	Lease	<u>Krieger</u>	Well No.	<u>R-1</u>
Location	<u>SW SW SW</u>				
Section	<u>35</u>	Twp.	<u>24S</u>	Rge.	<u>20E</u>
	County		<u>Allen</u>		State <u>Kansas</u>
Name of Sand	-				Bartlesville
Top of Core	-				831.6
Bottom of Core	-				842.6
Top of Sand	-				831.6
	(Analyzed)				
Bottom of Sand	-				839.6
Total Feet of Permeable Sand	-				7.0
Total Feet of Floodable Sand	-				6.0
Distribution of Permeable Sand:					
Permeability Range Millidarcys	Feet		Cum. Ft.		
35 - 124	2.0		2.0		
580 - 700	3.0		5.0		
700 & above	2.0		7.0		
Average Permeability Millidarcys	-				516.1
Average Percent Porosity	-				20.5
Average Percent Oil Saturation	-				39.0
Average Percent Water Saturation	-				25.9
Average Oil Content, Bbls./A. Ft.	-				628.
Total Oil Content, Bbls./Acre	-				5,024.
Average Percent Oil Recovery by Laboratory Flooding Tests	-				10.5
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	-				184.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	-				1,106.
Total Calculated Oil Recovery, Bbls./Acre	-				2,240.
Packer Setting, Feet	-				
Viscosity, Centipoises @	-				
A. P. I. Gravity, degrees @ 60 °F	-				
Elevation, Feet	-				

Water was used as the coring fluid. The core was sampled and the samples sealed in plastic bags 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:

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

831.6 - 839.6 - Dark brown, slightly shaly sandstone.

839.6 - 841.1 - Coal.

841.1 - 842.6 - Shale.

Coring was started at a depth of 831.6 feet in sandstone and completed at 842.6 feet in shale. This core shows a total of 8.0 feet of sandstone. For the most part, the pay is made up of dark brown, slightly shaly sandstone.

PERMEABILITY

The weighted average permeability of the core is 516.1 millidarcys (See Table III). By observing the data given on the coregraph, it is noticeable that the sand has an irregular permeability profile. The permeability of the sand varies from impermeable to a maximum of 886. millidarcys.

PERCENT SATURATION & OIL CONTENT

The sand in this core shows a good weighted average percent oil saturation, namely, 39.0. The weighted average percent water saturation is 25.9 (See Table III). This gives an overall weighted average total fluid saturation of 64.9 percent. This low total fluid saturation indicates considerable fluid was lost during coring most of which was

probably oil.

The weighted average oil content of the core is 628 barrels per acre foot. The total oil content, as shown by this core, is 5,024 barrels per acre of which 4,282 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 1,106 barrels of oil per acre was obtained from 6.0 feet of sand. The weighted average percent oil saturation was reduced from 41.9 to 31.4, or represents an average recovery of 10.5 percent. The weighted average effective permeability of the samples is 18.70 millidarcys, while the average initial fluid production pressure is 15.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 8 samples tested, 6 produced water and oil. This indicates that approximately 75 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 to water.

CONCLUSION

The results of the laboratory tests indicate that efficient water-flooding operations in the vicinity of this well should recover approximately 2,240 barrels of oil per acre or an average of 374 barrels per acre foot from the 6.0 feet of floodable pay sand analyzed in this core. These recovery values were calculated using the following data and assumptions:

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Original formation volume factor	1.04
Present formation volume factor	1.02
Reservoir water saturation, percent	18.0
Primary recovery, estimated, percent	4.0
Present oil saturation, percent	76.4
Average porosity, percent	21.9
Oil saturation after flooding, percent	31.4
Performance factor, percent	50.0
Net floodable pay sand, feet	6.0

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.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Wheeler Oil Company Lease Krieger Well No. R-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	832.1	15.4	36	18	54	429	Imp.	1.0	1.0	429	0.00
2	833.1	22.0	43	26	69	734	611.	1.0	2.0	734	611.00
3	834.1	22.9	45	27	72	799	672.	1.0	3.0	799	672.00
4	835.1	21.6	44	23	67	736	886.	1.0	4.0	736	886.00
5	836.1	15.5	37	21	58	444	124.	1.0	5.0	444	124.00
6	837.1	17.8	25	44	69	345	35.	1.0	6.0	345	35.00
7	838.1	23.8	41	24	65	756	582.	1.0	7.0	756	582.00
8	839.1	24.6	41	24	65	781	703.	1.0	8.0	781	703.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Wheeler Oil Company Lease Krieger Well No. R-1

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
831.6 - 839.6	7.0	516.1	3613.00

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
831.6 - 839.6	8.0	20.5	39.0	25.9	628	5024

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Wheeler Oil Company Lease Krieger Well No. R-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	832.1	15.8	37	454	0	0	37	20	454	0	Imp.	-
2	833.1	22.5	43	749	20	349	23	50	400	274	27.80	10
3	834.1	23.4	45	816	11	200	34	51	616	311	14.58	20
4	835.1	21.2	44	723	5	82	39	29	641	65	2.33	20
5	836.1	15.8	37	453	5	61	32	50	392	143	8.36	20
6	837.1	17.5	25	339	0	0	25	46	339	0	Imp.	-
7	838.1	24.3	41	772	12	226	29	51	546	364	34.80	10
8	839.1	24.2	41	769	10	188	31	51	581	380	24.30	10

Notes: cc—cubic centimeter.

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

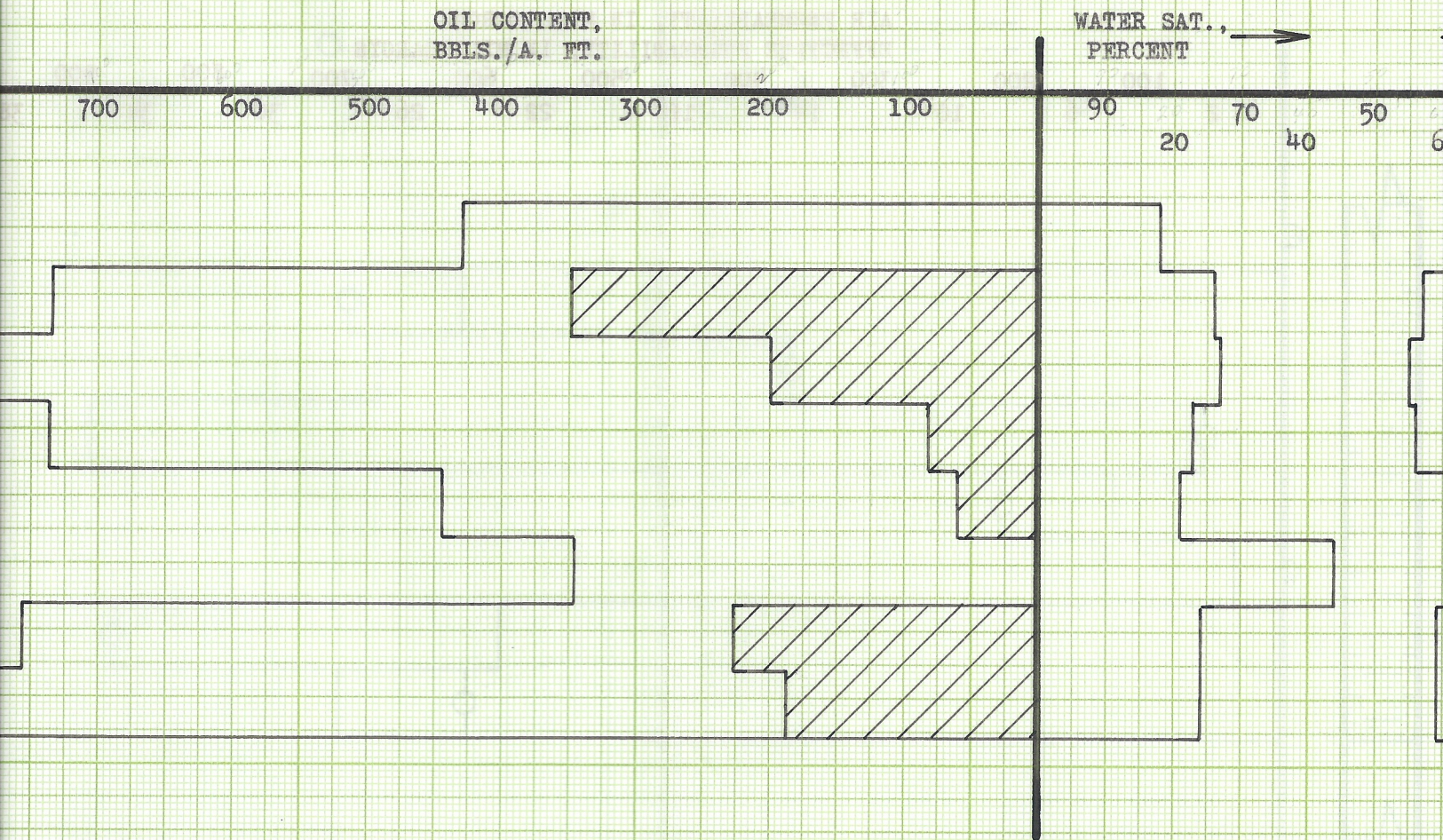
**—Determined by passing water through sample which still contains residual oil.

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Wheeler Oil Company	Lease	Krieger	Well No.	R-1
Depth Interval, Feet	831.6 - 839.6				
Feet of Core Analyzed	6.0				
Average Percent Porosity	21.9				
Average Percent Original Oil Saturation	41.9				
Average Percent Oil Recovery	10.5				
Average Percent Residual Oil Saturation	31.4				
Average Percent Residual Water Saturation	47.0				
Average Percent Total Residual Fluid Saturation	78.4				
Average Original Oil Content, Bbls./A. Ft.	713.				
Average Oil Recovery, Bbls./A. Ft.	184.				
Average Residual Oil Content, Bbls./A. Ft.	529.				
Total Original Oil Content, Bbls./Acre	4,282.				
Total Oil Recovery, Bbls./Acre	1,106.				
Total Residual Oil Content, Bbls./Acre	3,176.				
Average Effective Permeability, Millidarcys	18.70				
Average Initial Fluid Production Pressure, p.s.i.	15.0				

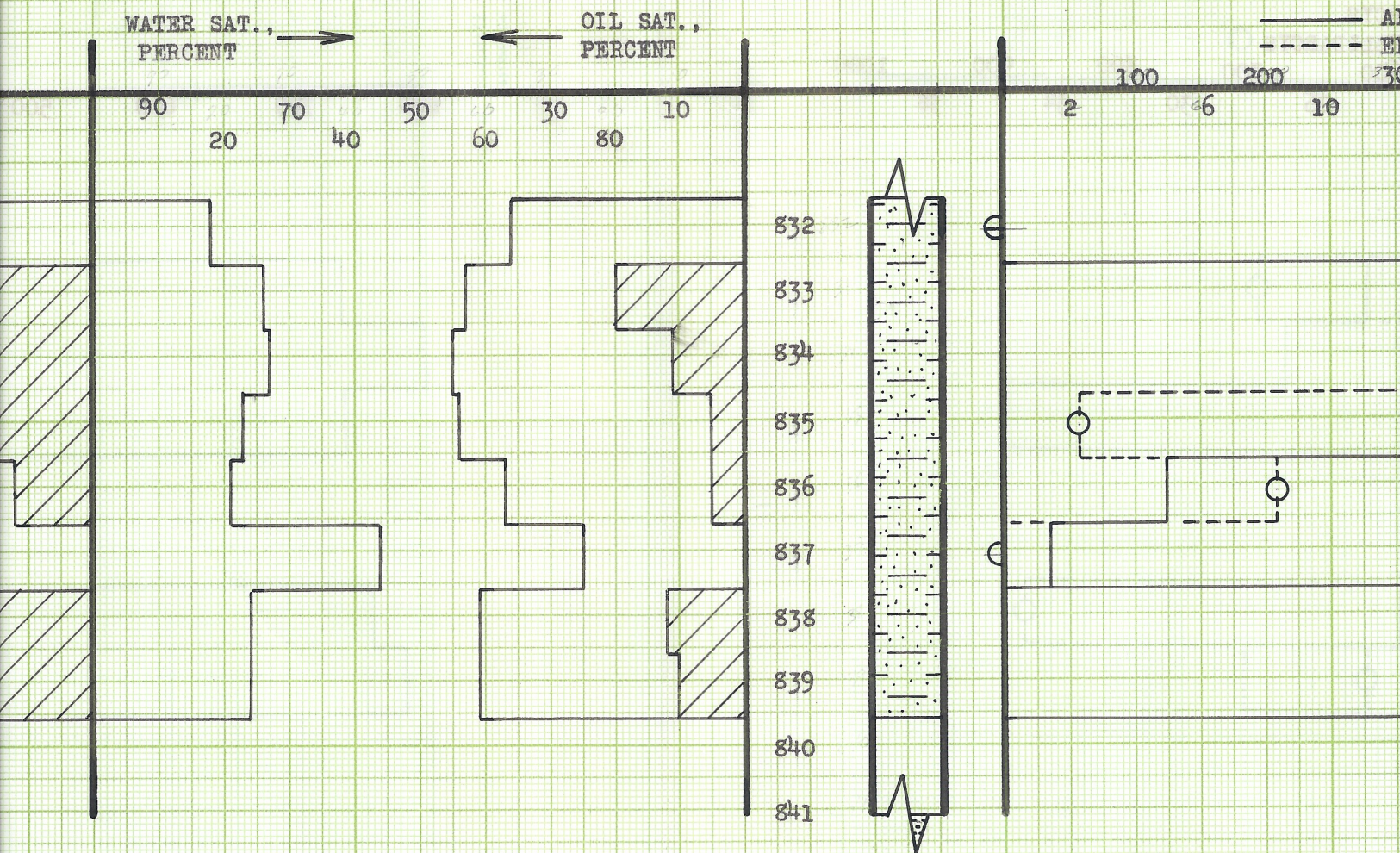
NOTE: Only those samples which recovered oil were used in calculating the above averages.



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DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE POROSITY, PERCENT	AVG. SATURA PERCENT
831.6 - 839.6	8.0	20.5	39.8



POT RECOVERY
SANDSTONE

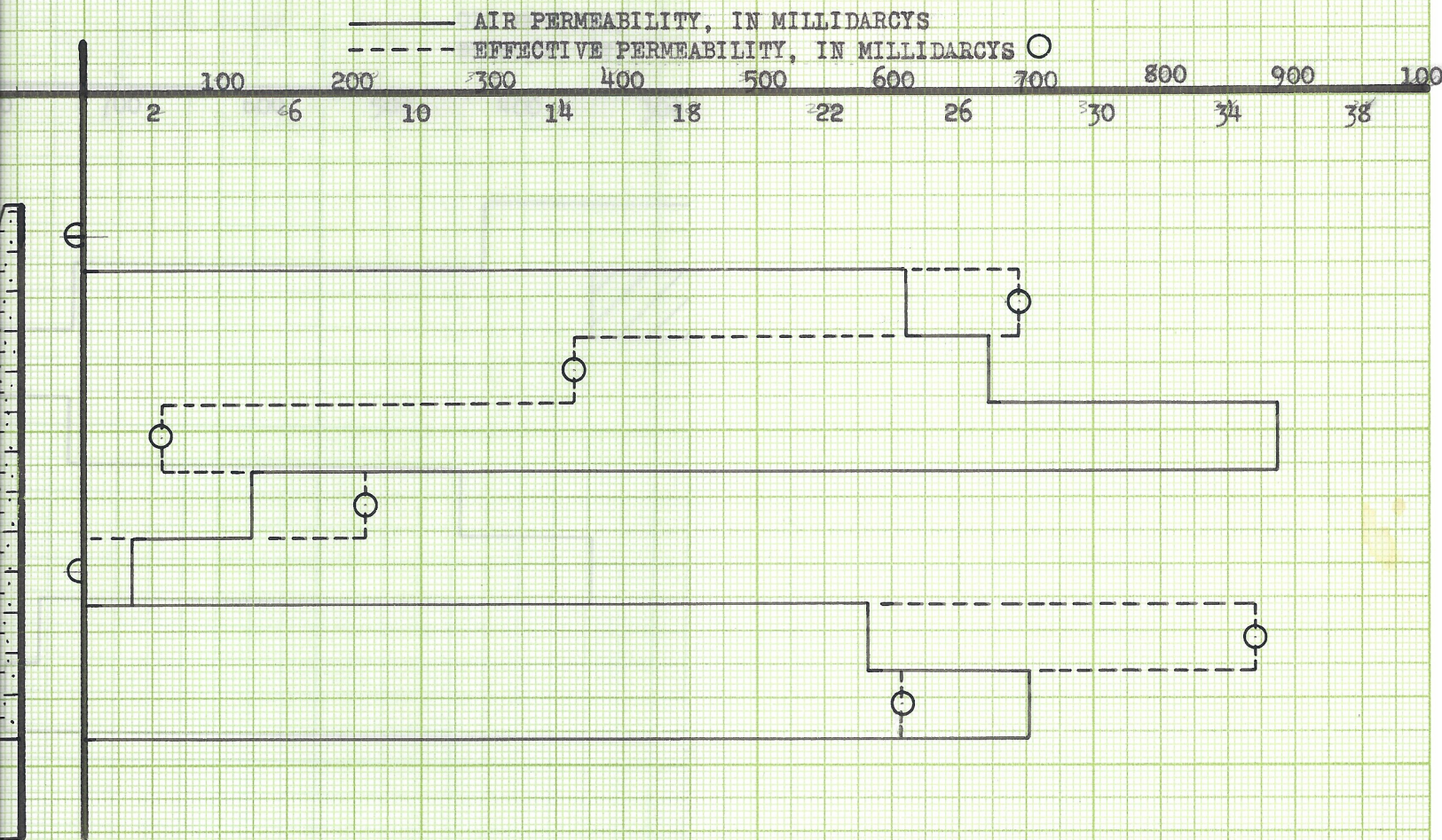
WHEELER OIL COMPANY

KRIEGER LEASE

WELL NO. R-1

ALLEN COUNTY, KANSAS

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, MILLIDARCS
8.0	20.5	39.0	25.9	628	5,024	516.1



- IMPERMEABLE TO AIR
- IMPERMEABLE TO WATER

PANY

NO. R-1

TOTAL OIL CONTENT BBLs./ACRE	AVG. AIR PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY, BBLs./ACRE
5,024	516.1	2,240

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 CHANUTE, KANSAS
 FEBRUARY, 1966