

OILFIELD RESEARCH LABORATORIES

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

October 6, 1981

Osage Drilling Company
916 South Steuben
Chanute, Kansas 66720

Gentlemen:

Enclosed herewith are the results of tests run on the rotary core taken from the Ballard "D" Lease, Well No. W-9, located in Chautauqua County, Kansas.

The core was sampled and sealed in plastic bags by a representative of the client and was submitted to our laboratory on September 24, 1981.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

5 c to Chanute, Kansas

- REGISTERED ENGINEERS -

CORE ANALYSIS - WATER ANALYSIS - REPRESSURING ENGINEERING - SURVEYING & MAPPING - PROPERTY EVALUATION & OPERATION

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GENERAL INFORMATION & SUMMARY

Company Osage Drilling Company Lease Ballard "D" Well No. W-9

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

Section 19 Twp. 33S Rge. 13E County Chautauqua State Kansas

Elevation, Feet

Name of Sand.....

Weiser

Top of Core

1121.0

Bottom of Core

1151.0

Top of Sand

1121.0

Bottom of Sand

1150.6

Total Feet of Permeable Sand

17.6

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

0 - 2

4.7

4.7

2 - 6

6.0

10.7

6 - 15

6.9

17.6

Average Permeability Millidarcys

6.0

Average Percent Porosity

12.9

Average Percent Oil Saturation

12.9

Average Percent Water Saturation

72.6

Average Oil Content, Bbls./A. Ft.

134.

Total Oil Content, Bbls./Acre

3,973.

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LOGName Osage Drilling Company Lease Ballard "D" Well No. W-9

<u>Depth Interval, Feet</u>	<u>Description</u>
1121.0 - 1122.3	Grayish very light brown shaly sandstone.
1122.3 - 1123.3	Grayish light brown sandstone.
1123.3 - 1125.3	Grayish light brown shaly sandstone.
1125.3 - 1129.5	Grayish light brown sandstone.
1129.5 - 1131.2	Grayish light brown shaly sandstone.
1131.2 - 1131.9	Light brown sandstone.
1131.9 - 1135.6	Grayish light brown shaly sandstone with shale partings.
1135.6 - 1142.0	Very light brown and gray laminated sandstone and shale.
1142.0 - 1144.0	Gray and light gray laminated shale and sandstone.
1144.0 - 1150.6	Gray and light gray slightly calcareous laminated shale and sandstone.
1150.6 - 1151.0	Gray, sandy, slightly calcareous shale.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

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			Ft.	Cum. Ft.		
1	1121.5	16.2	10	70	126	5.8	1.3	1.3	164	7.54
2	1122.5	17.4	14	62	189	11.	1.0	2.3	189	11.00
3	1123.6	15.2	9	69	106	5.6	1.0	3.3	106	5.60
4	1124.6	16.3	15	72	198	7.5	1.0	4.3	198	7.50
5	1125.5	16.6	13	59	167	13.	1.0	5.3	167	13.00
6	1126.6	15.9	7	64	86	11.	1.0	6.3	86	11.00
7	1127.7	15.1	13	61	152	9.9	1.0	7.3	152	9.90
8	1128.6	16.5	15	52	192	13.	1.2	8.5	230	15.60
9	1129.8	15.4	11	62	131	4.8	1.0	9.5	131	4.80
10	1130.6	15.4	27	66	323	2.1	0.7	10.2	226	1.47
11	1131.6	18.0	27	44	377	14.	0.7	10.9	264	9.80
12	1132.7	14.2	12	70	132	0.99	0.9	11.8	119	0.89
13	1133.7	14.6	23	55	261	3.0	1.0	12.8	261	3.00
14	1134.5	14.0	33	45	358	1.7	0.8	13.6	286	1.36
15	1135.5	14.2	18	69	198	2.6	1.0	14.6	198	2.60
16	1136.6	12.6	12	86	117	Imp.	1.4	16.0	164	0.00
17	1137.6	12.3	1	88	10	0.24	1.0	17.0	10	0.24
18	1138.6	13.0	4	74	40	0.37	1.0	18.0	40	0.37
19	1139.6	13.0	8	89	81	Imp.	1.0	19.0	81	0.00
20	1140.7	12.5	9	77	87	0.15	1.0	20.0	87	0.15
21	1141.7	13.1	14	69	142	Imp.	1.0	21.0	142	0.00
22	1142.5	9.8	19	78	145	Imp.	1.0	22.0	145	0.00
23	1143.6	7.3	5	93	28	Imp.	1.0	23.0	28	0.00
24	1144.7	5.7	16	80	71	Imp.	1.0	24.0	71	0.00
25	1145.5	10.6	11	86	91	Imp.	1.0	25.0	91	0.00
26	1146.6	7.1	7	90	39	Imp.	1.0	26.0	39	0.00
27	1147.7	9.3	14	83	101	Imp.	1.0	27.0	101	0.00
28	1148.5	10.1	14	80	110	Imp.	1.0	28.0	110	0.00
29	1149.7	7.9	10	86	61	Imp.	1.0	29.0	61	0.00
30	1150.5	7.9	7	89	43	Imp.	0.6	29.6	26	0.00

Company Osage Drilling Company

Lease Ballard "D"

Well No. W-9

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		Osage Drilling Company		Lease		Ballard "D"		Well No.		W-9	
Depth Interval, Feet		Depth Interval, Feet		Feet of Core Analyzed		Average Permeability, Millidarcys		Permeability Capacity Ft. x Md.		Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
1121.0 - 1135.6		1121.0 - 1135.6		14.6		7.2		105.06		190	2,777
1135.6 - 1150.6		1135.6 - 1150.6		3.0		0.25		0.76		80	1,196
1121.0 - 1150.6		1121.0 - 1150.6		17.6		6.0		105.82		134	3,973
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
1121.0 - 1135.6		14.6		15.7		15.7		61.8		190	2,777
1135.6 - 1150.6		15.0		10.3		10.2		83.1		80	1,196
1121.0 - 1150.6		29.6		12.9		12.9		72.6		134	3,973

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

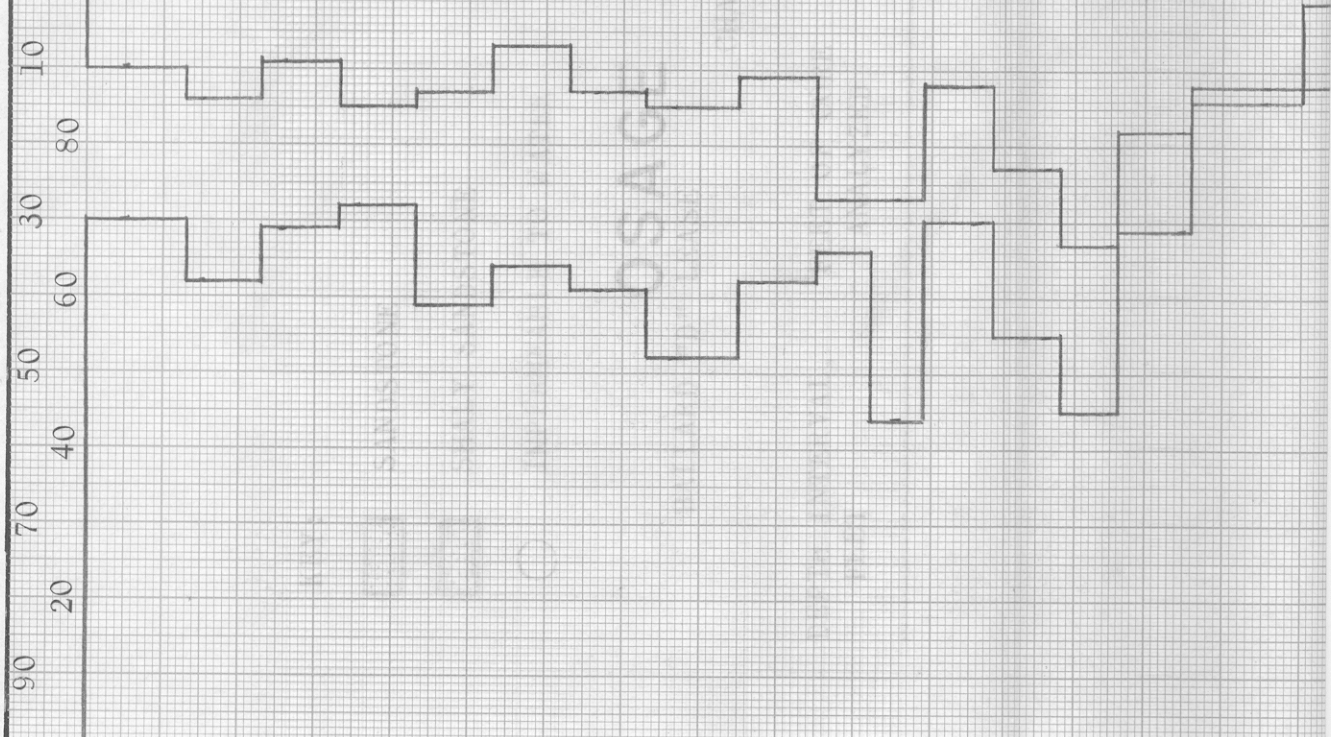
Company		Osage Drilling Company		Lease		Ballard "D"		Well No.		W-9	
Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation		Volume of Water Recovered cc*	Effective Permeability Millidarcys**	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water			
2	1122.5	16.9	15	197	0	0	15	63	0	Imp.	-
5	1125.5	16.7	13	168	0	0	13	71	62	0.82	30
6	1126.6	15.9	7	86	0	0	7	67	18	0.22	40
7	1127.7	15.0	13	151	0	0	13	64	12	0.45	50
8	1128.6	16.6	15	193	0	0	15	59	20	0.37	45
11	1131.6	18.5	26	373	0	0	26	46	0	Imp.	-

Notes: cc—cubic centimeter.

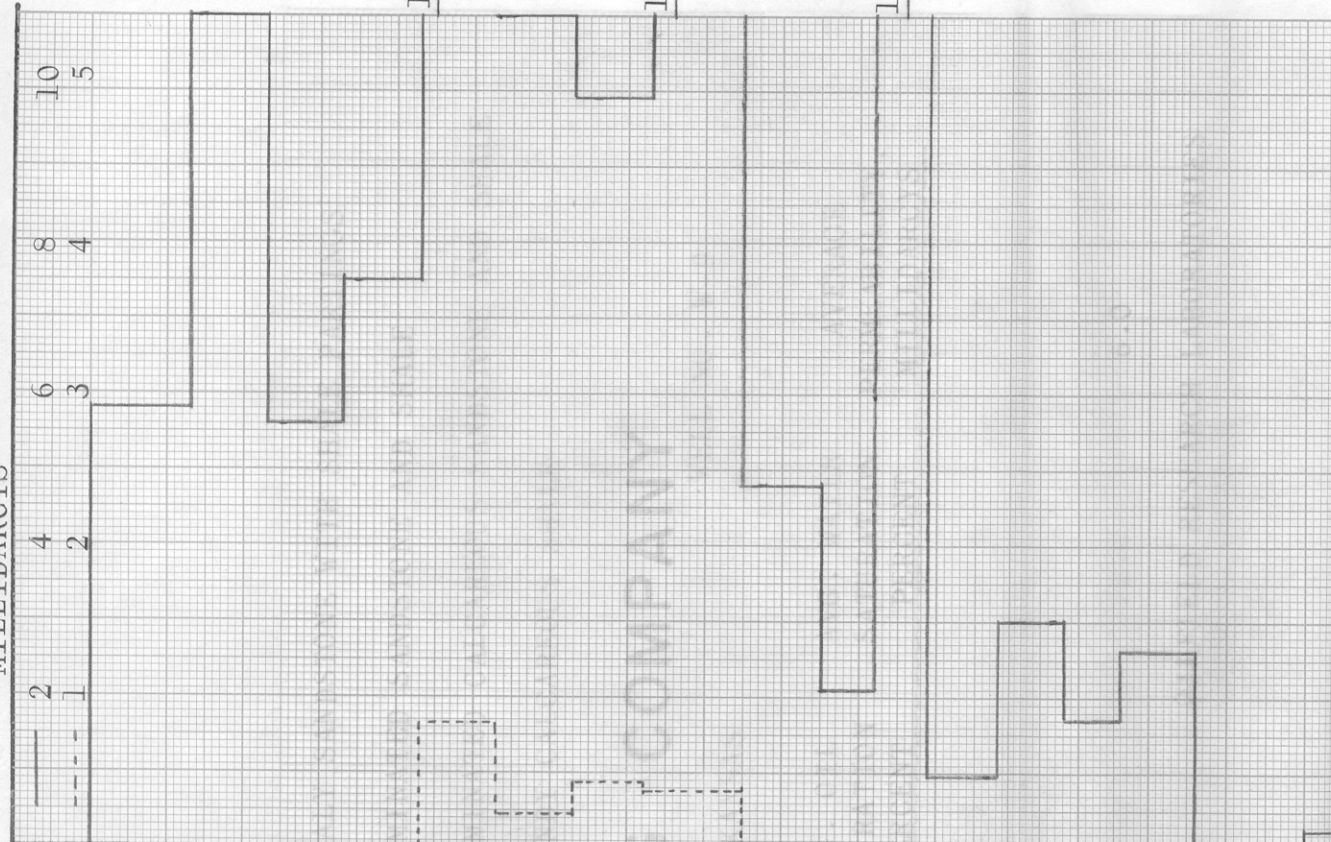
*—Volume of water recovered at the time of maximum oil recovery.

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

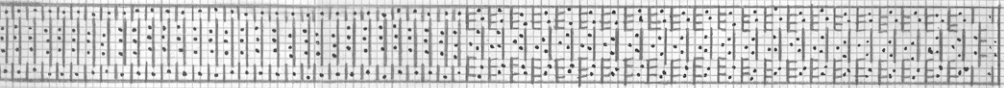
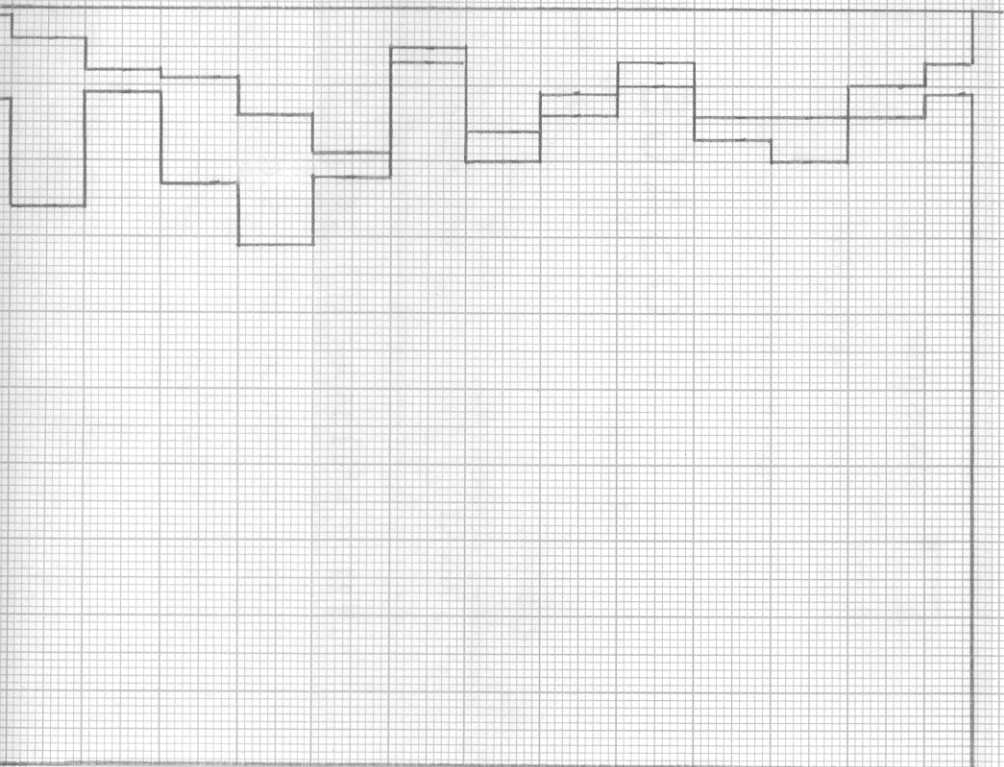
WATER SAT., PERCENT ———> <———— OIL SAT., PERCENT



PERMEABILITY, IN MILLIDARCYS
EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYS



1138
1139
1140
1141
1142
1143
1144
1145
1146
1147
1148
1149
1150
1151



KEY:

SANDSTONE

SHALY SANDSTONE

IMPERMEABLE TO WATER

SHALY SANDSTONE WITH SHALE PARTINGS

LAMINATED SANDSTONE AND SHALE

LAMINATED CALCAREOUS SANDSTONE AND SHALE

SANDY CALCAREOUS SHALE

OSAGE DRILLING COMPANY

BALLARD "D" LEASE

WELL NO. W-9

CHAUTAUQUA COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE		AVG. OIL		AVG. WATER		AVERAGE	
		PERCENT	SATURATION	PERCENT	SATURATION	PERCENT	SATURATION	PERMEABILITY, MILLIDARCS	
1121.0 - 1135.6	14.6	15.7		15.7		61.8		7.2	
1135.6 - 1150.6	15.0	10.3		10.2		83.1		0.25	
1121.0 - 1150.6	29.6	12.9		12.9		72.6		6.0	

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CHANUTE, KANSAS
OCTOBER, 1981

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