

OILFIELD RESEARCH LABORATORIES

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

May 13, 1982

L & L Oil Company
P. O. Box 13
Benedict, Kansas 66714

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Orendorff Lease, Well No. 10, located in Wilson County, Kansas and submitted to our laboratory on May 8, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel
by A. D.

Sanford A. Michel

SAM/kas

5 c to Benedict, Kansas

- REGISTERED ENGINEERS -

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

Offield Research Laboratories
GENERAL INFORMATION & SUMMARY

Company L & L Oil Company Lease Orendorff Well No. 10
 Location _____
 Section 2 Twp. 28S Rge. 15E County Wilson State Kansas

Elevation, Feet

Name of Sand..... Upper Bartlesville

Top of Core 942.0

Bottom of Core 950.1

Top of Sand 942.0

Bottom of Sand 948.9

Total Feet of Permeable Sand 4.5

Total Feet of Floodable Sand 3.7

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 1	0.8	0.8
10 - 15	2.3	3.1
25 - 40	1.4	4.5

Average Permeability Millidarcys 16.8

Average Percent Porosity 15.2

Average Percent Oil Saturation 42.7

Average Percent Water Saturation 36.4

Average Oil Content, Bbls./A. Ft. 517.

Total Oil Content, Bbls./Acre 2,997.

Average Percent Oil Recovery by Laboratory Flooding Tests 10.2

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. 133.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre 491.

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

See "Calculated Recovery"
Section

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. The core was reported to be from a non-virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
942.0 - 942.8	Brown very shaly sandstone.
942.8 - 944.4	Grayish brown very shaly sandstone.
944.4 - 944.7	Brown very shaly sandstone.
944.7 - 946.0	Brown sandstone.
946.0 - 946.5	Gray shale.
946.5 - 948.9	Brown sandstone.
948.9 - 949.9	Coal.
949.9 - 950.1	Gray shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 491 barrels of oil per acre was obtained from 3.7 feet of sand. The weighted average percent oil saturation was reduced from 47.5 to 37.3, or represents an average recovery of 10.2 percent. The weighted average effective permeability of the samples is 0.63 millidarcys, while the average initial fluid production pressure is 31.3 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 7 samples tested, 4 produced water and oil, This indicates that approximately 57 percent of the sand represented by these samples is floodable pay sand.

CALCULATED RECOVERY

It would appear from a study of the core data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 1,060 barrels of oil per acre. This is an average recovery of 287 barrels per acre foot from 3.7 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.06
Reservoir water saturation, percent, estimated	20.0
Average porosity, percent	17.6
Oil saturation after flooding, percent	37.3
Performance factor, percent, estimated	55.0
Net floodable sand, feet	3.7

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company L & L Oil Company Lease Orendorff Well No. 10

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	942.4	11.5	42	41	83	375	0.20	0.8	0.8	300	0.16
2	943.2	11.1	30	67	97	258	Imp.	1.0	1.8	258	0.00
3	944.6	8.8	28	59	87	191	Imp.	0.3	2.1	57	0.00
4	945.7	15.3	53	26	79	629	13.	1.3	3.4	818	16.90
5	946.8	19.0	40	22	62	590	29.	0.5	3.9	295	14.50
6	947.4	18.7	48	21	69	696	10.	1.0	4.9	696	10.00
7	948.4	19.1	43	31	74	637	38.	0.9	5.8	573	34.20

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company		L & L Oil Company		Lease		Orendorff		Well No.		1.0	
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			
1	942.4	11.9	41	379	0	0	41	42	0	Imp.	-
2	943.2	11.0	30	256	0	0	30	68	0	Imp.	-
3	944.6	9.0	28	196	0	0	28	60	0	Imp.	-
4	945.7	15.4	53	633	17	203	36	53	18	0.30	30
5	946.8	19.1	40	593	4	59	36	52	27	0.50	35
6	947.4	18.6	48	693	10	144	38	54	54	0.75	30
7	948.4	19.0	43	634	4	59	39	55	72	1.05	30

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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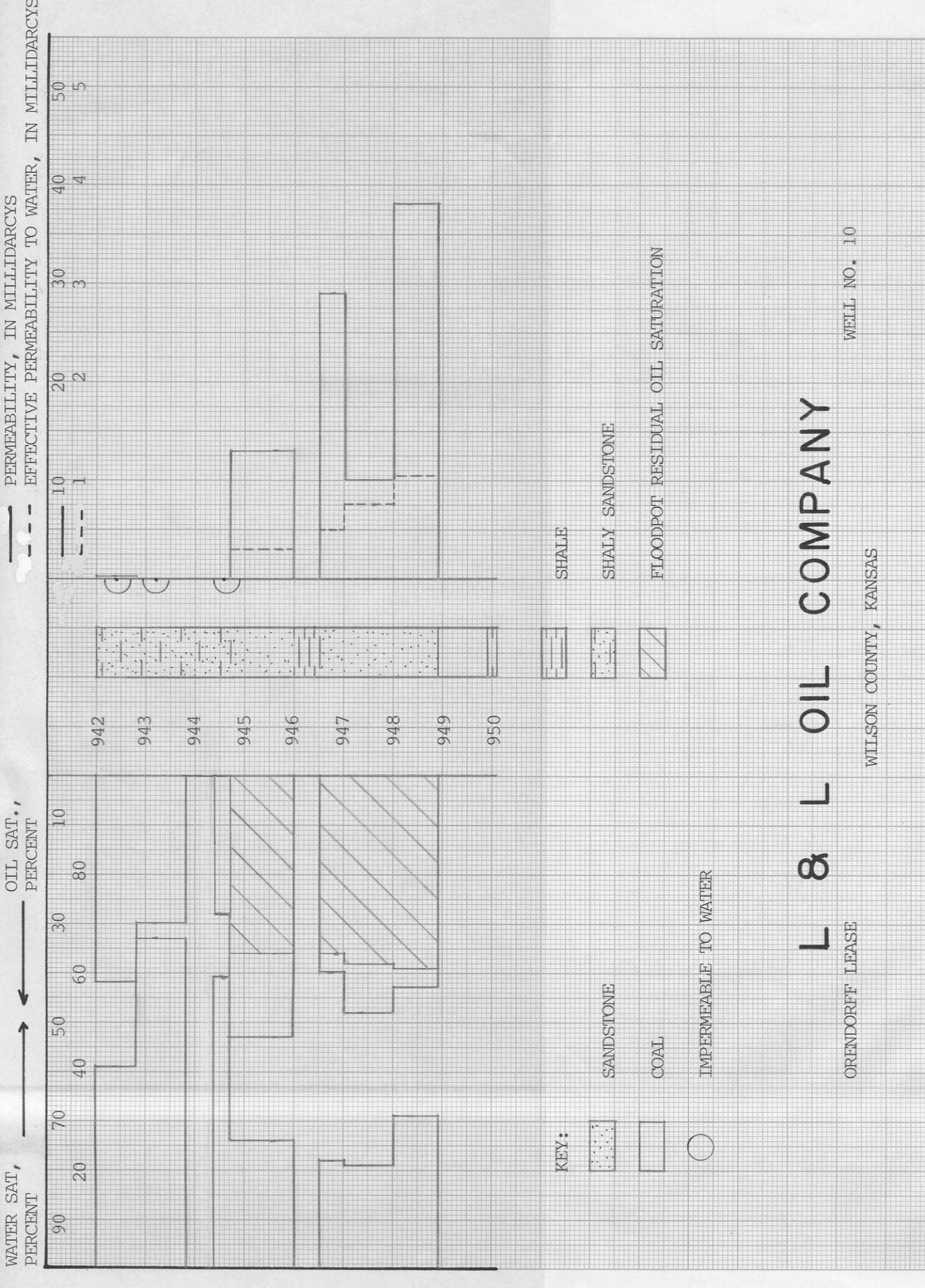
SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company L & L Oil Company Lease Orendorff Well No. 10

Depth Interval, Feet	944.7 - 948.9
Feet of Core Analyzed	3.7
Average Percent Porosity	17.6
Average Percent Original Oil Saturation	47.5
Average Percent Oil Recovery	10.2
Average Percent Residual Oil Saturation	37.3
Average Percent Residual Water Saturation	53.6
Average Percent Total Residual Fluid Saturation	90.9
Average Original Oil Content, Bbls./A. Ft.	645.
Average Oil Recovery, Bbls./A. Ft.	133.
Average Residual Oil Content, Bbls./A. Ft.	512.
Total Original Oil Content, Bbls./Acre	2,384.
Total Oil Recovery, Bbls./Acre	491.
Total Residual Oil Content, Bbls./Acre	1,893.
Average Effective Permeability, Millidarcys	0.63
Average Initial Fluid Production Pressure, p.s.i.	31.3

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



L & L OIL COMPANY

WELL NO. 10

WILSON COUNTY, KANSAS

ORENDORFF LEASE

COAL

FLOODPOT RESIDUAL OIL SATURATION

IMPERMEABLE TO WATER

L & L OIL COMPANY

ORENDORFF LEASE

WILSON COUNTY, KANSAS

WELL NO. 10

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY BBLs. / ACRE
942.0 - 944.7	2.1	10.9	34.3	56.0	0.20	
944.7 - 948.9	3.7	17.6	47.5	25.3	20.4	
942.0 - 948.9	5.8	15.2	42.7	36.4	16.8	1060 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
MAY, 1982

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