

OILFIELD RESEARCH LABORATORIES

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

January 22, 1982

Inexco Oil Company
Rural Route # 2, Box 3
Moran, Kansas 66755

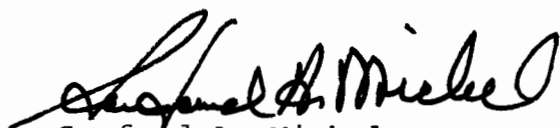
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Cook Lease, Well No. E-8, located in Allen County, Kansas and submitted to our laboratory on January 18, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Sanford A. Michel

SAM/kas

3 c to Moran, Kansas
2 c to Oklahoma City, Oklahoma

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GENERAL INFORMATION & SUMMARY

Company Inexco Oil Company Lease Cook Well No. E-8
 Location _____
 Section 24 Twp. 26S Rge. 20E County Allen State Kansas

Elevation, Feet
 Name of Sand..... Bartlesville
 Top of Core 745.0
 Bottom of Core 753.8
 Top of Sand 745.3
 Bottom of Sand 753.8
 Total Feet of Permeable Sand 8.0
 Total Feet of Floodable Sand 3.5

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 6	3.4	3.4
22 - 45	2.5	5.9
62 - 93	2.1	8.0

Average Permeability Millidarcys 31.3
 Average Percent Porosity 17.1
 Average Percent Oil Saturation 53.9
 Average Percent Water Saturation..... 28.2
 Average Oil Content, Bbls./ A. Ft. 711.
 Total Oil Content, Bbls./ Acre..... 5,691.
 Average Percent Oil Recovery by Laboratory Flooding Tests..... 7.2
 Average Oil Recovery by Laboratory Flooding Tests, Bbls./ A. Ft. 95.
 Total Oil Recovery by Laboratory Flooding Tests, Bbls./ Acre 333.
 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.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
745.0 - 745.3	Gray shale.
745.3 - 746.0	Brownish black slightly carbonaceous sandstone.
746.0 - 747.4	Gray and black laminated shale and slightly carbonaceous sandstone.
747.4 - 748.7	Brownish black slightly carbonaceous sandstone.
748.7 - 749.2	Alternate layers gray shale and brown sandstone.
749.2 - 750.0	Brownish black slightly carbonaceous sandstone.
750.0 - 752.8	Alternate layers brownish black slightly carbonaceous sandstone and shale.
752.8 - 753.8	Gray and brown laminated shale and sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 333 barrels of oil per acre was obtained from 3.5 feet of sand. The weighted average percent oil saturation was reduced from 54.4 to 47.2, or represents an average recovery of 7.2 percent. The weighted average effective permeability of the samples is 0.53 millidarcys, while the average initial fluid production pressure is 35.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 9 samples tested, 4 produced water and oil, and 3 produced water only. This indicates that approximately 44 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 890 barrels of oil per acre. This is an average recovery of 254 barrels per acre foot from 3.5 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.05
Reservoir water saturation, percent, estimated	10.0
Average porosity, percent	17.0
Oil saturation after flooding, percent	47.2
Performance factor, percent, estimated	50.0
Net floodable sand, feet	3.5

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Inexco Oil Company Lease Cook Well No. E-8

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	745.4	17.2	59	15	74	787	92.	0.7	0.7	551	64.40
2	746.6	16.3	67	21	88	847	5.8	1.4	2.1	1186	8.12
3	747.8	16.9	54	12	66	708	62.	0.6	2.7	425	37.20
4	748.3	19.0	41	36	77	604	44.	0.7	3.4	423	30.80
5	749.3	18.2	55	21	76	777	71.	0.8	4.2	622	56.80
6	750.7	17.6	57	28	85	778	30.	1.0	5.2	778	30.00
7	751.5	15.9	57	32	89	703	4.1	1.0	6.2	703	4.10
8	752.6	17.5	44	43	87	597	23.	0.8	7.0	478	18.40
9	753.3	16.1	42	42	84	525	0.59	1.0	8.0	525	0.59

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		Inexco Oil Company	Lease	Cook	Well No.	E-8
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.			
745.3 - 753.8	8.0	31.3	250.41			
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
745.3 - 753.8	8.0	17.1	53.9	28.2	711	5,691

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company		Inexco Oil Company		Lease		Cook		Well No.		E-8	
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.
			%	Bbbls./A. Ft.	%	Bbbls./A. Ft.	% Oil	% Water			
1	745.4	17.3	59	792	7	94	52	24	14	0.22	40
2	746.6	16.4	67	852	0	0	67	22	0	Imp.	-
3	747.8	17.0	54	712	0	0	54	17	14	0.22	50
4	748.3	18.5	42	603	0	0	42	36	8	0.08	50
5	749.3	18.3	55	781	0	0	55	25	18	0.30	40
6	750.7	17.5	57	774	10	136	47	39	46	0.75	20
7	751.5	16.0	57	708	8	99	49	41	46	0.67	30
8	752.6	17.4	44	594	3	40	41	47	12	0.37	50
9	753.3	15.6	43	520	0	0	43	42	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.

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SUMMARY OF LABORATORY FLOODING TESTS

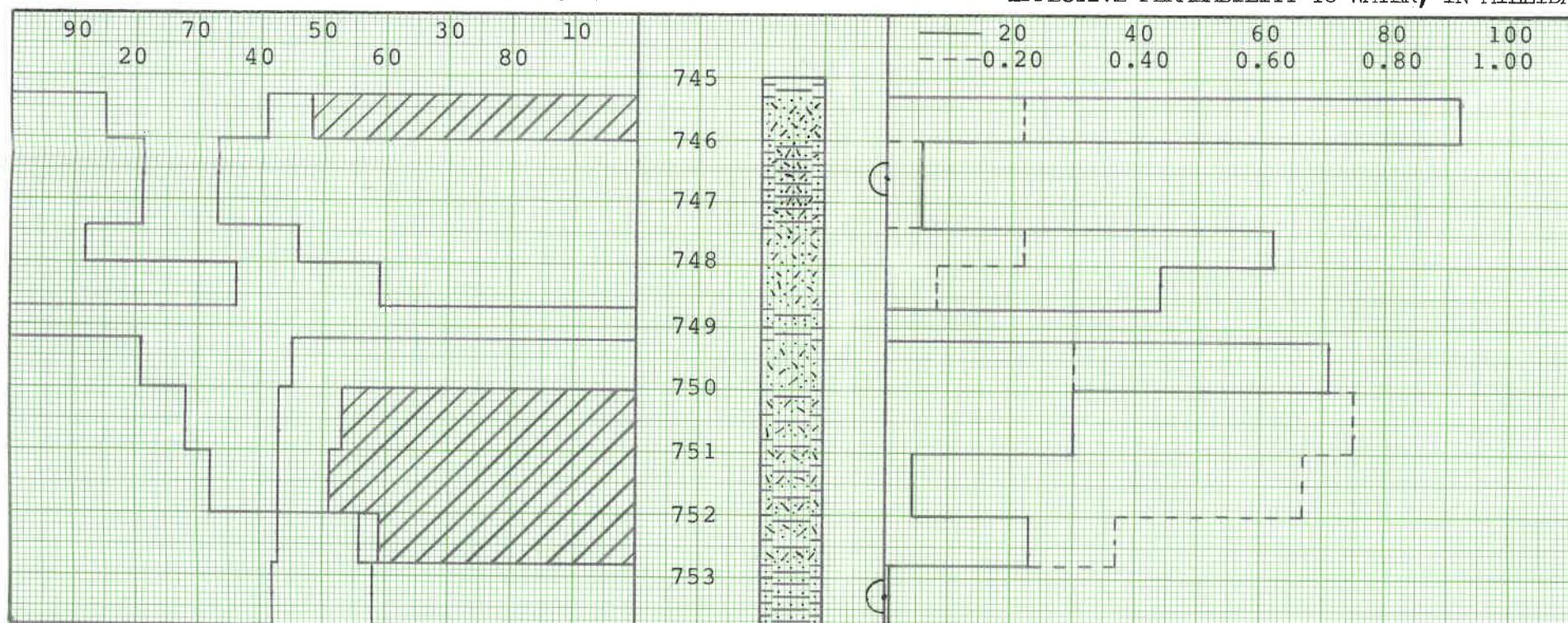
TABLE V

Company	Inexco Oil Company	Lease	Cook	Well No.
		745.3 - 753.8		E-8
Depth Interval, Feet		3.5		
Feet of Core Analyzed		17.0		
Average Percent Porosity		54.4		
Average Percent Original Oil Saturation		7.2		
Average Percent Oil Recovery		47.2		
Average Percent Residual Oil Saturation		38.4		
Average Percent Residual Water Saturation		85.6		
Average Percent Total Residual Fluid Saturation		718.		
Average Original Oil Content, Bbls./A. Ft.		95.		
Average Oil Recovery, Bbls./A. Ft.		623.		
Average Residual Oil Content, Bbls./A. Ft.		2,512.		
Total Original Oil Content, Bbls./Acre		333.		
Total Oil Recovery, Bbls./Acre		2,179.		
Total Residual Oil Content, Bbls./Acre		0.53		
Average Effective Permeability, Millidarcys		35.0		
Average Initial Fluid Production Pressure, p.s.i.				

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

OIL SAT.,
PERCENT

— PERMEABILITY, IN MILLIDARCYs
- - - EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYs



SHALE



CARBONACEOUS SANDSTONE

LAMINATED SHALE AND SANDSTONE

IMPERMEABLE TO WATER

ALTERNATE LAYERS SHALE AND SANDSTONE

LAMINATED CARBONACEOUS SHALE AND SANDSTONE

 $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

ALTERNATE LAYERS CARBONACEOUS SANDSTONE
AND SHALE

FLOODPOT RESIDUAL OIL SATURATION

COOK LEASE

ALLEN COUNTY, KANSAS

WELL NO. E-8

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
745.3 - 753.8	8.0	17.1	53.9	28.2	31.3	890

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
JANUARY, 1982

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