



OILFIELD RESEARCH LABORATORIES

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

July 26, 1979

Thompson Oil & Gas, Ltd.
P. O. Box 449
Moran, Kansas 66755

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Hess Lease, Well No. 5, Allen County, Kansas, and submitted to our laboratory on July 21, 1979.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES


Benjamin R. Pearman

BRP:dlb

5 c to Moran, Kansas

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GENERAL INFORMATION & SUMMARY

Company Thompson Oil & Gas, Ltd. Lease Hess Well No. 5

Location 990' SNL & 1320' WEL, NW SE NE

Section 28 Twp. 25S Rge. 19E County Allen State Kansas

Name of Sand - - - - - Bartlesville

Top of Core - - - - - 845.0

Bottom of Core - - - - - 886.0

Top of Sand - - - - - 845.3

Bottom of Sand - - - - - 886.0

Total Feet of Permeable Sand - - - - - 18.9

Total Feet of Floodable Sand - - - - - 7.2

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

3 - 10	9.7	9.7
10 - 40	6.2	15.9
40 & Above	3.0	18.9

Average Permeability Millidarcys - - - - - 20.8

Average Percent Porosity - - - - - 15.5

Average Percent Oil Saturation - - - - - 55.1

Average Percent Water Saturation - - - - - 29.2

Average Oil Content, Bbls./A. Ft. - - - - - 661.

Total Oil Content, Bbls./Acre - - - - - 12,496.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 7.1

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 88.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 484.

Total Calculated Oil Recovery, Bbls./Acre (Primary & waterflooding) 1,580.

Packer Setting, Feet - - - - -

Viscosity, Centipoises @ - - - - -

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

Elevation, Feet - - - - -

This core was sampled and the samples sealed in plastic bags by a representative of the client. Fresh water mud was used as the circulating fluid while taking this core. The well was reported to have been drilled in virgin territory.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
845.0 - 845.3	Gray sandy shale.
845.3 - 847.8	Dark brown slightly shaly sandstone.
847.8 - 848.8	Brown laminated shaly sandstone.
848.8 - 852.5	Dark brown slightly shaly sandstone.
852.5 - 855.1	Brown and gray laminated sandy shale.
855.1 - 857.8	Dark brown shaly sandstone.
857.8 - 859.7	Brown and gray laminated sandy shale.
859.7 - 865.0	Dark carbonaceous slightly shaly sandstone.
865.0 - 865.4	Brownish gray sandy shale.
865.4 - 869.0	Dark carbonaceous shaly sandstone.
869.0 - 886.0	Dark carbonaceous laminated shaly sandstone.

LABORATORY FLOODING TESTS

The upper portion of the sand in this core responded to laboratory flooding tests, as a total recovery of 484 barrels of oil per acre was obtained from 5.5 feet of sand. The weighted average percent oil saturation was reduced from 43.9 to 36.8, or represents an average recovery of 7.1 percent. The weighted average effective permeability of the samples is 0.76 millidarcys, while the average initial fluid production pressure is 33.8 pounds per square inch (See Table V).

CALCULATED RECOVERY

A study of the results of the laboratory tests indicate that efficient primary and waterflooding operations in the vicinity of this well should recover approximately 1,580 barrels of oil per acre. This is an average recovery of 220 barrels per acre foot from the 7.2 feet of floodable sand analyzed in this core.

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

Original formation volume factor	1.04
Reservoir water saturation, percent	20.0
Average porosity, percent	15.8
Oil saturation after flooding, percent	36.8
Performance factor, percent	45.0
Net floodable pay sand, feet	7.2

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Thompson Oil & Gas, Ltd. Lease Hess Well No. 5

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	845.8	16.0	53	25	78	658	84.	1.0	1.0	658	84.00
2	847.2	14.5	42	39	81	473	21.	1.5	2.5	710	31.50
3	848.3	15.3	43	35	78	510	7.7	1.0	3.5	510	7.70
4	849.6	15.8	43	35	78	527	35.	1.7	5.2	896	59.50
5	851.3	15.9	41	37	78	506	44.	2.0	7.2	1,012	88.00
6	855.8	17.1	46	27	73	610	7.2	1.4	8.6	854	10.08
7	857.5	15.2	48	30	78	566	3.3	1.3	9.9	736	4.29
8	860.5	14.3	44	37	81	488	4.6	1.0	10.9	488	4.60
9	863.5	16.0	60	32	92	745	39.	1.0	11.9	745	39.00
10	863.7	17.0	73	23	96	965	15.	1.0	12.9	965	15.00
11	865.8	15.6	53	28	81	641	8.3	1.0	13.9	641	8.30
12	868.2	15.1	70	23	93	820	6.0	1.0	14.9	820	6.00
13	872.1	15.2	85	10	95	1,007	10.	1.0	15.9	1,007	10.00
14	875.5	12.3	69	26	95	658	13.	1.0	16.9	658	13.00
15	877.5	16.6	78	16	94	1,005	6.8	1.0	17.9	1,005	6.80
16	885.8	15.0	68	27	95	791	4.5	1.0	18.9	791	4.50

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Thompson Oil & Gas, Ltd.		Lease Hess		Well No. 5	
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
845.3 - 852.5	7.2	37.6	270.70		
855.1 - 886.0	11.7	10.4	121.57		
845.3 - 886.0	18.9	20.8	392.27		

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
845.3 - 852.5	7.2	15.5	43.6	35.0	526	3,786
855.1 - 886.0	11.7	15.4	62.1	25.6	745	8,710
845.3 - 886.0	18.9	15.5	55.1	29.2	661	12,496

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Thompson Oil & Gas, Ltd.			Lease			Hess			Well No. 5			
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	845.8	16.5	53	678	18	230	35	59	448	104	2.78	25
2	847.2	14.8	42	482	4	46	38	51	436	10	0.30	40
3	848.3	15.3	43	510	5	59	38	51	451	6	0.18	40
4	849.6	16.0	43	534	0	0	43	39	534	3	0.09	50
5	851.3	16.3	41	518	5	63	36	59	455	16	0.38	30
6	855.8	17.2	45	600	0	0	45	29	600	0	Imp.	-
7	857.5	15.2	48	566	0	0	48	32	566	0	Imp.	-
8	860.5	14.0	45	489	0	0	45	39	489	0	Imp.	-
9	863.5	16.2	61	767	0	0	61	32	767	0	Imp.	-
10	864.7	17.0	73	965	0	0	73	25	965	0	Imp.	-
11	865.8	15.8	54	662	0	0	54	30	662	0	Imp.	-
12	868.2	15.1	69	808	0	0	69	26	808	0	Imp.	-
13	872.1	15.1	85	996	0	0	85	11	996	0	Imp.	-
14	875.5	12.7	65	640	0	0	65	28	640	0	Imp.	-
15	877.5	16.6	78	1,005	0	0	78	17	1,005	0	Imp.	-
16	885.8	15.1	68	797	0	0	68	26	797	0	Imp.	-

Company Thompson Oil & Gas, Ltd. Lease Hess Well No. 5

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	Thompson Oil & Gas, Ltd.	Lease	Hess	Well No.	5
Depth Interval, Feet	845.3 - 852.5				
Feet of Core Analyzed	5.5				
Average Percent Porosity	15.8				
Average Percent Original Oil Saturation	43.9				
Average Percent Oil Recovery	7.1				
Average Percent Residual Oil Saturation	36.8				
Average Percent Residual Water Saturation	55.4				
Average Percent Total Residual Fluid Saturation	92.2				
Average Original Oil Content, Bbls./A. Ft.	537.				
Average Oil Recovery, Bbls./A. Ft.	88.				
Average Residual Oil Content, Bbls./A. Ft.	449.				
Total Original Oil Content, Bbls./Acre	2,947.				
Total Oil Recovery, Bbls./Acre	484.				
Total Residual Oil Content, Bbls./Acre	2,463.				
Average Effective Permeability, Millidarcys	0.76				
Average Initial Fluid Production Pressure, p.s.i.	33.8				

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

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RESULTS OF SAND CHLORIDE TESTS

TABLE VI

Company Thompson Oil & Gas, Ltd. Lease Hess Well No. 5

Sample No.	Depth, Feet	Chloride Content of Brine in Sand ppm	Percent Connate Water Saturation Drilling & Foreign	Total
1	845.8	55,836.		
2	847.2	37,958.		
3	848.3	38,987.		
4	849.6	42,840.		
5	851.3	37,909.		
6	855.8	48,703.		
7	857.5	45,517.		
8	860.5	51,855.		
9	863.5	40,554.		
10	864.7	53,814.		
11	865.8	48,504.		
12	868.2	56,171.		
13	872.1	73,027.		
14	875.5	48,084.		
15	877.5	43,401.		
16	885.8	64,288.		
NOTE: Water sample contained 14,326 MG/L Chlorides.				

Note: ppm — parts per million