



OILFIELD RESEARCH LABORATORIES

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December 16, 1980

H. A. L. Petroleum Exploration Inc.
2124 James Downey Rd.
Independence, Missouri 64057

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Beale Lease, Well No. 11, located in Neosho County, Kansas and submitted to our laboratory on October 10, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESREACH LABORATORIES


Sanford A. Michel

SAM/mkf

5 c to Independence, Mo.

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GENERAL INFORMATION & SUMMARY

Company H. A. L. Petroleum Exploration, Inc. Beale Well No. 11

Location _____

Section 29 Twp 27S Rge 19E County Neosho State Kansas

Elevation, Feet - - - - -

Name of Sand - - - - - Bartlesville

Top of Core - - - - - 764.0

Bottom of Core - - - - - 778.0

Top of Sand - - - - - 764.0

Bottom of Sand - - - - - 778.0

Total Feet of Permeable Sand - - - - - 5.0

Total Feet of Floodable Sand - - - - - 2.0

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 10	3.0	3.0
20 - 50	1.4	4.4
70 - 80	0.6	5.0

Average Permeability Millidarcys - - - - - 19.4

Average Percent Porosity - - - - - 15.3

Average Percent Oil Saturation - - - - - 30.5

Average Percent Water Saturation - - - - - 48.9

Average Oil Content, Bbls./A. Ft. - - - - - 388.

Total Oil Content, Bbls./Acre - - - - - 3688.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 17.4

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 263.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 526.

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.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
764.0 - 764.6	Grayish brown slightly calcareous sandstone.
764.6 - 766.3	Gray and light brown laminated shale and sandstone.
766.3 - 770.4	Gray laminated sandstone and shale.
770.4 - 771.2	Light brown shaly sandstone.
771.2 - 772.6	Brown sandstone.
772.6 - 778.7	Light brown and gray laminated sandstone and shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 526 barrels of oil per acre was obtained from 2.0 feet of sand. The weighted average percent oil saturation was reduced from 55.3 to 37.9, or represents an average recovery of 17.4 percent. The weighted average effective permeability of the samples is 2.14 millidarcys, while the average

initial fluid production pressure is 21.7 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 10 samples tested, 3 produced water and oil. This indicates that approximately 30 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 660 barrels of oil per acre. This is an average recovery of 332 barrels per acre foot from 2.0 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	17.9
Oil saturation after flooding, percent	37.9
Performance factor, percent, estimated	50.0
Net floodable sand, feet	2.0

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company H. A. L. Petroleum Exploration, Inc. Lease Beale Well No. 11

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	764.5	15.5	35	55	90	421	71.	0.6	0.6	253	42.60
2	765.5	15.6	25	46	71	303	Imp.	1.7	2.3	515	0.00
3	768.5	13.7	16	65	81	170	Imp.	1.0	3.3	170	0.00
4	770.5	18.1	29	41	70	407	Imp.	0.8	4.1	326	0.00
5	771.5	20.2	72	10	82	1128	28.	1.0	5.1	1128	28.00
6	772.5	15.8	44	43	87	539	42.	0.4	5.5	216	16.80
7	773.5	16.2	23	56	79	289	Imp.	1.0	6.5	289	0.00
8	775.5	14.9	42	39	81	486	6.3	1.0	7.5	486	6.30
9	777.5	13.0	21	52	73	212	1.6	1.0	8.5	212	1.60
10	778.5	10.9	11	81	92	93	1.7	1.0	9.5	93	1.70

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		H. A. L. Petroleum Exploration, Inc.		Lease Beale		Well No. 11	
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	
764.0 - 778.7	9.5	15.3	30.5	48.9	388	3,688	

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

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.
			%	Bbbs./A. Ft.	%	Bbbs./A. Ft.	% Oil	% Water			
1	764.5	15.5	35	421	4	48	31	60	157	3.00	35
2	765.5	15.1	26	305	0	0	26	50	0	Imp.	-
3	768.5	14.0	15	163	0	0	15	67	0	Imp.	-
4	770.5	18.2	29	409	0	0	29	43	0	Imp.	-
5	771.5	20.1	72	1223	30	468	42	48	126	1.67	15
6	772.5	15.8	44	539	6	74	38	54	145	2.00	15
7	773.5	15.7	24	292	0	0	24	58	0	Imp.	-
8	775.5	15.3	41	487	0	0	41	42	0	Imp.	-
9	777.5	13.2	21	215	0	0	21	60	0	Imp.	-
10	778.5	10.9	11	93	0	0	11	81	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.

H. A. L. Petroleum Exploration, Inc. Lease Beale Well No. 11

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	H. A. L. Petroleum Exploration, Inc.	Lease	Beale	Well No.	11
Depth Interval, Feet	764.0 - 778.7				
Feet of Core Analyzed	2.0				
Average Percent Porosity	17.9				
Average Percent Original Oil Saturation	55.3				
Average Percent Oil Recovery	17.4				
Average Percent Residual Oil Saturation	37.9				
Average Percent Residual Water Saturation	52.8				
Average Percent Total Residual Fluid Saturation	90.7				
Average Original Oil Content, Bbbls./A. Ft.	795.				
Average Oil Recovery, Bbbls./A. Ft.	263.				
Average Residual Oil Content, Bbbls./A. Ft.	532.				
Total Original Oil Content, Bbbls./Acre	1591.				
Total Oil Recovery, Bbbls./Acre	526.				
Total Residual Oil Content, Bbbls./Acre	1065.				
Average Effective Permeability, Millidarcys	2.14				
Average Initial Fluid Production Pressure, p.s.i.	21.7				

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