

# OILFIELD RESEARCH LABORATORIES

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

November 3, 1981

Mark III Corporation  
1534 South Main  
Ottawa, Kansas 66067

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Higginbotham Lease, Well No. 1, located in Miami County, Kansas and submitted to our laboratory on October 26, 1981.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

  
Sanford A. Michel

SAM/mkf

5 c to Ottawa, Ks.

**Oilfield Research Laboratories**  
**GENERAL INFORMATION & SUMMARY**

Company Mark III Corporation Lease Higginbotham Well No. 1  
 Location \_\_\_\_\_  
 Section 26 Twp. 17S Rge. 21E County Miami State Kansas

Elevation, Feet .....  
 Name of Sand ..... PERU  
 Top of Core ..... 425.0  
 Bottom of Core ..... 439.4  
 Top of Sand ..... (Tested) 425.9  
 Bottom of Sand ..... 439.0  
 Total Feet of Permeable Sand ..... 10.6  
 Total Feet of Floodable Sand ..... 5.9

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
35 - 80	2.0	2.0
100 - 135	3.7	5.7
145 - 200	4.9	10.6

Average Permeability Millidarcys ..... 130.1  
 Average Percent Porosity ..... 20.5  
 Average Percent Oil Saturation ..... 29.3  
 Average Percent Water Saturation ..... 45.6  
 Average Oil Content, Bbls./A. Ft. .... 478.  
 Total Oil Content, Bbls./Acre ..... 5,069.  
 Average Percent Oil Recovery by Laboratory Flooding Tests ..... 4.2  
 Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. .... 81.  
 Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre ..... 476.  
 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. Salt water mud was used as a drilling fluid.

#### FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval,</u> <u>Feet</u>	<u>Description</u>
425.0 - 426.9	Dark brown slightly calcareous sandstone.
426.9 - 436.0	Brown slightly calcareous sandstone.
436.0 - 439.0	Brown slightly calcareous sandstone with some fine shale partings.
439.0 - 439.4	Gray shale.

#### LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 476 barrels of oil per acre was obtained from 5.9 feet of sand. The weighted average percent oil saturation was reduced from 34.4 to 30.2, or represents an average recovery of 4.2 percent. The weighted average effective permeability of the samples is 12.93 millidarcys, while the average initial fluid production pressure is 14.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 9 samples tested, 5 produced water and oil and 4 samples produced water only. This indicates that approximately 56 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 1400 barrels of oil per acre. This is an average recovery of 237 barrels per acre foot from 5.9 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.04
Reservoir water saturation, percent, estimated	40.0
Average porosity, percent	22.2
Oil saturation after flooding, percent	30.2
Performance factor, percent, estimated	50.0
Net floodable sand, feet	5.9

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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	Total			Ft.	Cum. Ft.		
1	426.5	23.3	31	58	89	560	130.	1.0	1.0	560	130.00
2	428.6	29.4	44	44	88	1004	163.	1.4	2.4	1406	228.20
3	430.1	26.0	20	60	80	403	133.	1.2	3.6	484	159.60
4	431.1	16.1	25	63	88	312	145.	1.0	4.6	312	145.00
5	432.6	17.1	21	27	48	279	199.	1.5	6.1	419	298.50
6	434.3	14.6	34	29	63	385	101.	1.5	7.6	578	151.50
7	435.8	13.2	27	44	71	277	37.	1.0	8.6	277	37.00
8	437.4	23.0	31	51	82	553	153.	1.0	9.6	553	153.00
9	438.6	22.1	28	50	78	480	76.	1.0	10.6	480	76.00

Company Mark III Corporation

Lease Higginbotham

Well No. 1

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## SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Mark III Corporation Lease Higginbotham Well No. 1

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
425.9 - 439.0	10.6	130.1	1378.80	29.3	45.6	478	5,069
425.9 - 439.0	10.6			20.5			

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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.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water			
1	426.5	23.3	31	560	2	36	29	62	174	2.10	10
2	428.6	29.2	44	997	10	227	34	55	448	19.92	10
3	430.1	26.0	20	403	0	0	20	61	378	19.49	10
4	431.1	16.0	25	310	0	0	25	66	278	22.49	10
5	632.6	17.1	21	279	0	0	21	67	10	0.37	50
6	434.3	14.5	34	382	3	34	31	48	66	1.20	30
7	435.8	13.7	26	276	0	0	26	51	32	0.94	40
8	437.4	22.9	31	551	2	36	29	55	370	29.09	10
9	438.6	22.3	28	484	2	35	26	54	350	15.42	10

Company Mark III Corporation Lease Higginbotham Well No. 1

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.

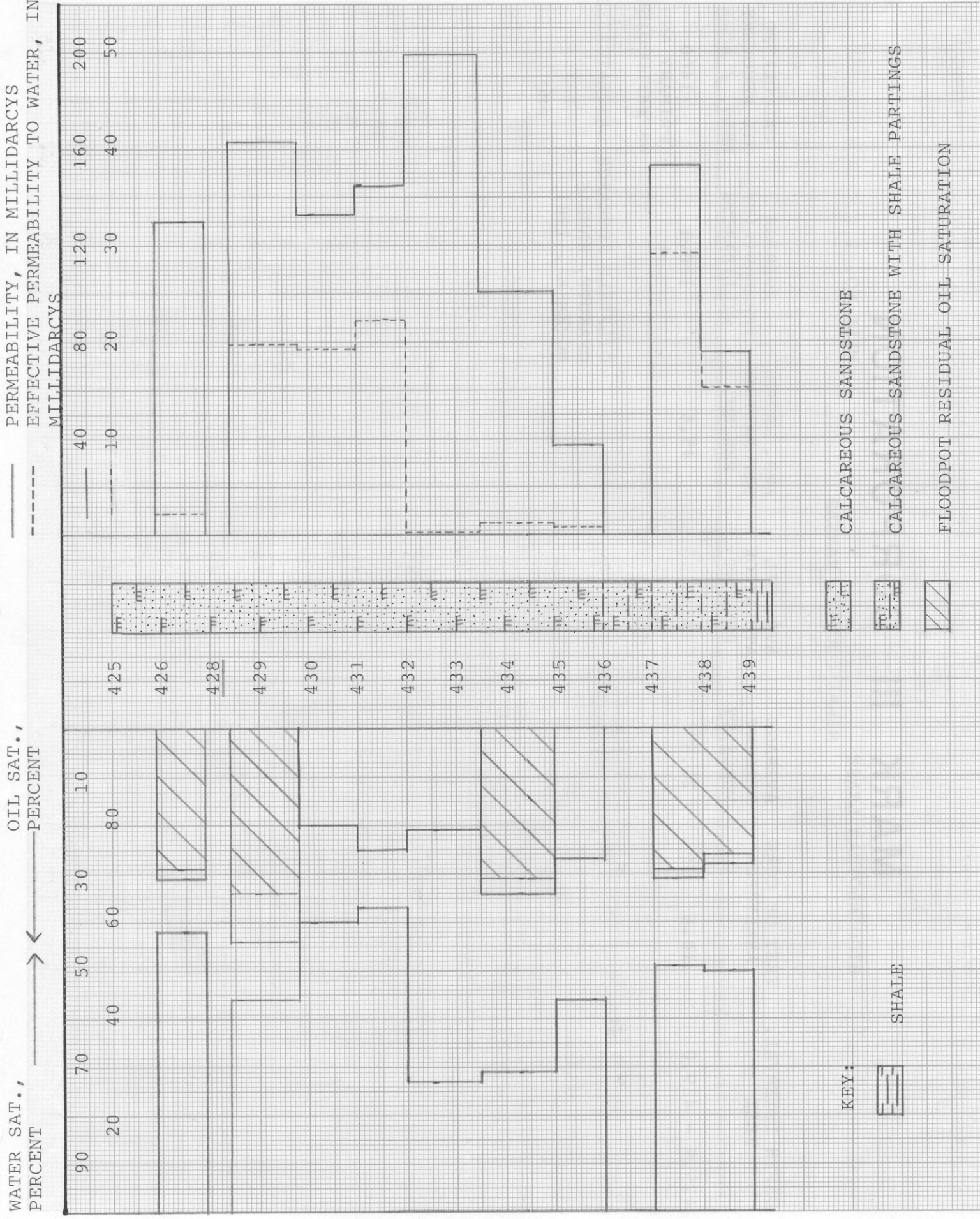
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## SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Mark III Corporation	Lease	Higginbotham	Well No.	1
Depth Interval, Feet	425.9 - 439.0				
Feet of Core Analyzed	5.9				
Average Percent Porosity	22.2				
Average Percent Original Oil Saturation	34.4				
Average Percent Oil Recovery	4.2				
Average Percent Residual Oil Saturation	30.2				
Average Percent Residual Water Saturation	54.2				
Average Percent Total Residual Fluid Saturation	84.4				
Average Original Oil Content, Bbbls./A. Ft.	604.				
Average Oil Recovery, Bbbls./A. Ft.	81.				
Average Residual Oil Content, Bbbls./A. Ft.	523.				
Total Original Oil Content, Bbbls./Acre	3,564.				
Total Oil Recovery, Bbbls./Acre	476.				
Total Residual Oil Content, Bbbls./Acre	3,088.				
Average Effective Permeability, Millidarcys	12.93				
Average Initial Fluid Production Pressure, p.s.i.	14.0				

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



# MARK III CORPORATION

HIGGINBOTHAM LEASE

WELL NO. 1

MIAMI COUNTY, KANSAS

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
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425.9 - 439.0	10.6	20.5	29.3	45.6	130.1	1400 (PRIMARY AND WATERFLOODING)
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OILFIELD RESEARCH LABORATORIES  
CHANUTE, KANSAS  
NOVEMBER, 1981

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