

# OILFIELD RESEARCH LABORATORIES

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

April 9, 1981

Mark III Corporation  
1534 South Main  
Ottawa, Kansas 66067

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary cores taken from the Caylor Lease, Well No. 3, located in Miami County, Kansas and submitted to our laboratory on March 19, 1981.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

5 c to Ottawa, Kansas



The cores were 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, Feet</u>	<u>Description</u>
	<u>PERU SAND</u>
363.0 - 370.3	Light brown sandstone with fine shale partings containing a vertical fracture.
370.3 - 372.0	Gray shaly limestone.
372.0 - 373.4	Light brown sandstone with fine shale partings.
	<u>UPPER SQUIRREL SAND</u>
504.0 - 506.8	Light brown sandstone.
506.8 - 514.7	Gray slightly sandy shale.
	<u>SQUIRREL SAND</u>
605.0 - 607.1	Gray and light brown laminated shale and sandstone.
607.1 - 607.6	Light brown and gray laminated sandstone and shale
607.6 - 613.2	Gray and light brown laminated shale and sandstone.

LABORATORY FLOODING TESTS

PERU SAND

At the request of the client, only the Peru sand was subjected to laboratory flooding tests.

The Peru sand in this core responded to laboratory flooding tests, as a total recovery of 895 barrels of oil per acre was obtained from 6.3 feet of sand. The weighted average percent oil saturation was reduced from 37.0 to 29.7, or represents an average recovery of 7.3 percent. The weighted average effective permeability of the samples is 30.07 millidarcys, while the average initial fluid production pressure is 15.0 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 3 samples produced water only. This indicates that approximately 56 percent of the sand represented by these samples is floodable pay sand.

CALCULATED RECOVERYPERU SAND

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 1,760 barrels of oil per acre. This is an average recovery of 209 barrels per acre foot from 6.3 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.03
Reservoir water saturation, percent, estimated	35.0
Average porosity, percent	21.5
Oil saturation after flooding, percent	29.7
Performance factor, percent, estimated	50.0
Net floodable sand, feet	6.3

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Mark III Corporation

Lease Caylor

Well No. 3

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation		Oil Content Bbbs. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water			Ft.	Cum. Ft.		
1	363.2	25.6	27	56	536	253.	1.0	1.0	536	253.00
2	364.3	23.1	30	65	537	167.	1.0	2.0	537	167.00
3	365.3	27.0	49	38	1026	247.	1.0	3.0	1026	247.00
4	366.8	25.7	42	44	837	167.	1.5	4.5	1256	250.50
5	368.5	16.2	33	50	415	50.	1.5	6.0	623	75.00
6	169.9	17.4	32	43	432	67.	1.3	7.3	562	87.10
7	370.7	7.4	12	70	69	Imp.	1.7	9.0	117	0.00
8	372.3	15.1	22	61	258	13.	1.0	10.0	258	13.00
9	373.3	16.2	22	64	277	40.	0.4	10.4	111	16.00
					<u>UPPER SQUIRREL SAND</u>					
10	504.3	21.6	29	42	486	40.	1.0	1.0	486	40.00
11	505.3	21.7	21	54	354	12.	1.0	2.0	354	12.00
12	506.6	22.0	22	49	376	12.	0.8	2.8	301	9.60
13	507.8	11.3	14	62	123	*	1.7	4.5	209	*
14	509.4	13.1	27	67	274	Imp.	1.5	6.0	411	0.00
15	510.2	13.0	21	20	212	Imp.	1.0	7.0	212	0.00
16	511.5	10.8	15	74	126	Imp.	1.0	8.0	126	0.00
17	512.9	13.6	18	74	190	0.26	1.0	9.0	190	0.26
18	513.6	6.4	17	80	84	Imp.	1.7	10.7	143	0.00
					<u>SQUIRREL SAND</u>					
19	605.7	15.5	19	58	229	0.47	1.0	1.0	229	0.47
20	607.3	15.0	18	61	210	14.	0.5	1.5	105	7.00
21	609.2	15.1	32	53	375	*	1.0	2.5	375	*
22	611.7	14.4	19	64	212	Imp.	1.0	3.5	212	0.00

NOTE: \* Permeability sample unobtainable.

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## SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company Mark III Corporation Lease Caylor Well No. 3

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
<u>PERU SAND</u>			
363.0 - 373.4	8.7	126.3	1,098.60
<u>UPPER SQUIRREL SAND</u>			
504.0 - 514.7	3.8	16.3	61.86
<u>SQUIRREL SAND</u>			
605.0 - 612.0	1.5	5.0	7.47

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
<u>PERU SAND</u>						
363.0 - 373.4	10.4	18.8	29.9	54.0	483	5,027
<u>UPPER SQUIRREL SAND</u>						
504.0 - 514.7	10.7	13.8	20.1	60.3	227	2,432
<u>SQUIRREL SAND</u>						
605.0 - 612.0	3.5	15.0	22.6	58.7	263	921

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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				Bbls./A. Ft.
1	363.2	25.4	27	532	0	0	27	65	226	84.71	10	
2	364.3	23.2	30	540	2	36	28	60	208	19.87	10	
3	365.3	26.9	49	1023	19	397	30	63	220	23.24	10	
4	366.8	25.7	42	837	13	259	29	62	240	89.96	10	
5	368.5	16.1	33	412	2	25	31	64	90	1.50	25	
6	369.9	17.4	32	432	2	27	30	56	370	7.05	20	
7	370.7	7.5	12	70	0	0	12	71	0	Imp.	-	
8	372.3	15.4	21	251	0	0	21	65	64	1.05	30	
9	373.3	16.0	22	273	0	0	22	73	28	0.94	40	

Company Mark III Corporation
Lease Caylor
Well No. 3

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

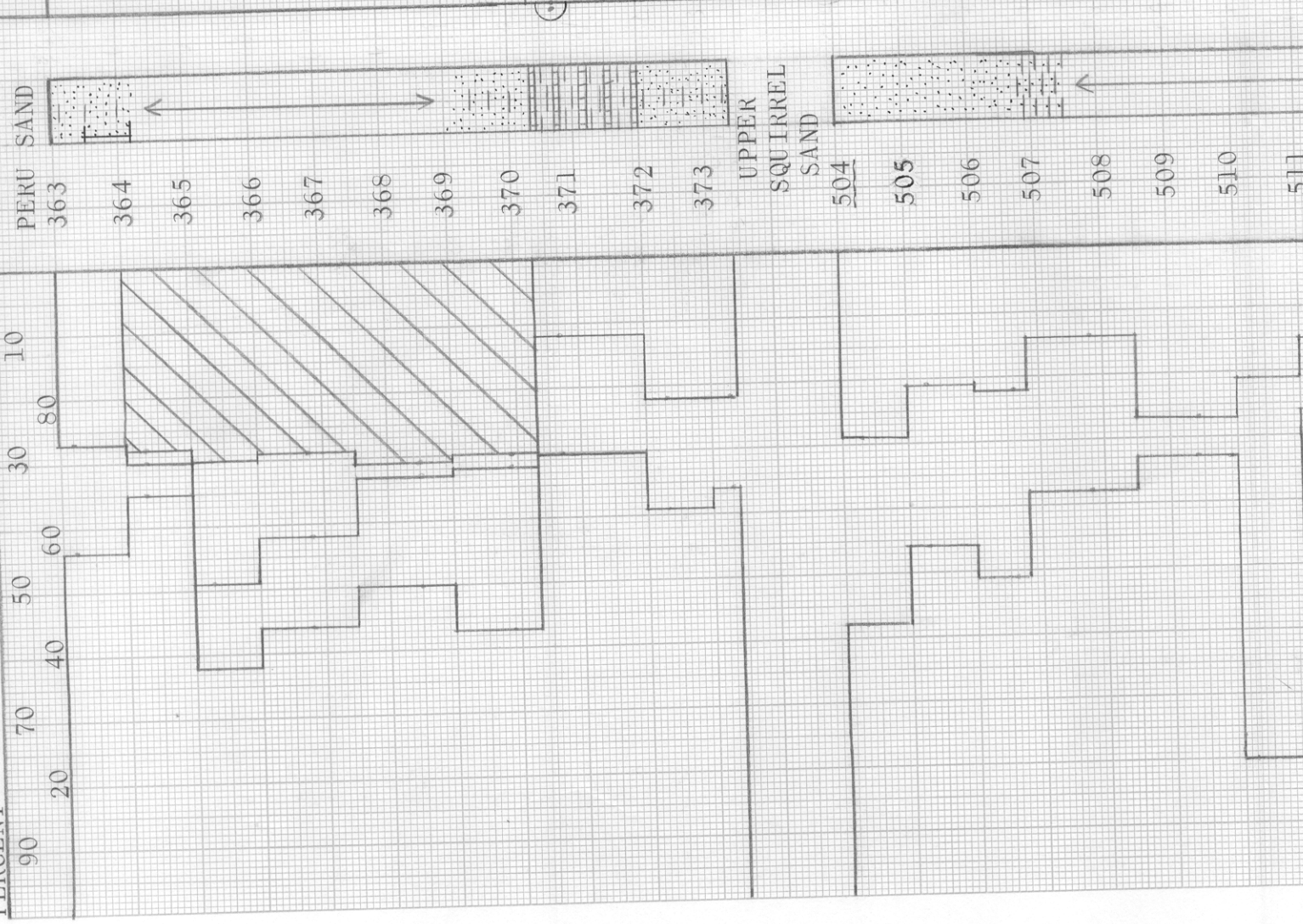
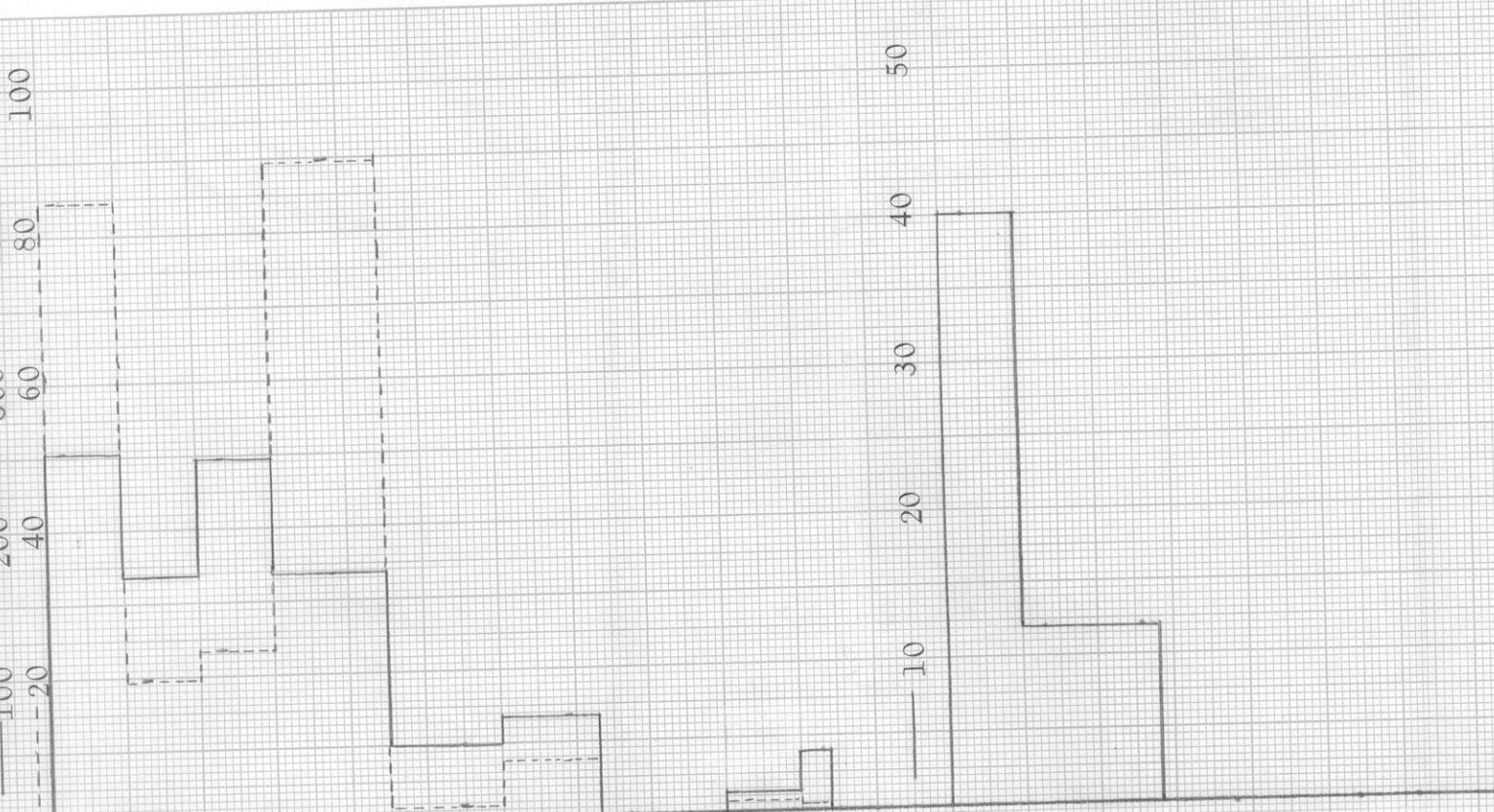
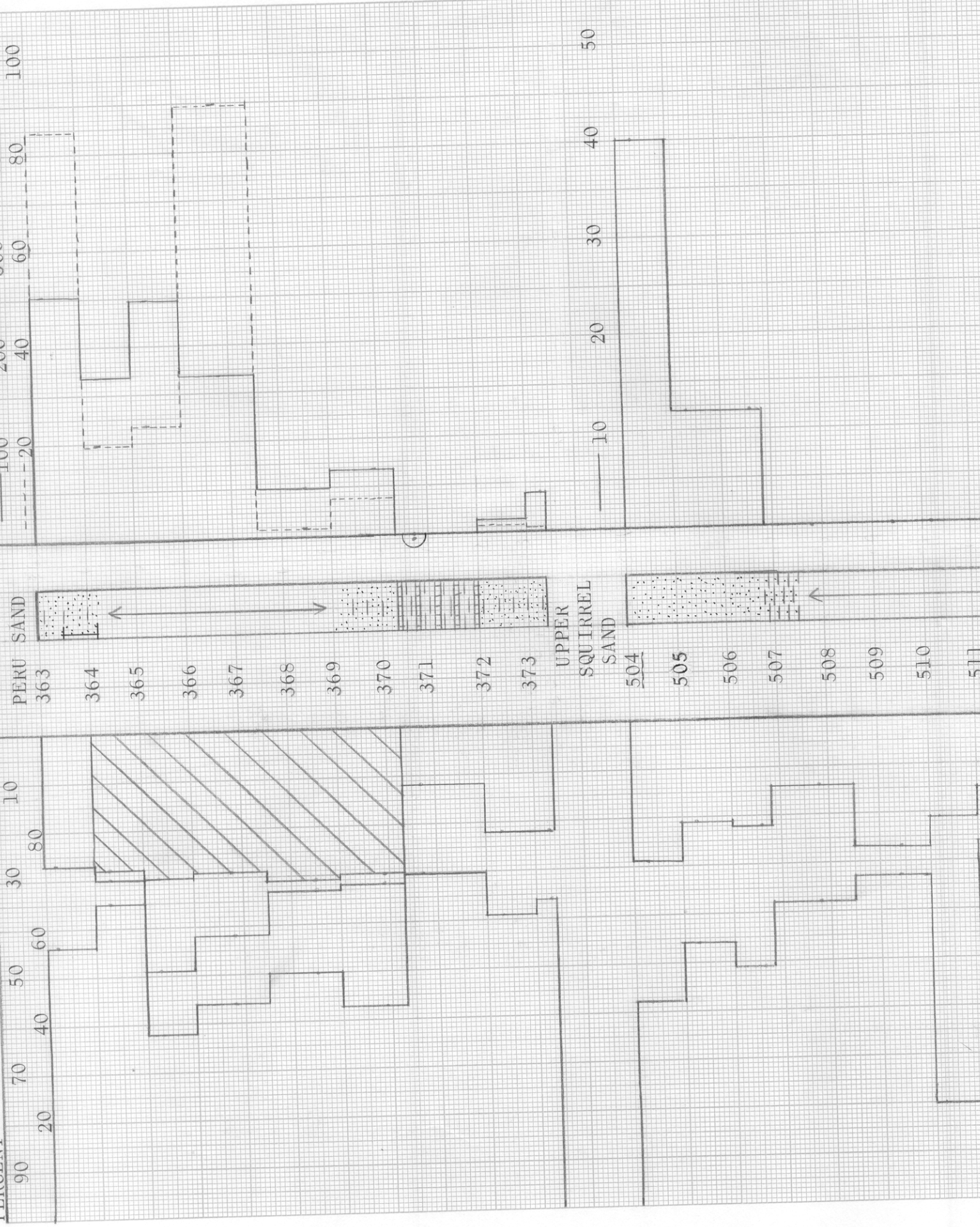
Company Mark III Corporation Lease Caylor Well No. 3  
PERU SAND

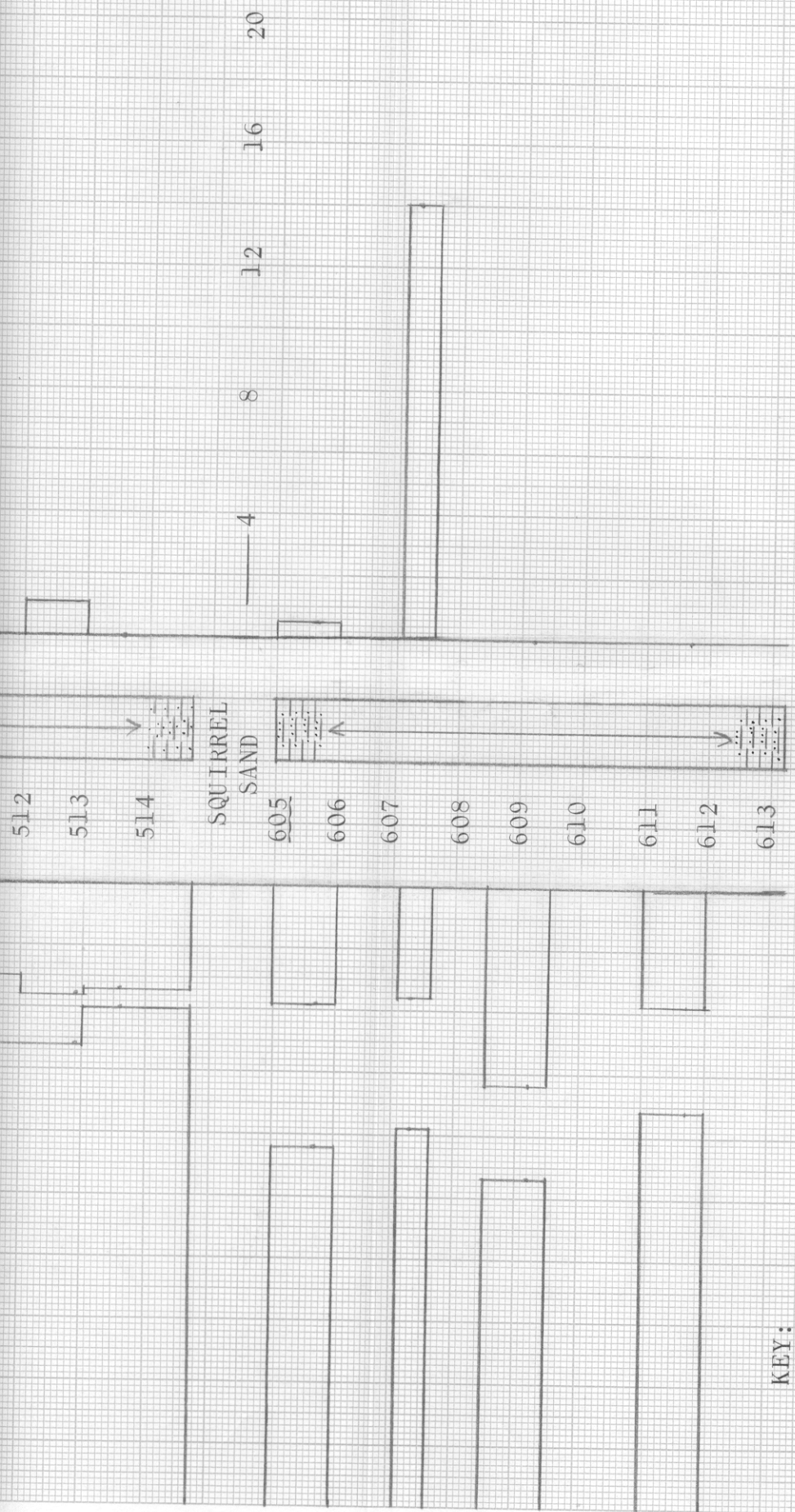
Depth Interval, Feet	363.0 - 373.4
Feet of Core Analyzed	6.3
Average Percent Porosity	21.5
Average Percent Original Oil Saturation	37.0
Average Percent Oil Recovery	7.3
Average Percent Residual Oil Saturation	29.7
Average Percent Residual Water Saturation	61.1
Average Percent Total Residual Fluid Saturation	90.8
Average Original Oil Content, Bbls./A. Ft.	635.
Average Oil Recovery, Bbls./A. Ft.	142.
Average Residual Oil Content, Bbls./A. Ft.	493.
Total Original Oil Content, Bbls./Acre	4,000.
Total Oil Recovery, Bbls./Acre	895.
Total Residual Oil Content, Bbls./Acre	3,105.
Average Effective Permeability, Millidarcys	30.07
Average Initial Fluid Production Pressure, p.s.i.	15.0

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









WATER SAT., PERCENT

EFFECTIVE PERMEABILITY TO WATER, MILLIDARCYS





KEY:

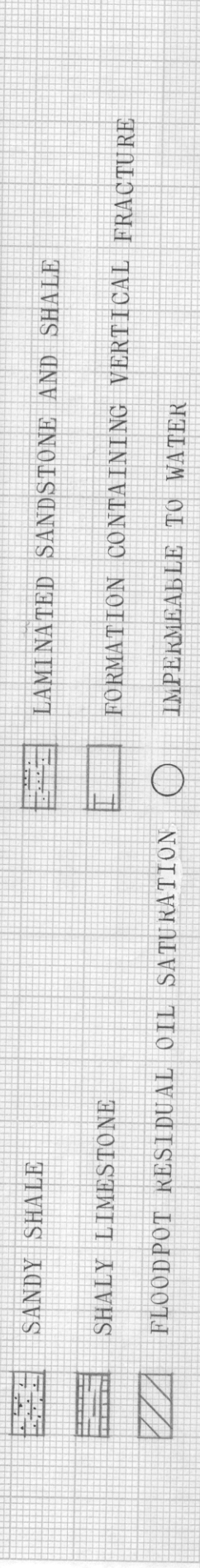
-  SANDSTONE
-  SANDY SHALE
-  SHALY LIMESTONE
-  FLOODPOT RESIDUAL OIL SATURATION
-  SANDSTONE WITH FINE SHALE PARTINGS
-  LAMINATED SANDSTONE AND SHALE
-  FORMATION CONTAINING VERTICAL FRACTURE
-  IMPERMEABLE TO WATER

# MARK III CORPORATION

CAYLOR LEASE

MIAMI COUNTY, KANSAS

WELL NO. 3



# MARK III CORPORATION

CAYLOR LEASE  
 MIAMI COUNTY, KANSAS  
 WELL NO. 3

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCS	CALCULATED OIL RECOVERY BBLs. / ACRE
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363.0 - 373.4	10.4	18.8	29.9	54.0	126.3	1760 (PRIMARY AND WATERFLOODING)
PERU SAND						
504.0 - 514.7	10.7	13.8	20.1	60.3	16.3	-
UPPER SQUIRREL SAND						
SQUIRREL SAND						
605.0 - 612.0	3.5	15.0	22.6	58.7	5.0	-

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