

# OILFIELD RESEARCH LABORATORIES

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

March 19, 1982

M & M Drilling  
Box 216  
Mound City, Kansas 66056

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Jackson Lease, Well No. 2, located in Linn County, Kansas and submitted to our laboratory on March 13, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

5 c to Mound City, Kansas

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

Company M & M Drilling Lease Jackson Well No. 2  
 Location SW $\frac{1}{4}$   
 Section 4 Twp. 20S Rge. 23E County Linn State Kansas

Elevation, Feet .....

Name of Sand..... Peru

Top of Core ..... 242.0

Bottom of Core ..... 267.7

Top of Sand ..... 242.0

Bottom of Sand ..... 267.7

Total Feet of Permeable Sand ..... 6.8

Total Feet of Floodable Sand ..... 0.9

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 1	4.0	4.0
1 - 2	1.9	5.9
17 - 19	0.9	6.8

Average Permeability Millidarcys ..... 3.3

Average Percent Porosity ..... 15.9

Average Percent Oil Saturation ..... 27.2

Average Percent Water Saturation ..... 63.7

Average Oil Content, Bbls./A. Ft. .... 352.

Total Oil Content, Bbls./Acre ..... 3,060.

Average Percent Oil Recovery by Laboratory Flooding Tests ..... 14.0

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. .... 223.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre ..... 201.

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>
242.0 - 244.1	Grayish brown slightly calcareous very shaly sandstone
244.1 - 245.0	Brown sandstone.
245.0 - 262.0	No core.
262.0 - 266.9	Light brown shaly sandstone with gray shale partings.
266.9 - 267.7	Grayish brown very shaly sandstone.

#### LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 201 barrels of oil per acre was obtained from 0.9 feet of sand. The weighted average percent oil saturation was reduced from 46.0 to 32.0, or represents an average recovery of 14.0 percent. The weighted average effective permeability of the samples is 0.15 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, 1 produced water and oil. This indicates that approximately 11 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 245 barrels of oil per acre. This is an average recovery of 272 barrels per acre foot from 0.9 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.03
Reservoir water saturation, percent, estimated	35.0
Average porosity, percent	20.5
Oil saturation after flooding, percent	32.0
Performance factor, percent, estimated	55.0
Net floodable sand, feet	0.9

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## RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company M & M Drilling

Lease Jackson

Well No. 2

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	Total			Ft.	Cum. Ft.		
1	242.5	17.2	21	69	90	270	0.74	1.0	1.0	280	0.74
2	243.7	10.0	17	76	93	132	Imp.	1.1	2.1	145	0.00
3	244.5	20.4	46	38	84	728	18.	0.9	3.0	655	16.20
4	262.6	16.1	31	63	94	387	1.8	1.0	4.0	387	1.80
5	263.6	16.5	28	68	96	358	0.32	1.0	5.0	358	0.32
6	264.6	16.1	29	56	85	362	0.95	1.0	6.0	362	0.95
7	265.5	16.7	27	60	87	350	0.95	1.0	7.0	350	0.95
8	266.6	17.9	35	58	93	486	1.3	0.9	7.9	437	1.17
9	267.5	12.5	11	85	96	107	Imp.	0.8	8.7	86	0.00

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## SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	M & M Drilling	Lease	Jackson	Well No.		2
Depth Interval, Feet	Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
242.0 - 245.0	242.0 - 245.0	1.9	8.9	16.94	360	1,080
262.0 - 267.7	262.0 - 267.7	4.9	1.1	5.19	347	1,980
242.0 - 267.7	242.0 - 267.7	6.8	3.3	22.13	352	3,060
242.0 - 245.0	242.0 - 245.0	15.5	27.0	62.3	360	1,080
262.0 - 267.7	262.0 - 267.7	16.1	27.2	64.4	347	1,980
242.0 - 267.7	242.0 - 267.7	15.9	27.2	63.7	352	3,060

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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	242.5	17.7	20	275	0	0	20	70	275	0	Imp.	-
2	243.7	10.3	17	136	0	0	17	77	136	0	Imp.	-
3	244.5	20.5	46	732	14	223	32	53	510	4	0.15	35
4	262.6	16.0	31	385	0	0	31	62	385	0	Imp.	-
5	263.6	16.4	28	356	0	0	28	69	356	0	Imp.	-
6	264.6	16.2	29	364	0	0	29	57	364	0	Imp.	-
7	265.5	16.9	27	354	0	0	27	60	354	0	Imp.	-
8	266.6	17.7	35	481	0	0	35	59	481	0	Imp.	-
9	267.5	12.8	11	109	0	0	11	85	109	0	Imp.	-

Company M & M Drilling
Lease Jackson
Well No. 2

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.

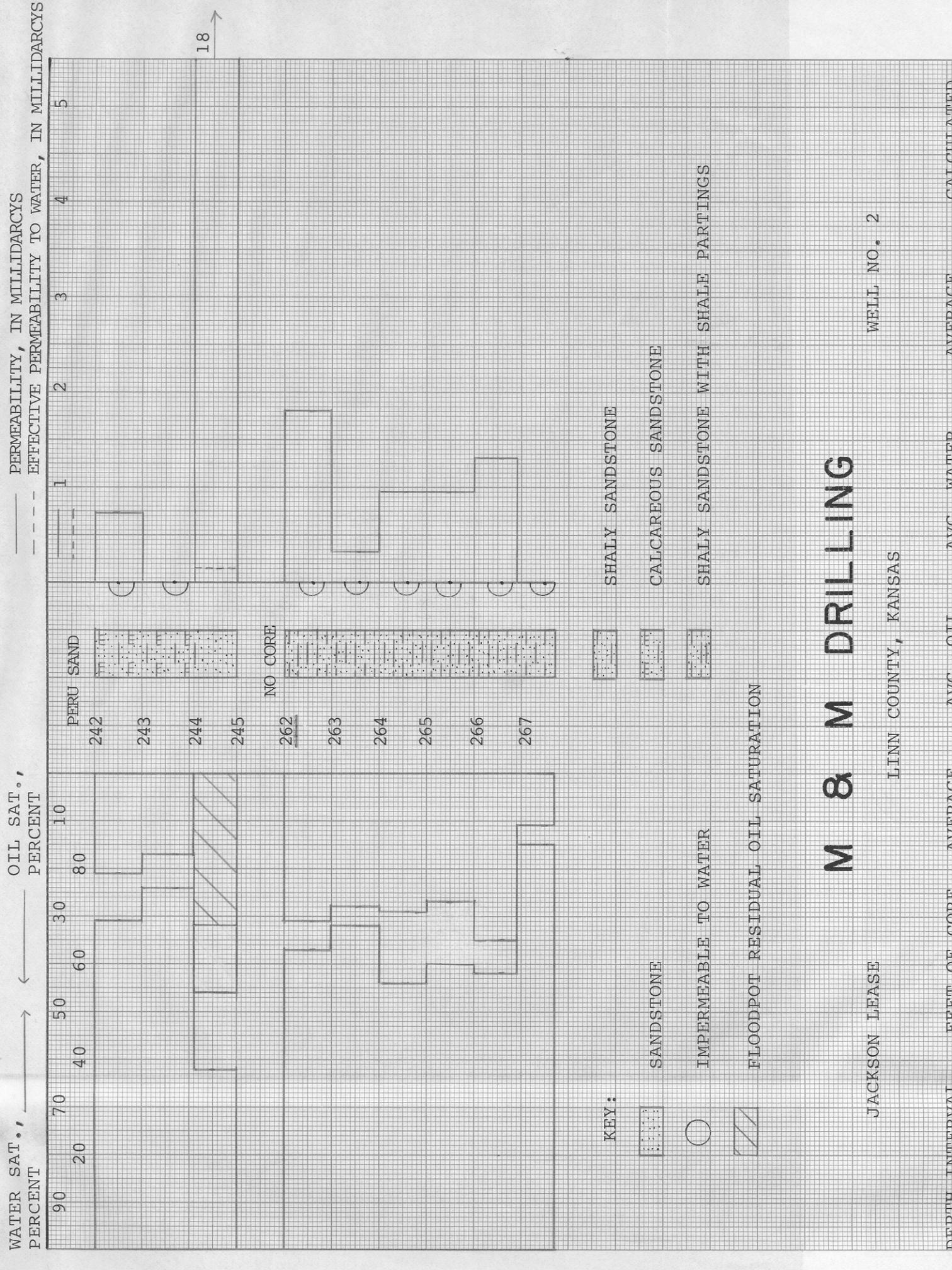
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## SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	M & M Drilling	Lease	Jackson	Well No.	2
Depth Interval, Feet	242.0 - 245.0				
Feet of Core Analyzed	0.9				
Average Percent Porosity	20.5				
Average Percent Original Oil Saturation	46.0				
Average Percent Oil Recovery	14.0				
Average Percent Residual Oil Saturation	32.0				
Average Percent Residual Water Saturation	53.0				
Average Percent Total Residual Fluid Saturation	85.0				
Average Original Oil Content, Bbbls./A. Ft.	733.				
Average Oil Recovery, Bbbls./A. Ft.	223.				
Average Residual Oil Content, Bbbls./A. Ft.	510.				
Total Original Oil Content, Bbbls./Acre	660.				
Total Oil Recovery, Bbbls./Acre	201.				
Total Residual Oil Content, Bbbls./Acre	459.				
Average Effective Permeability, Millidarcys	0.150				
Average Initial Fluid Production Pressure, p.s.i.	35.0				

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



IMPERMEABLE TO WATER

SHALY SANDSTONE WITH SHALE PARTINGS

FLOODPOT RESIDUAL OIL SATURATION

# M & M DRILLING

JACKSON LEASE

WELL NO. 2

LINN 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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242.0 - 245.0

15.5

27.0

62.3

8.9

262.0 - 267.7

16.1

27.2

64.4

1.1

242.0 - 267.7

15.9

27.2

63.7

3.3

245

(PRIMARY AND  
WATERFLOODING)

OILFIELD RESEARCH LABORATORIES  
CHANUTE, KANSAS  
MARCH, 1982

PDC