

# OILFIELD RESEARCH LABORATORIES

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

December 23, 1980

Phipps-Murphy Enterprises  
P. O. Box 336  
Kiowa, Oklahoma 74553

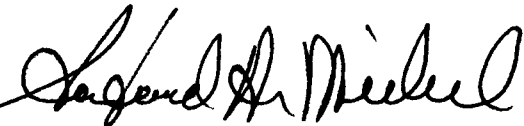
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Franklin Lease, Well No. 4, located in Crawford County, Kansas and submitted to our laboratory on October 30, 1980.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Sanford A. Michel

SAM/mkf

4 c to Kiowa, Okla.  
1 c to Chanute, Ks.

# Oilfield Research Laboratories

## GENERAL INFORMATION & SUMMARY

Company Phipps-Murphy Enterprises ~~Lease~~ Franklin Well No. 4

Location \_\_\_\_\_

Section 29 Twp. 28S Rge. 22E County Crawford State Kansas

Elevation, Feet - - - - -

Name of Sand - - - - - Bartlesville

Top of Core - - - - - 398.0

Bottom of Core - - - - - 407.7

Top of Sand - - - - - 398.0

Bottom of Sand - - - - - 407.7

Total Feet of Permeable Sand - - - - - 9.7

Total Feet of Floodable Sand - - - - - 3.1

Distribution of Permeable Sand:  
Permeability Range  
Millidarcys

Feet

Cum. Ft.

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 5	5.0	5.0
5 - 10	2.2	7.2
20 - 30	0.6	7.8
30 - 40	1.9	9.7

Average Permeability Millidarcys - - - - - 11.5

Average Percent Porosity - - - - - 17.6

Average Percent Oil Saturation - - - - - 45.7

Average Percent Water Saturation - - - - - 34.4

Average Oil Content, Bbls./A. Ft. - - - - - 626.

Total Oil Content, Bbls./Acre - - - - - 6,076.

Average Percent Oil Recovery by Laboratory Flooding Tests - - - - - 7.6

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. - - - - - 107.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre - - - - - 330.

Total Calculated Oil Recovery, Bbls./Acre - - - - - See "Calculated Recovery" Section

The core was sampled and the sampled sealed in plastic bags by a representative of the client. Fresh water mud was used as a drilling fluid. The core was reported to be from a semi-virgin area.

#### FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval,</u> <u>Feet</u>	<u>Description</u>
398.0 - 399.9	Brown slightly calcareous sandstone.
399.9 - 400.8	Brown and gray laminated slightly calcareous sandstone and shale.
400.8 - 405.2	Brown shaly slightly calcareous sandstone.
405.2 - 405.8	Brown slightly calcareous sandstone.
405.8 - 407.7	Brown shaly slightly calcareous sandstone.

#### LABORATORY FLOODING TESTS

At the request of the client, samples numbers 1 through 8 were subjected to flooding tests, these samples responded to laboratory flooding tests, as a total recovery of 330 barrels of oil per acre was obtained from 3.1 feet of sand. The weighted average percent oil saturation was reduced from 42.6 to 35.0, or represents an average recovery of 7.6 percent. The weighted average effective permeability of the samples is 1.41 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 8 samples tested, 3 produced water and oil, and 3 samples produced water only. This indicates that approximately 38 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 830 barrels of oil per acre. This is an average recovery of 268 barrels per acre foot from 3.1 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	25.0
Average porosity, percent	18.3
Oil saturation after flooding, percent	35.0
Performance factor, percent, estimated	50.0
Net floodable sand, feet	3.1

**Oilfield Research Laboratories**

**RESULTS OF SATURATION & PERMEABILITY TESTS**

TABLE 1-B

Company Phipps-Murphy Enterprises Lease Franklin Well No. 4

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	398.5	19.6	38	37	75	578	35.	1.0	1.0	578	35.00
2	399.5	17.2	43	34	77	574	31.	0.9	1.9	517	27.90
3	400.5	16.0	31	33	64	385	0.92	0.9	2.8	347	0.83
4	401.5	18.2	46	29	75	650	8.3	1.2	4.0	780	9.96
5	402.5	17.9	55	25	80	764	7.1	1.0	5.0	764	7.10
6	403.5	16.4	51	39	90	649	3.6	1.0	6.0	649	3.60
7	404.5	16.6	52	32	84	670	4.1	1.2	7.2	804	4.92
8	405.5	17.1	37	40	77	491	27.	0.6	7.8	295	16.20
9	406.5	18.8	58	39	97	846	4.8	1.0	8.8	846	4.80
10	407.5	18.2	39	40	79	551	1.6	0.9	9.7	496	1.44

# Oilfield Research Laboratories

## RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Phipps-Murphy Enterprises Lease Franklin Well No. 4

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	398.5	19.5	38	575	4	61	34	59	196	3.37	30
2	399.5	17.3	43	577	7	94	36	58	19	0.22	35
3	400.5	16.0	31	385	0	0	31	62	9	0.15	50
4	401.5	18.0	46	642	11	154	35	60	45	0.67	40
5	402.5	17.9	55	764	0	0	55	41	69	1.05	35
6	403.5	16.2	51	641	0	0	51	41	0	Imp.	-
7	404.5	17.1	51	677	0	0	51	35	0	Imp.	-
8	405.5	16.9	37	485	0	0	37	60	106	1.57	30

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.

## Oilfield Research Laboratories

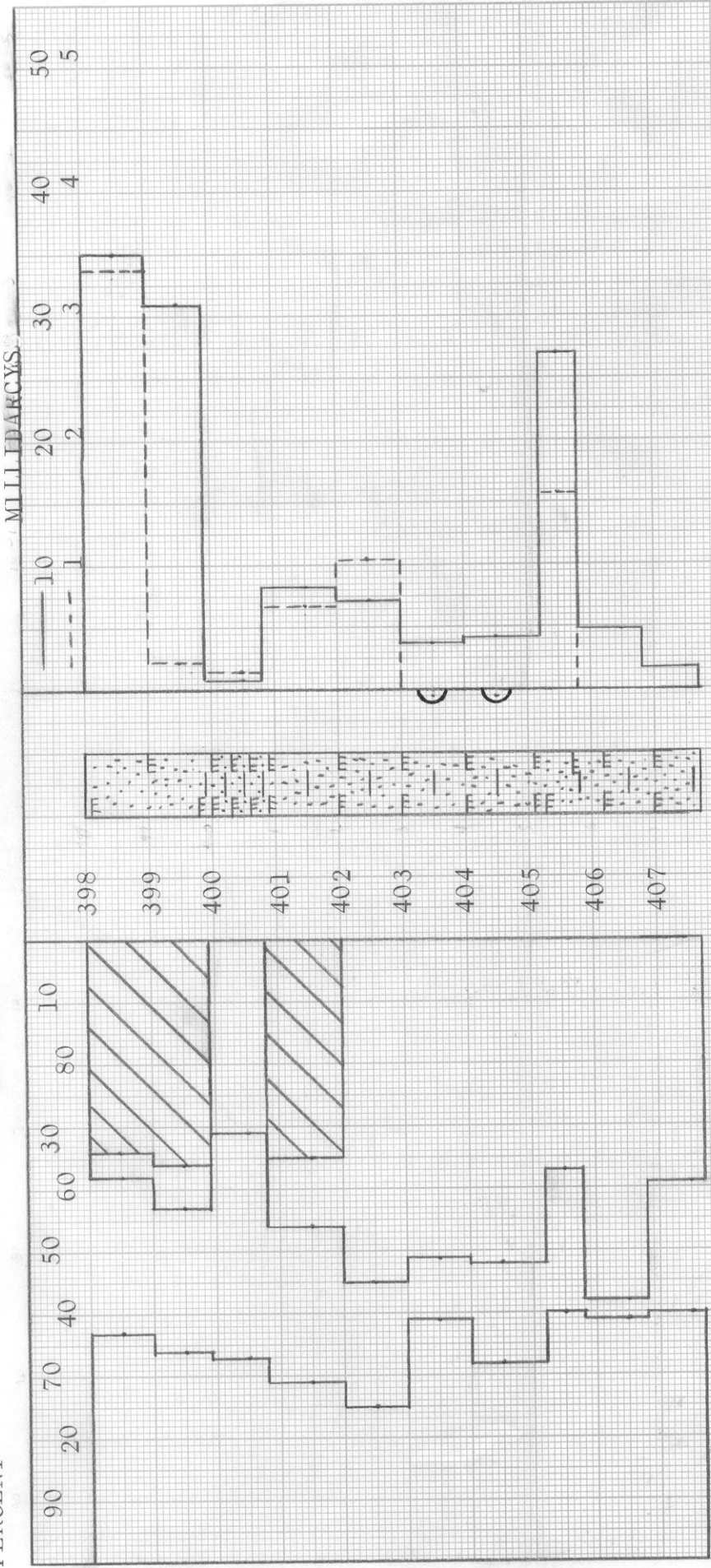
## SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Phipps-Murphy Enterprises	Lease	Franklin	Well No.	4
Depth Interval, Feet	398.0 - 407.7				
Feet of Core Analyzed	3.1				
Average Percent Porosity	18.3				
Average Percent Original Oil Saturation	42.6				
Average Percent Oil Recovery	7.6				
Average Percent Residual Oil Saturation	35.0				
Average Percent Residual Water Saturation	58.1				
Average Percent Total Residual Fluid Saturation	94.1				
Average Original Oil Content, Bbls./A. Ft.	602.				
Average Oil Recovery, Bbls./A. Ft.	107.				
Average Residual Oil Content, Bbls./A. Ft.	495.				
Total Original Oil Content, Bbls./Acre	1,864.				
Total Oil Recovery, Bbls./Acre	330.				
Total Residual Oil Content, Bbls./Acre	1,534.				
Average Effective Permeability, Millidarcys	1.41				
Average Initial Fluid Production Pressure, p.s.i.	35.0				

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

WATER SAT., PERCENT →  
OIL SAT., PERCENT ←  
PERMEABILITY, IN MILLIDARCYS  
EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYS



- KEY:
- CALCAREOUS SANDSTONE
  - SHALY CALCAREOUS SANDSTONE
  - LAMINATED CALCAREOUS SANDSTONE AND SHALE
  - FLOODPOT RESIDUAL OIL SATURATION
  - IMPERMEABLE TO WATER

# PHIPPS - MURPHY ENTERPRISES

FRANKLIN LEASE

WELL NO. 4

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

398.0 - 407.7

9.7

17.6

45.7

34.4

11.5

830

(PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES  
 CHANUTE, KANSAS  
 DECEMBER, 1980

KK