

# OILFIELD RESEARCH LABORATORIES

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

February 5, 1982

Rantoul Energy Corporation  
1505 SW 42nd Street  
Topeka, Kansas 66609

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Moews Lease, Well No. 4 A, located in Franklin County, Kansas and submitted to our laboratory on February 2, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

5 c to Topeka, Kansas

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

Company Rantoul Energy Corporation Lease Moews Well No. 4 A  
 Location 1520' WEL & 200' SNL  
 Section 3 Twp. 19S Rge. 20E County Franklin State Kansas

Elevation, Feet .....

Name of Sand..... Lower Squirrel

Top of Core ..... 787.0

Bottom of Core ..... 795.5

Top of Sand ..... (Tested) 787.3

Bottom of Sand ..... 793.7

Total Feet of Permeable Sand ..... 4.9

Total Feet of Floodable Sand ..... 3.5

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 3	1.1	1.1
18 - 27	2.0	3.1
118 - 170	1.8	4.9

Average Permeability Millidarcys ..... 65.1

Average Percent Porosity ..... 17.1

Average Percent Oil Saturation ..... 44.6

Average Percent Water Saturation..... 34.9

Average Oil Content, Bbls./A. Ft. .... 615.

Total Oil Content, Bbls./Acre..... 3,443.

Average Percent Oil Recovery by Laboratory Flooding Tests..... 11.1

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. .... 174.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre ..... 608.

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. Air and water were used as a drilling fluid. The core was reported to be from a non-virgin area.

#### FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
787.0 - 787.3	Grayish brown slightly calcareous shaly sandstone.
787.3 - 790.4	Dark brown slightly calcareous sandstone with scattered shale partings.
790.4 - 790.7	Dark brown slightly calcareous sandstone.
790.7 - 791.5	Grayish brown slightly calcareous shaly sandstone.
791.5 - 793.0	Black slightly calcareous sandstone.
793.0 - 793.7	Grayish brown shaly sandstone.
793.7 - 795.5	Gray slightly sandy shale.

#### LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 608 barrels of oil per acre was obtained from 3.5 feet of sand. The weighted average percent oil saturation was reduced from 48.4 to 37.3, or represents an average recovery of 11.1 percent. The weighted average effective permeability of the samples is 5.06 millidarcys, while the average initial fluid production pressure is 27.5 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 7 samples tested, 4 produced water and oil. This indicates that approximately 57 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 980 barrels of oil per acre. This is an average recovery of 281 barrels per acre foot from 3.5 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	20.0
Average porosity, percent	18.6
Oil saturation after flooding, percent	37.3
Performance factor, percent, estimated	50.0
Net floodable sand, feet	3.5

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**RESULTS OF SATURATION & PERMEABILITY TESTS**

**TABLE 1-B**

Company Rantoul Energy Corporation Lease Moews Well No. 4 A

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	787.5	14.6	55	24	79	623	2.1	1.1	1.1	685	2.31
2	788.5	15.0	37	46	83	431	18.	1.0	2.1	431	18.00
3	789.5	17.9	44	26	70	611	26.	1.0	3.1	611	26.00
4	790.5	20.5	33	29	62	525	118.	0.3	3.4	158	35.40
5	791.7	24.1	57	21	78	1066	169.	0.5	3.9	533	84.50
6	792.5	20.1	60	19	79	936	153.	1.0	4.9	936	153.00
7	793.6	11.7	14	84	98	127	Imp.	0.7	5.6	89	0.00

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## SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company	Lease	Moews	Well No.	4 A
	Rantoul Energy Corporation			
Depth Interval, Feet	787.3 - 793.7	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
	4.9	65.1	319.21	
Depth Interval, Feet	787.3 - 793.7	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.
	5.6	17.1	44.6	34.9
	5.6	17.1	44.6	615
	787.3 - 793.7	5.6	17.1	3,443

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## RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company Rantoul Energy Corporation Lease Moews Well No. 4 A

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	787.5	14.5	55	619	0	0	55	25	0	Imp.	-
2	788.5	15.1	37	433	3	35	34	50	42	0.83	35
3	789.5	17.8	44	608	8	110	36	36	20	0.38	35
4	790.5	20.7	33	530	0	0	33	30	0	Imp.	-
5	791.7	24.2	57	1070	16	300	41	40	160	12.99	20
6	792.5	20.2	60	940	20	313	40	44	274	10.00	20
7	793.6	11.2	15	130	0	0	15	83	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.

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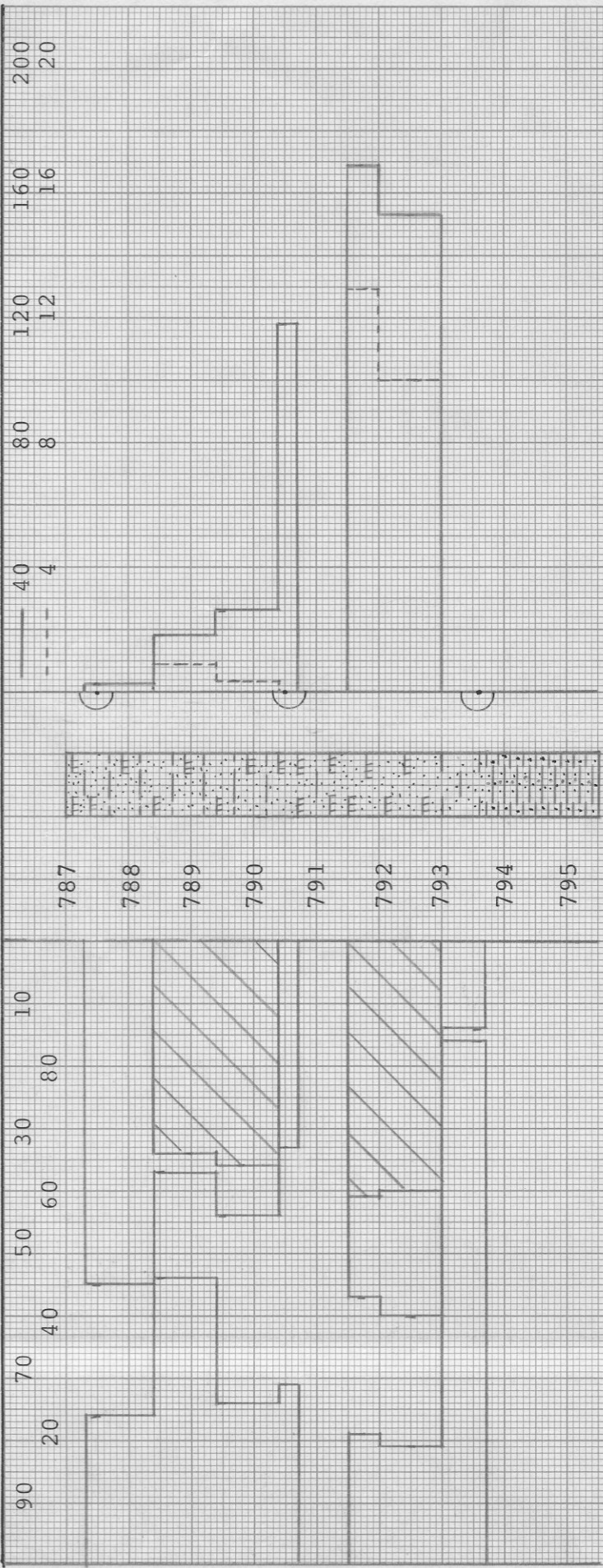
## SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Rantoul Energy Corporation	Lease	MOEWS	Well No.	4 A
Depth Interval, Feet	787.3 - 793.7				
Feet of Core Analyzed	3.5				
Average Percent Porosity	18.6				
Average Percent Original Oil Saturation	48.4				
Average Percent Oil Recovery	11.1				
Average Percent Residual Oil Saturation	37.3				
Average Percent Residual Water Saturation	42.9				
Average Percent Total Residual Fluid Saturation	80.2				
Average Original Oil Content, Bbls./A. Ft.	719.				
Average Oil Recovery, Bbls./A. Ft.	174.				
Average Residual Oil Content, Bbls./A. Ft.	545.				
Total Original Oil Content, Bbls./Acre	2,516.				
Total Oil Recovery, Bbls./Acre	608.				
Total Residual Oil Content, Bbls./Acre	1,908.				
Average Effective Permeability, Millidarcys	5.06				
Average Initial Fluid Production Pressure, p.s.i.	27.5				

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

WATER SAT., PERCENT → ← OIL SAT., PERCENT  
 — PERMEABILITY, IN MILLIDARCY  
 --- EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCY



- KEY:
- SHALY SANDSTONE
  - CALCAREOUS SANDSTONE
  - IMPERMEABLE TO WATER
  - SHALY CALCAREOUS SANDSTONE
  - CALCAREOUS SANDSTONE WITH SHALE PARTINGS
  - SANDY SHALE
  - FLOODPOT RESIDUAL OIL SATURATION

# RANTOUL ENERGY CORPORATION

MOEWS LEASE  
 FRANKLIN COUNTY, KANSAS  
 WELL NO. 4A

SANDY SHALE

CALCAREOUS SANDSTONE

FLOODPOT RESIDUAL OIL SATURATION

IMPERMEABLE TO WATER

# RANTOUL ENERGY CORPORATION

MOEWS LEASE

WELL NO. 4A

FRANKLIN 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
787.3 - 793.7	5.6	17.1	44.6	34.9	65.1	980 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES  
CHANUTE, KANSAS  
FEBRUARY, 1982

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