

OILFIELD RESEARCH LABORATORIES

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

October 20, 1981

Rantoul Energy Corporation
1505 SW 42nd. St.
Topeka, Kansas 66609

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Kester Lease, Well No. 8-C, located in Greenwood County, Kansas and submitted to our laboratory on October 12, 1981.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/mkf

5 c to Topeka, Ks.

- REGISTERED ENGINEERS -

CORE ANALYSIS - WATER ANALYSIS - REPRESSURING ENGINEERING - SURVEYING & MAPPING - PROPERTY EVALUATION & OPERATION

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GENERAL INFORMATION & SUMMARY

Company Rantoul Energy Corp. Lease Kester Well No. 8-C
 Location 1980' NSL & 660' EWL
 Section 10 Twp. 27S Rge. 13E County Greenwood State Kansas

Elevation, Feet

Name of Sand.....

SQUIRREL

Top of Core

1202.0

Bottom of Core

1221.0

Top of Sand

1202.0

Bottom of Sand

1221.0

Total Feet of Permeable Sand

13.0

Total Feet of Floodable Sand

5.4

Distribution of Permeable Sand: Permeability Range Millidarcys

Feet

Cum. Ft.

0 - 5

5.9

5.9

10 - 20

2.6

8.5

20 - 70

3.5

12.0

Over 70

1.0

13.0

Average Permeability Millidarcys

34.8

Average Percent Porosity

15.2

Average Percent Oil Saturation

27.8

Average Percent Water Saturation

58.4

Average Oil Content, Bbls./A. Ft.

352.

Total Oil Content, Bbls./Acre

5,823.

Average Percent Oil Recovery by Laboratory Flooding Tests

3.3

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

46.

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

246.

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 gel was used as a drilling fluid.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, <u>Feet</u>	<u>Description</u>
1202.0 - 1202.8	Light gray shaly limestone.
1202.8 - 1203.7	Gray calcareous shale.
1203.7 - 1204.5	Light gray shaly limestone.
1204.5 - 1206.1	Light grayish brown slightly calcareous shaly sandstone.
1206.1 - 1207.1	Light gray very shaly sandstone.
1207.1 - 1207.8	Grayish brown sandstone.
1207.8 - 1208.1	Gray shale.
1208.1 - 1213.9	Brown sandstone.
1213.9 - 1214.4	Dark brown and gray laminated sandstone and shale.
1214.4 - 1215.0	Brown sandstone.
1215.0 - 1218.5	Grayish black shaly slightly carbonaceous sandstone
1218.5 - 1219.9	Grayish brown shaly sandstone with fine shale partings.
1219.9 - 1221.0	Gray and light gray laminated sandstone and shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 246 barrels of oil per acre was obtained from 5.4 feet of sand. The weighted average percent oil saturation was reduced from 35.1 to 31.8, or represents an average recovery of 3.3 percent. The weighted average effective permeability of the samples is 4.23 millidarcys, while the average initial fluid production pressure is 26.7 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 18 samples tested, 6 produced water and oil, and 5 samples produced water only. This indicates that approximately 33 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 910 barrels of oil per acre. This is an average recovery of 169 barrels per acre foot from 5.4 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.08
Reservoir water saturation, percent, estimated	40.0
Average porosity, percent	18.3
Oil saturation after flooding, percent	31.8
Performance factor, percent, estimated	50.0
Net floodable sand, feet	5.4

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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	1202.4	7.0	21	70	91	114	Imp.	0.8	0.8	91	0.00
2	1204.6	9.1	12	81	93	85	Imp.	0.6	1.4	51	0.00
3	1205.4	12.0	18	78	96	168	Imp.	1.0	2.4	168	0.00
4	1206.3	6.6	2	90	92	10	3.8	1.0	3.4	10	3.80
5	1207.5	20.1	29	48	77	452	21.	0.7	4.1	316	14.70
6	1208.5	21.5	29	44	73	484	236.	1.0	5.1	484	236.00
7	1209.4	16.4	35	54	89	445	20.	1.0	6.1	445	20.00
8	1210.4	15.6	37	45	82	448	12.	1.0	7.1	448	12.00
9	1211.4	15.5	41	53	94	493	49.	1.0	8.1	493	49.00
10	1212.5	21.5	33	42	75	550	68.	1.0	9.1	550	68.00
11	1213.3	19.2	28	60	88	417	32.	0.8	9.9	334	25.60
12	1214.5	18.5	24	49	73	345	19.	0.6	10.5	207	11.40
13	1215.5	17.1	39	46	85	517	5.0	1.0	11.5	517	5.00
14	1216.4	15.4	32	58	90	382	1.4	1.0	12.5	382	1.40
15	1217.4	16.5	46	47	93	589	2.9	1.5	14.0	884	4.35
16	1218.6	16.9	31	57	88	406	1.0	0.4	14.4	162	0.40
17	1219.4	10.7	17	78	95	141	0.21	1.0	15.4	141	0.21
18	1220.5	13.6	12	60	72	127	Imp.	1.1	16.5	140	0.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		Rantoul Energy Corporation		Lease	Kester	Well No.	8-C
Depth Interval, Feet	Feet of Core Analyzed	Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
1202.0 - 1207.1	1.0	1202.0 - 1207.1	1.0	3.8	3.80		
1207.1 - 1215.0	7.1	1207.1 - 1215.0	7.1	61.5	436.70		
1215.0 - 1221.0	4.9	1215.0 - 1221.0	4.9	2.3	11.36		
1202.0 - 1221.0	13.0	1202.0 - 1221.0	13.0	34.8	451.86		
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	
1202.0 - 1207.1	3.4	8.7	12.9	80.2	94	320	
1207.1 - 1215.0	7.1	18.5	32.7	49.2	462	3,277	
1215.0 - 1221.0	6.0	15.0	30.4	56.9	371	2,226	
1202.0 - 1221.0	16.5	15.2	27.8	58.4	352	5,823	

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company		Rantoul Energy Corporation		Lease		Kester		Well No.		8-C	
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	1202.4	7.2	20	112	0	0	20	72	0	Imp.	-
2	1204.6	9.0	12	84	0	0	12	81	0	Imp.	-
3	1205.4	11.7	19	172	0	0	19	78	0	Imp.	-
4	1206.3	6.7	2	10	0	0	2	94	12	0.82	50
5	1207.5	20.4	28	443	0	0	28	49	0	Imp.	-
6	1208.5	21.6	29	486	3	50	26	56	270	9.93	15
7	1209.4	16.5	35	448	5	64	30	61	26	0.83	45
8	1210.4	15.1	38	445	0	0	38	50	0	Imp.	-
9	1211.4	15.5	41	493	4	48	37	61	152	2.02	20
10	1212.5	21.6	33	553	2	34	31	53	348	9.16	15
11	1213.3	19.2	28	417	0	0	28	62	46	1.29	35
12	1214.5	18.6	24	346	0	0	24	60	292	16.24	10
13	1215.5	17.0	39	514	3	40	36	58	22	0.83	30
14	1216.4	15.5	32	385	0	0	32	60	16	0.22	35
15	1217.4	16.4	46	585	0	0	46	48	22	0.22	25
16	1218.6	16.9	31	406	2	26	29	62	18	0.17	35
17	1219.4	10.5	18	147	0	0	18	78	0	Imp.	-
18	1220.5	13.5	12	126	0	0	12	61	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

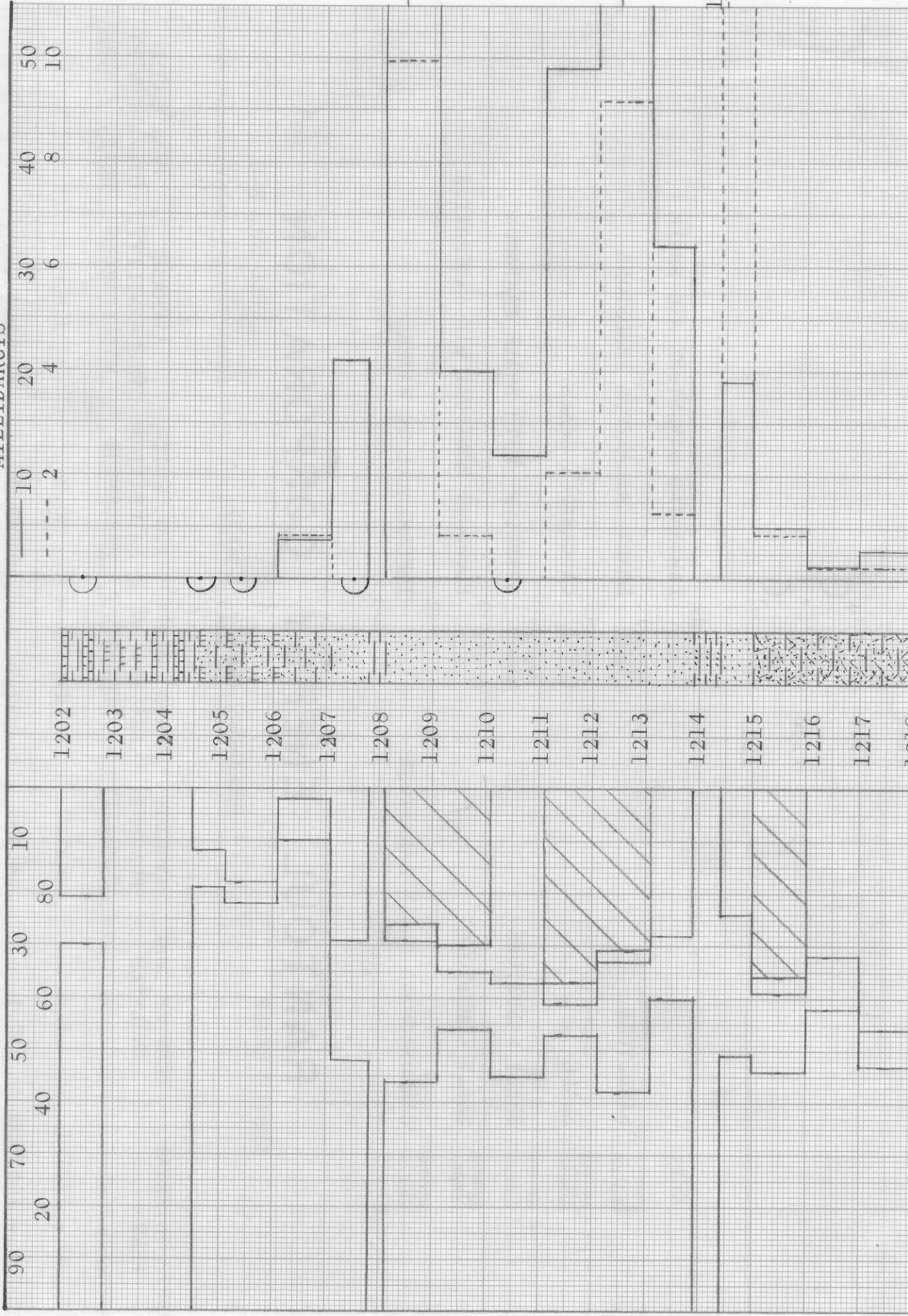
Company	Rantoul Energy Corporation	Lease	Kester	Well No.	8-C
Depth Interval, Feet	1207.1 - 1215.0	1215.0 - 1221.0	1207.1 - 1221.0		
Feet of Core Analyzed	4.0	1.4	5.4		
Average Percent Porosity	18.8	17.0	18.3		
Average Percent Original Oil Saturation	34.5	36.7	35.1		
Average Percent Oil Recovery	3.5	2.7	3.3		
Average Percent Residual Oil Saturation	31.0	34.0	31.8		
Average Percent Residual Water Saturation	57.8	59.1	58.1		
Average Percent Total Residual Fluid Saturation	87.8	93.1	89.9		
Average Original Oil Content, Bbls./A. Ft.	495.	483.	492.		
Average Oil Recovery, Bbls./A. Ft.	49.	36.	46.		
Average Residual Oil Content, Bbls./A. Ft.	446.	447.	446.		
Total Original Oil Content, Bbls./Acre	1,980.	676.	2,656.		
Total Oil Recovery, Bbls./Acre	196.	50.	246.		
Total Residual Oil Content, Bbls./Acre	1,784.	626.	2,410.		
Average Effective Permeability, Millidarcys	5.49	0.64	4.23		
Average Initial Fluid Production Pressure, p.s.i.	23.8	32.5	26.7		

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

1503.0 - 1551.0 16.2 12.3 28.4 34.8 670

WATER SAT., PERCENT → ← OIL SAT., PERCENT

PERMEABILITY, IN MILLIDARCYS
EFFECTIVE PERMEABILITY TO WATER, IN MILLIDARCYS



236

68

16.24

1219
1220
1221

KEY:

SANDSTONE

SHALE

SHALY SANDSTONE

SHALY LIMESTONE

CARBONACEOUS SHALY SANDSTONE

LAMINATED SANDSTONE AND SHALE

SHALY CALCAREOUS SANDSTONE

CALCAREOUS SHALE

SANDSTONE WITH SHALE PARTINGS

FLOODPOT RESIDUAL OIL SATURATION

IMPERMEABLE TO WATER

RANTOUL ENERGY CORPORATION

KESTER LEASE

WELL NO. 8-C

GREENWOOD COUNTY, KANSAS

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
1202.0 - 1207.1	3.4	8.7	12.9	80.2	3.8	
1207.1 - 1215.0	7.1	18.5	32.7	49.2	61.5	
1215.0 - 1221.0	6.0	15.0	30.4	56.9	2.3	
1202.0 - 1221.0	16.5	15.2	27.8	58.4	34.8	910 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS