

OILFIELD RESEARCH LABORATORIES

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

July 2, 1981

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

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary cores taken from the Dunnivan Lease, Well No. B4-D, located in Franklin County, Kansas and submitted to our laboratory on June 24, 1981.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

5 c to Topeka, Kansas

- REGISTERED ENGINEERS -

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

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GENERAL INFORMATION & SUMMARY

Company Rantoul Energy Corporation Lease Dunnivan Well No. B4-D

Location _____

Section 32 Twp. 17S Rge. 21E County Franklin State Kansas

Elevation, Feet

Name of Sand.....	Squirrel	Cattleman
Top of Core	624.0	729.0
Bottom of Core	636.0	741.0
Top of Sand	624.0	729.0
Bottom of Sand	636.0	740.5
Total Feet of Permeable Sand	6.8	5.0
Total Feet of Floodable Sand	0.	1.3

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

SQUIRREL SAND

0 - 10	2.8	2.8
10 - 15	1.3	4.1
25 - 35	1.7	5.8
40 - 45	1.0	6.8

CATTLEMAN SAND

0 - 5	4.0	4.0
30 - 35	1.0	5.0

Average Permeability Millidarcys	16.9	7.1
Average Percent Porosity	16.3	11.9
Average Percent Oil Saturation	26.3	30.0
Average Percent Water Saturation	54.5	59.6
Average Oil Content, Bbls./A. Ft.	337.	285.
Total Oil Content, Bbls./Acre	4,043.	3,281.
Average Percent Oil Recovery by Laboratory Flooding Tests	0.	12.
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	0.	144.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	0.	187.
Total Calculated Oil Recovery, Bbls./Acre	-	See "Cal. Rec." Section

The core was sampled and the samples sealed in plastic bags by a representative of the client.

Since only the Cattleman sand responded to flooding susceptibility tests, a calculated recovery is given for the Cattleman sand only.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
	<u>SQUIRREL SAND</u>
624.0 - 625.0	Hard grayish light brown very shaly sandstone.
625.0 - 625.6	Grayish brown shaly sandstone.
625.6 - 628.9	Light brown slightly calcareous sandstone.
628.9 - 631.3	Hard grayish light brown calcareous very shaly sandstone.
631.3 - 632.1	Grayish light brown calcareous shaly sandstone.
632.1 - 632.8	Light brown slightly calcareous sandstone.
632.8 - 636.0	Hard grayish light brown very shaly sandstone.
	<u>CATTLEMAN SAND</u>
729.0 - 733.7	Grayish light brown slightly calcareous very shaly sandstone.
733.7 - 735.0	Grayish brown shaly sandstone.
735.0 - 736.9	Grayish light brown calcareous very shaly sandstone.
736.9 - 737.9	Grayish brown slightly calcareous slightly shaly sandstone.
737.9 - 740.5	Grayish light brown slightly calcareous very shaly sandstone.
740.5 - 741.0	Gray sandy shale.

LABORATORY FLOODING TESTSCATTLEMAN SAND

The sand in this core responded to laboratory flooding tests, as a total recovery of 187 barrels of oil per acre was obtained from 1.3 feet of sand. The weighted average percent oil saturation was reduced from 57.0 to 45.0, or represents an average recovery of 12.0 percent. The weighted average effective permeability of the samples is 1.10 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 11 samples tested, 1 produced water and oil. This indicates that approximately 9.0 percent of the sand represented by these samples is floodable pay sand.

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CALCULATED RECOVERY

CATTLEMAN 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 150 barrels of oil per acre. This is an average recovery of 116 barrels per acre foot from 1.3 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.04
Reservoir water saturation, percent, estimated	35.0
Average porosity, percent	15.5
Oil saturation after flooding, percent	45.0
Performance factor, percent, estimated	55.0
Net floodable sand, feet	1.3

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company			Rantoul Energy Corporation			Lease			Dunnivan			Well No.			B4-D		
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.								
						SQUIRREL SAND											
1	624.5	15.7	29	60	89	353	Imp.	1.0	1.0	353	0.00						
2	625.4	18.7	34	47	81	493	3.9	0.6	1.6	296	2.34						
3	626.7	21.8	26	51	77	440	11.	1.3	2.9	572	14.30						
4	627.5	22.7	24	52	76	423	29.	1.0	3.9	423	29.00						
5	628.5	24.0	19	57	76	354	42.	1.0	4.9	354	42.00						
6	629.7	15.5	30	60	90	361	0.69	1.4	6.3	505	0.97						
7	630.7	5.4	20	72	92	84	Imp.	1.0	7.3	84	0.00						
8	631.6	18.0	41	36	77	573	6.3	0.8	8.1	458	5.04						
9	632.6	20.1	36	33	69	561	30.	0.7	8.8	393	21.00						
10	633.4	10.1	35	50	85	274	Imp.	1.2	10.0	329	0.00						
11	634.5	12.0	11	52	63	102	Imp.	1.0	11.0	102	0.00						
12	635.6	14.0	16	70	86	174	Imp.	1.0	12.0	174	0.00						
						CATTLEMAN SAND											
13	729.6	10.6	3	87	90	25	Imp.	1.0	1.0	25	0.00						
14	730.5	11.1	10	80	90	86	Imp.	1.0	2.0	86	0.00						
15	731.6	10.3	20	73	93	160	Imp.	1.0	3.0	160	0.00						
16	732.7	16.9	35	58	93	459	Imp.	1.0	4.0	459	0.00						
17	733.6	16.6	47	42	89	605	0.62	0.7	4.7	424	0.43						
18	734.8	15.4	57	38	95	681	2.1	1.3	6.0	885	2.73						
19	735.6	5.1	40	50	90	158	Imp.	1.0	7.0	158	0.00						
20	736.6	9.4	47	47	94	343	0.89	0.9	7.9	309	0.80						
21	737.7	15.3	18	50	68	213	31.	1.0	8.9	213	31.00						
22	738.5	11.7	20	72	92	182	0.71	1.1	10.0	200	0.78						
23	739.6	9.7	32	58	90	241	Imp.	1.5	11.5	362	0.00						

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Rantoul Energy Corporation			Lease	Dunnivan	Well No.	B4-D
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.			
<u>SQUIRREL SAND</u>						
624.0 - 628.9	3.9	22.5	87.64			
628.9 - 636.0	2.9	9.3	27.01			
624.0 - 636.0	6.8	16.9	114.65			
<u>CATTLEMAN SAND</u>						
729.0 - 740.5	5.0	7.1	35.74			
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>SQUIRREL SAND</u>						
624.0 - 628.9	4.9	20.8	25.8	53.8	408	1,998
628.9 - 636.0	7.1	13.2	26.6	54.9	288	2,045
624.0 - 636.0	12.0	16.3	26.3	54.5	337	4,043
<u>CATTLEMAN SAND</u>						
729.0 - 740.5	11.5	11.9	30.0	59.6	285	3,281

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Well No. B4-D

Lease Dunnivan

Rantoul Energy Corporation

Company

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.	%	Water				
			SQUIRREL SAND									
1	624.5	15.8	29	355	0	0	29	62	355	0	Imp.	-
2	625.4	18.8	34	496	0	0	34	48	496	0	Imp.	-
3	626.7	21.9	26	442	0	0	26	65	442	94	1.17	20
4	627.5	22.8	24	425	0	0	24	54	425	142	1.95	20
5	628.5	23.9	19	352	0	0	19	74	352	172	2.25	20
6	629.7	15.1	31	363	0	0	31	60	363	0	Imp.	-
7	630.7	5.5	20	85	0	0	20	73	85	0	Imp.	-
8	631.6	17.9	41	569	0	0	41	37	569	0	Imp.	-
9	632.6	20.0	36	559	0	0	36	34	559	0	Imp.	-
10	633.4	10.2	35	277	0	0	35	51	277	0	Imp.	-
11	634.5	11.5	12	107	0	0	12	52	107	0	Imp.	-
12	635.6	13.9	16	173	0	0	16	71	173	0	Imp.	-
			CATTLEMAN SAND									
13	729.6	10.5	3	24	0	0	3	88	24	0	Imp.	-
14	730.5	11.0	10	85	0	0	10	81	85	0	Imp.	-
15	731.6	10.4	20	161	0	0	20	74	161	0	Imp.	-
16	732.7	16.8	35	456	0	0	35	59	456	0	Imp.	-
17	733.6	16.5	47	602	0	0	47	43	602	0	Imp.	-
18	734.8	15.5	57	685	12	144	45	50	541	92	1.10	35
19	735.6	5.2	40	161	0	0	40	51	161	0	Imp.	-
20	736.6	9.3	47	339	0	0	47	48	339	0	Imp.	-
21	737.7	15.8	17	208	0	0	17	52	208	0	Imp.	-
22	738.5	11.6	20	180	0	0	20	73	180	0	Imp.	-
23	739.6	9.6	32	238	0	0	32	59	238	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

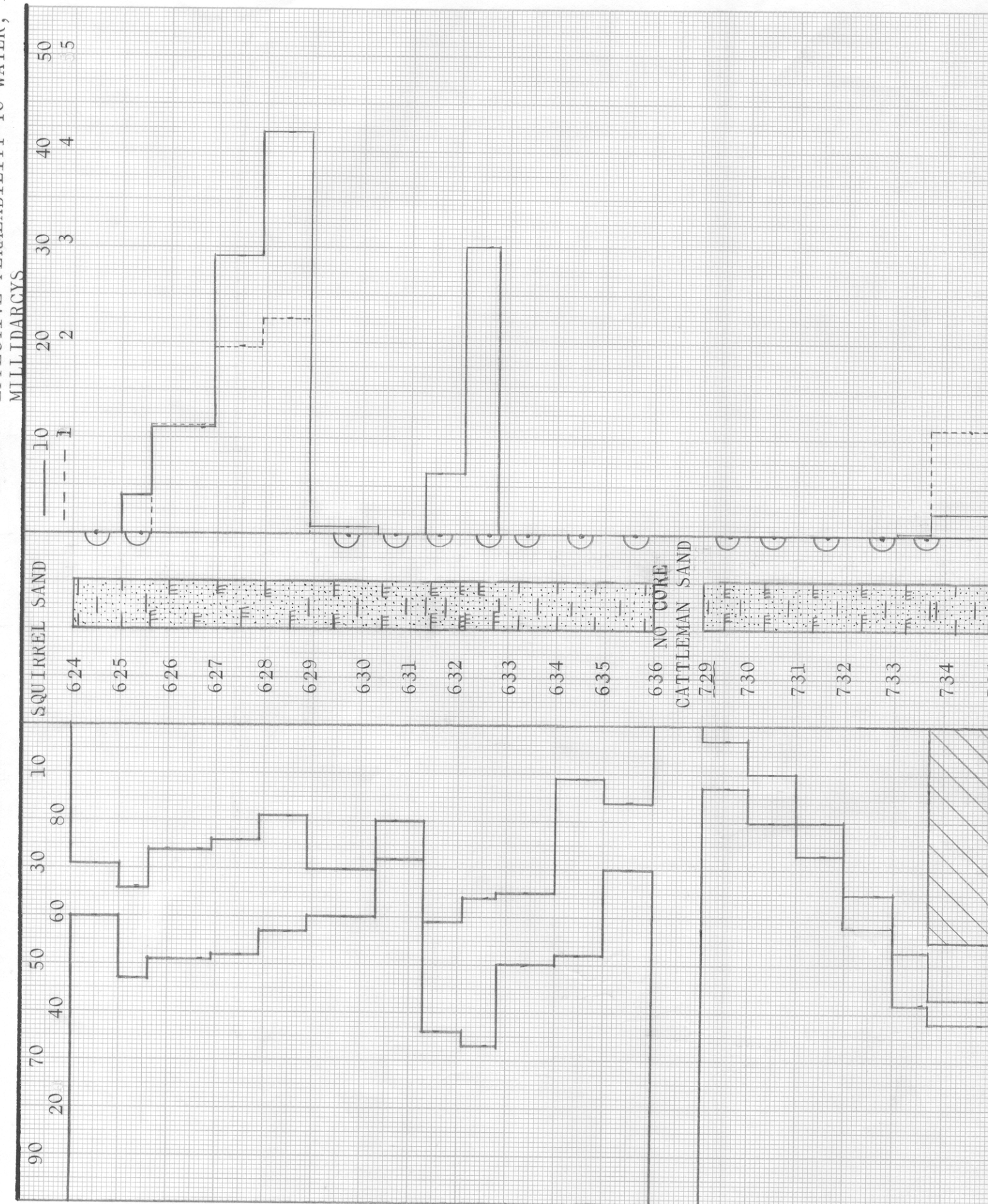
Company	Rantoul Energy Corporation	Lease	Dunnivan	Well No.	B4-D
Depth Interval, Feet		<u>CATTLEMAN SAND</u>			
		729.0 - 740.5			
Feet of Core Analyzed		1.3			
Average Percent Porosity		15.5			
Average Percent Original Oil Saturation		57.0			
Average Percent Oil Recovery		12.0			
Average Percent Residual Oil Saturation		45.0			
Average Percent Residual Water Saturation		50.0			
Average Percent Total Residual Fluid Saturation		95.0			
Average Original Oil Content, Bbls./A. Ft.		685.			
Average Oil Recovery, Bbls./A. Ft.		144.			
Average Residual Oil Content, Bbls./A. Ft.		541.			
Total Original Oil Content, Bbls./Acre		890.			
Total Oil Recovery, Bbls./Acre		187.			
Total Residual Oil Content, Bbls./Acre		703.			
Average Effective Permeability, Millidarcys		1.10			
Average Initial Fluid Production Pressure, p.s.i.		35.			

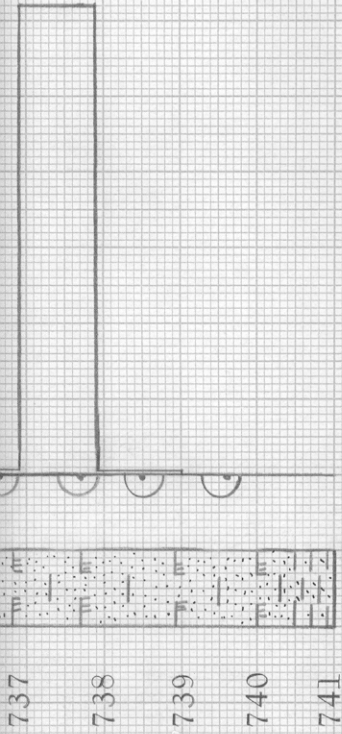
NOTE: Only those samples which recovered oil were used in calculating the above averages.

WATER SAT.,
PERCENT

OIL SAT.,
PERCENT

PERMEABILITY, IN MILLIDARCYS
EFFECTIVE PERMEABILITY TO WATER, IN
MILLIDARCYS





KEY:

SHALY SANDSTONE

SANDY SHALE

CALCAREOUS SANDSTONE

FLOODPOT RESIDUAL OIL SATURATION

SHALY CALCAREOUS SANDSTONE

IMPERMEABLE TO WATER

RANTOUL ENERGY CORPORATION

DUNNIVAN LEASE

FRANKLIN COUNTY, KANSAS

WELL NO. B4-D

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

SQUIRREL SAND

624.0 - 628.9 4.9 20.8 25.8 53.8 22.5

628.9 - 636.0 7.1 13.2 26.6 54.9 9.3

624.0 - 636.0 12.0 10.5 26.3 54.5 16.9

CATTLEMAN SAND

729.0 - 740.5 11.5 11.9 30.0 59.6 7.1

150
(PRIMARY AND
WATERFLOODING)