

OILFIELD RESEARCH LABORATORIES

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

June 10, 1982

Worldwide Bearmount
P.O. Box 707
Chanute, Kansas 66720

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Bruenger I Lease, Well No. 3, located in Allen County, Kansas and submitted to our laboratory on June 5, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES



Sanford A. Michel

SAM/dlb

5 c to Chanute, Kansas

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Worldwide Bearmount Lease Bruenger I Well No. 3

Location _____

Section 7 Twp. 26S Rge. 19E County Allen State Kansas

Elevation, Feet

Name of Sand.....

Cattleman

Top of Core

761.0

Bottom of Core

839.0

Top of Sand

761.0

Bottom of Sand

839.0

Total Feet of Permeable Sand

28.0

Total Feet of Floodable Sand

5.0

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 5	14.4	14.4
5 - 10	3.6	18.0
10 - 30	5.0	23.0
30 - 50	4.0	27.0
80 - 85	1.0	28.0

Average Permeability Millidarcys

13.5

Average Percent Porosity

16.1

Average Percent Oil Saturation

40.1

Average Percent Water Saturation.....

44.7

Average Oil Content, Bbls./A. Ft.

522.

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

14,613.

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

5.0

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

74.

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

368.

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 was used as a drilling fluid. The core was reported to be from a virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval,</u> <u>Feet</u>	<u>Description</u>
761.0 - 770.0	Dark brown sandstone.
770.0 - 777.0	Gray slightly sandy shale.
777.0 - 819.0	No core
819.0 - 820.7	Brown shaly sandstone.
820.7 - 822.3	Brown slightly shaly sandstone.
822.3 - 823.5	Grayish brown shaly sandstone.
823.5 - 826.0	Grayish brown very shaly sandstone.
826.0 - 827.0	Brown sandstone.
827.0 - 828.0	Grayish brown shaly sandstone.
828.0 - 831.0	Grayish brown very shaly sandstone.
831.0 - 832.0	Grayish brown shaly sandstone.
832.0 - 833.0	Gray sandy shale.
833.0 - 835.0	Brown slightly shaly sandstone.
835.0 - 835.7	Brown very shaly sandstone.
835.7 - 836.7	Brown shaly sandstone.
836.7 - 837.8	Grayish brown very shaly sandstone.
837.8 - 839.0	Brown shaly sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 368 barrels of oil per acre was obtained from 5.0

feet of sand. The weighted average percent oil saturation was reduced from 50.0 to 45.0, or represents an average recovery of 5.0 percent. The weighted average effective permeability of the samples is 0.66 millidarcys, while the average initial fluid production pressure is 37.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 27 samples tested, 5 produced water and oil, and 3 produced water only. This indicates that approximately 19 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 1,170 barrels of oil per acre. This is an average recovery of 233 barrels per acre foot from 5.0 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.06
Reservoir water saturation, percent, estimated	15.0
Average porosity, percent	19.0
Oil saturation after flooding, percent	45.0
Performance factor, percent, estimated	45.0
Net floodable sand, feet	5.0

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Worldwide Bearmount Lease Bruenger I Well No. 3

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbbls. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water	Total			Ft.	Cum. Ft.		
1	761.5	18.6	42	34	76	606	11.	1.0	1.0	606	11.00
2	762.4	17.7	58	36	94	796	27.	1.0	2.0	796	27.00
3	763.6	20.2	52	16	68	815	83.	1.0	3.0	815	83.00
4	764.6	20.5	53	28	81	843	49.	1.0	4.0	843	49.00
5	765.6	16.9	59	25	84	774	21.	1.0	5.0	774	21.00
6	766.4	16.6	54	29	83	695	31.	1.0	6.0	695	31.00
7	767.5	19.0	46	28	74	678	43.	1.0	7.0	678	43.00
8	768.4	17.8	45	30	75	621	30.	1.0	8.0	621	30.00
9	769.6	17.1	60	35	95	796	23.	1.0	9.0	796	23.00
10	819.4	15.8	34	53	87	417	3.1	1.0	10.0	417	3.10
11	820.5	15.6	35	46	81	424	4.7	0.7	10.7	297	3.29
12	821.5	15.4	53	32	85	633	6.3	1.6	12.3	1013	10.08
13	822.5	13.8	33	57	90	353	1.2	1.2	13.5	424	1.44
14	824.6	13.2	30	63	93	307	0.36	1.5	15.0	461	0.54
15	825.5	13.5	17	72	89	178	0.42	1.0	16.0	178	0.42
16	826.7	14.2	62	33	95	683	15.	1.0	17.0	683	15.00
17	827.5	13.6	43	50	93	454	2.2	1.0	18.0	454	2.20
18	828.6	13.0	7	80	87	71	0.63	1.0	19.0	71	0.63
19	829.5	13.9	36	61	97	388	0.36	1.0	20.0	388	0.36
20	830.6	14.4	19	60	79	212	0.55	1.0	21.0	212	0.55
21	831.4	17.1	23	51	74	305	3.0	1.0	22.0	305	3.00
22	833.6	18.8	32	40	72	467	6.0	1.0	23.0	467	6.00
23	834.4	19.1	34	43	77	504	6.3	1.0	24.0	504	6.30
24	835.5	14.1	34	55	89	372	0.57	0.7	24.7	260	0.40
25	836.4	15.8	32	55	87	392	1.5	1.0	25.7	392	1.50
26	837.5	14.7	44	50	94	502	0.76	1.1	26.8	552	0.84
27	838.4	16.0	41	44	85	509	2.5	1.2	28.0	611	3.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		Lease		Well No.	
Worldwide Bearmount		Bruenger I		3	
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
761.0 - 770.0	9.0	35.3	318.00		
819.0 - 839.0	19.0	3.1	58.65		
761.0 - 839.0	28.0	13.5	376.65		

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
761.0 - 770.0	9.0	18.3	52.1	29.0	736	6,624
819.0 - 839.0	19.0	15.1	34.4	52.1	420	7,989
761.0 - 839.0	28.0	16.1	40.1	44.7	522	14,613

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Worldwide Bearmount										Lease		Bruenger I		Well No.		3	
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	761.5	18.6	42	606	3	43	39	42	12	0.15	45						
2	762.4	17.8	58	801	9	124	49	46	22	0.33	35						
3	763.6	20.3	52	819	6	94	46	38	86	1.87	30						
4	764.6	20.4	53	839	5	79	48	38	54	0.82	30						
5	765.6	17.3	58	778	0	0	58	26	0	Imp.	-						
6	766.4	16.8	54	704	0	0	54	41	8	0.15	50						
7	767.5	18.5	47	675	0	0	47	27	0	Imp.	-						
8	768.4	17.9	45	625	2	28	43	42	8	0.15	45						
9	769.6	17.0	60	791	0	0	60	35	0	Imp.	-						
10	819.4	15.7	34	414	0	0	34	54	0	Imp.	-						
11	820.5	15.1	36	422	0	0	36	45	0	Imp.	-						
12	821.5	15.4	53	633	0	0	53	33	0	Imp.	-						
13	822.5	13.9	33	356	0	0	33	58	0	Imp.	-						
14	824.6	13.4	30	312	0	0	30	64	0	Imp.	-						
15	825.5	14.0	16	174	0	0	16	73	0	Imp.	-						
16	826.7	14.3	62	688	0	0	62	34	35	1.33	35						
17	827.5	13.5	43	450	0	0	43	49	0	Imp.	-						
18	828.6	13.6	7	74	0	0	7	81	0	Imp.	-						
19	829.5	14.0	36	391	0	0	36	60	0	Imp.	-						
20	830.6	14.4	19	212	0	0	19	61	0	Imp.	-						
21	831.4	17.6	22	300	0	0	22	52	0	Imp.	-						
22	833.6	18.7	32	464	0	0	32	40	0	Imp.	-						
23	834.4	19.1	34	504	0	0	34	44	0	Imp.	-						
24	835.5	13.6	35	369	0	0	35	54	0	Imp.	-						
25	836.4	15.7	32	390	0	0	32	56	0	Imp.	-						
26	837.5	14.8	44	505	0	0	44	50	0	Imp.	-						
27	838.4	16.5	40	512	0	0	40	45	78	0.80	20						

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.

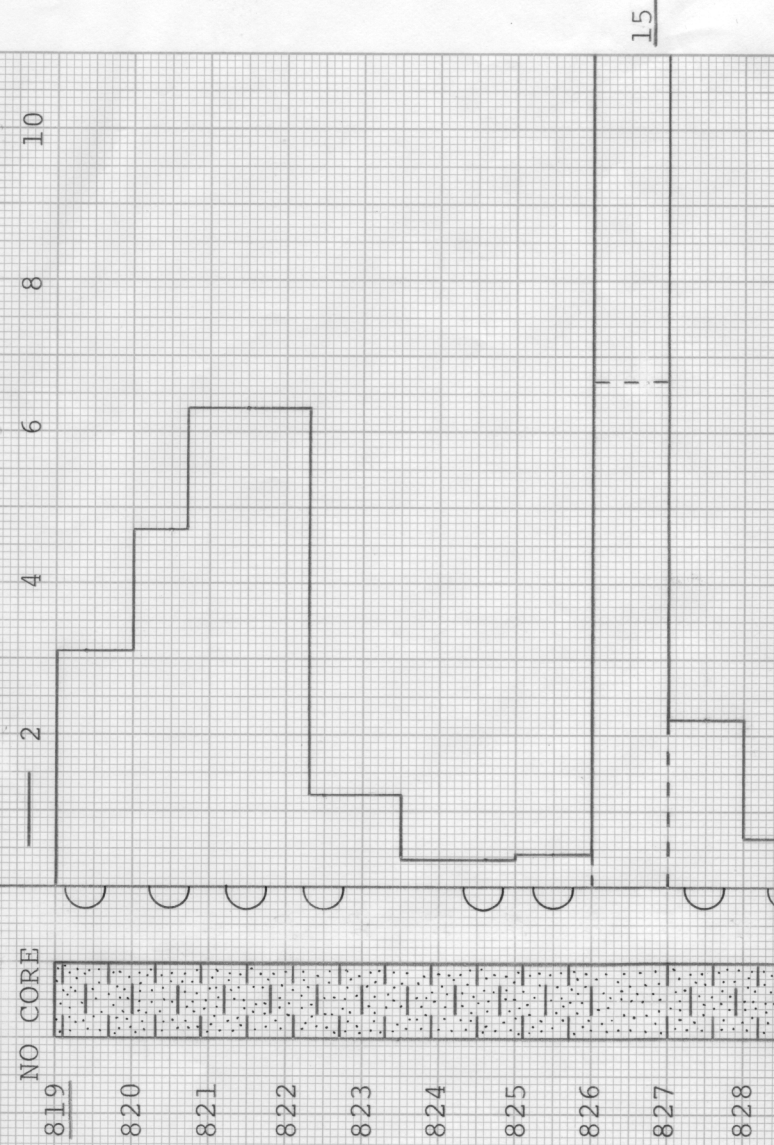
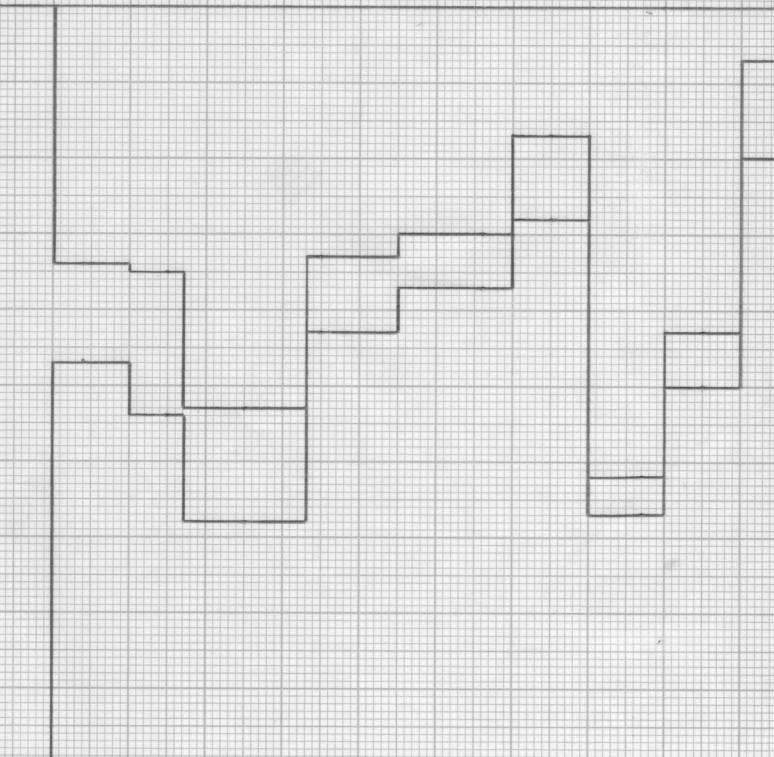
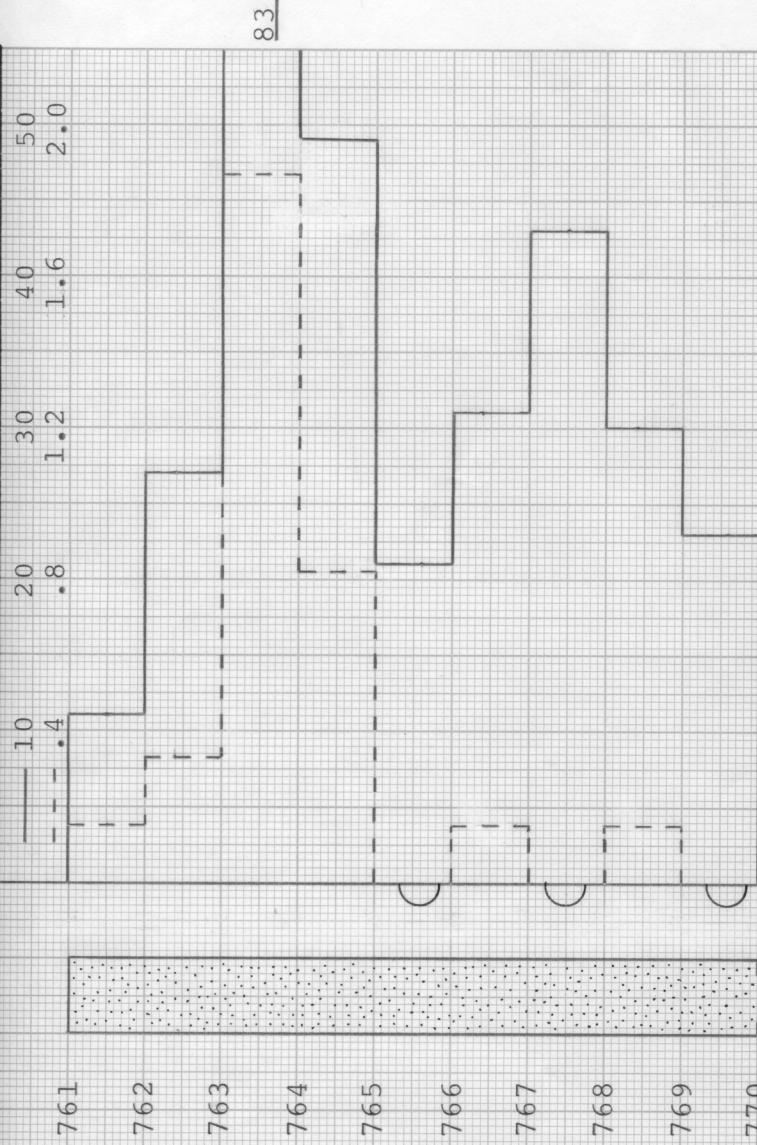
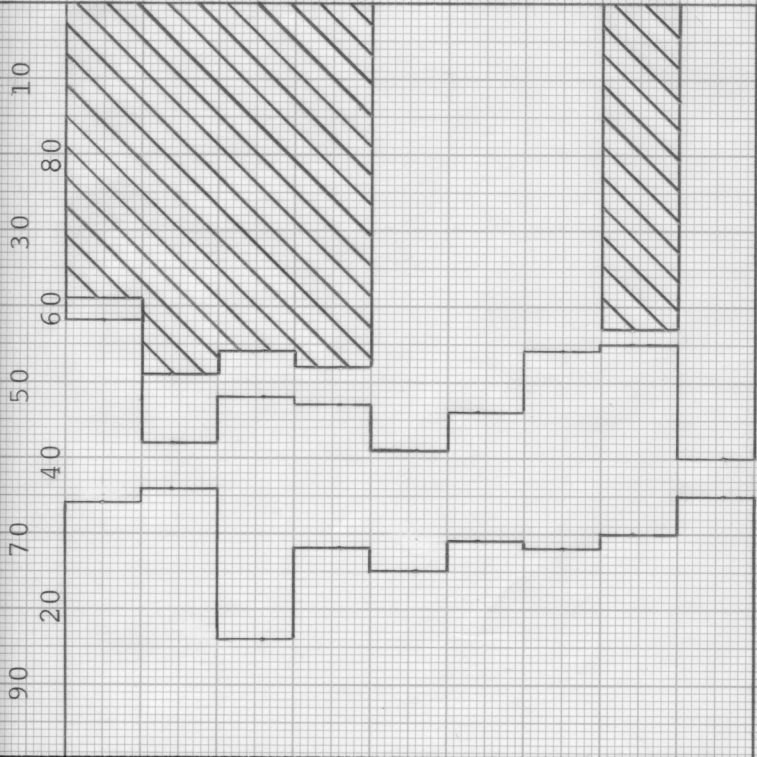
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SUMMARY OF LABORATORY FLOODING TESTS

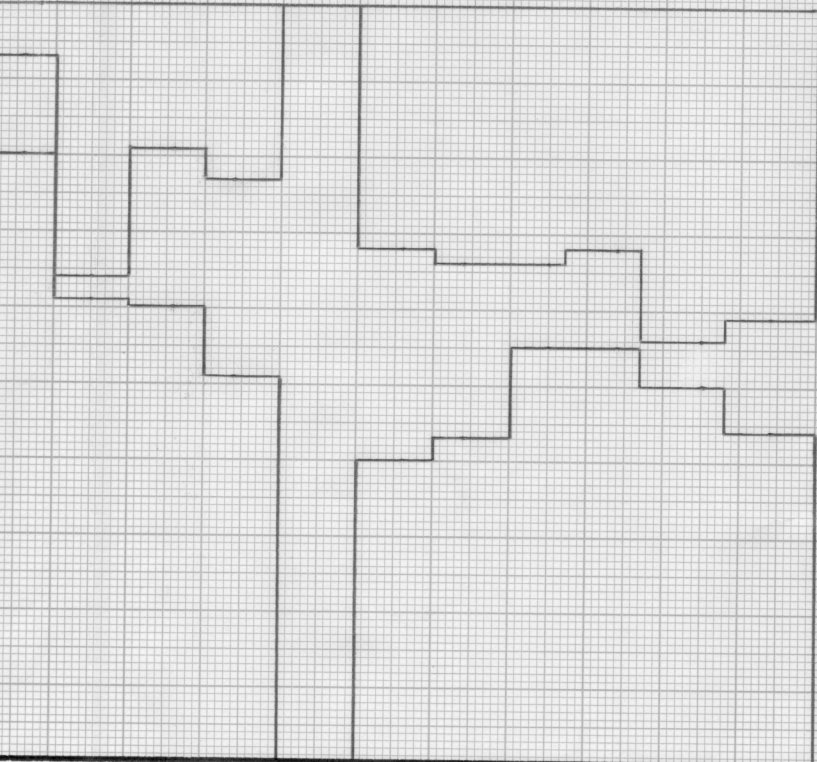
TABLE V

Company	Worldwide Bearmount	Lease	Bruenger I	Well No.	3
Depth Interval, Feet	761.0 - 770.0				
Feet of Core Analyzed	5.0				
Average Percent Porosity	19.0				
Average Percent Original Oil Saturation	50.0				
Average Percent Oil Recovery	5.0				
Average Percent Residual Oil Saturation	45.0				
Average Percent Residual Water Saturation	41.2				
Average Percent Total Residual Fluid Saturation	86.2				
Average Original Oil Content, Bbls./A. Ft.	738.				
Average Oil Recovery, Bbls./A. Ft.	74.				
Average Residual Oil Content, Bbls./A. Ft.	664.				
Total Original Oil Content, Bbls./Acre	3,690.				
Total Oil Recovery, Bbls./Acre	368.				
Total Residual Oil Content, Bbls./Acre	3,322.				
Average Effective Permeability, Millidarcys	0.66				
Average Initial Fluid Production Pressure, p.s.i.	37.0				

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



829
830
831
832
833
834
835
836
837
838
839



KEY:



SANDSTONE



SHALY SANDSTONE



SANDY SHALE



FLOODPOT RESIDUAL OIL SATURATION



IMPERMEABLE TO WATER

WORLDWIDE BEARMOUNT

BRUENGER I LEASE

WELL NO. 3

ALLEN COUNTY, KANSAS

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY BBLs. / ACRE
761.0 - 770.0	9.0	18.3	52.1	29.0	35.3	
819.0 - 839.0	19.0	15.1	34.4	52.1	3.1	
761.0 - 839.0	28.0	16.1	40.1	44.7	13.5	1170 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
JUNE, 1982.

AMD