

OILFIELD RESEARCH LABORATORIES

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

April 29, 1982

Fred C. Berckefeldt
3820 Worwick Town Road
Topeka, Kansas 66610

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Hanna Lease, Well No. 2, Wilson County, Kansas, and submitted to our laboratory on April 26, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/tem

10 c to Topeka, KS

Oilfield Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Fred C. Berckefeldt Lease Hanna Well No. 2
 Location -
 Section 17 Twp. 30S Rge. 16E County Wilson State Kansas

Elevation, Feet

Name of Sand.....

Bartlesville

Top of Core

785.0

Bottom of Core

794.6

Top of Sand

785.0

Bottom of Sand

792.2

Total Feet of Permeable Sand

6.0

Total Feet of Floodable Sand

2.0

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

0 - 8

2.8

2.8

13 - 19

3.2

6.0

Average Permeability Millidarcys

10.1

Average Percent Porosity

14.5

Average Percent Oil Saturation

31.6

Average Percent Water Saturation

49.6

Average Oil Content, Bbls./A. Ft.

354.

Total Oil Content, Bbls./Acre

2,548.

Average Percent Oil Recovery by Laboratory Flooding Tests

2.5

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

29.

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

58.

Total Calculated Oil Recovery, Bbls./Acre

See "Calculated Recovery" Section.

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The core was sampled and the samples sealed in plastic bags by a representative of the client. Fresh water mud was used as a drilling fluid.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
785.0 - 786.0	Grayish brown very shaly sandstone.
786.0 - 787.0	Brown slightly shaly sandstone.
787.0 - 790.2	Brownish black sandstone.
790.2 - 791.0	Grayish brown shaly sandstone.
791.0 - 792.2	Grayish brown very shaly sandstone.
792.2 - 794.6	Gray shale.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 58 barrels of oil per acre was obtained from 2.0 feet of sand. The weighted average percent oil saturation was reduced from 27.0 to 24.5, or represents an average recovery of 2.5 percent. The weighted average effective permeability of the samples is 1.67 millidarcys, while the average initial fluid production pressure is 15.0 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 7 samples tested, 2 produced water and oil, and 2 produced water only. This indicates that approximately 29 percent of the sand represented by these samples is floodable pay sand.

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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 370 barrels of oil per acre. This is an average recovery of 185 barrels per acre foot from 2.0 feet of floodable sand analyzed in this core.

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

Original formation volume factor, estimated	1.08
Reservoir water saturation, percent, estimated	45.0
Average porosity, percent	15.0
Oil saturation after flooding, percent	24.5
Performance factor, percent, estimated	60.0
Net floodable sand, feet	2.0

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Fred C. Berckefeldt Lease Hanna Well No. 2

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	785.6	14.3	34	50	84	377	0.76	1.0	1.0	377	0.76
2	786.7	15.1	28	56	84	328	7.7	1.0	2.0	328	7.70
3	787.6	14.7	26	54	80	297	15.	1.0	3.0	297	15.00
4	788.6	14.0	22	63	85	239	18.	1.0	4.0	239	18.00
5	789.5	14.5	21	55	76	236	13.	1.2	5.2	283	15.60
6	790.5	14.1	43	34	77	470	4.1	0.8	6.0	376	3.28
7	791.4	14.5	48	34	82	540	Imp.	1.2	7.2	648	0.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		Lease		Well No.	
Fred C. Berckefeldt		Hanna		2	
Depth Interval, Feet	Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.	Total Oil Content Bbls./Acre
785.0 - 790.2	785.0 - 790.2	5.2	11.0	57.06	1,524
790.2 - 792.2	790.2 - 792.2	0.8	4.1	3.28	1,024
785.0 - 792.2	785.0 - 792.2	6.0	10.1	60.34	2,548

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
785.0 - 790.2	5.2	14.5	26.0	55.6	293	1,524
790.2 - 792.2	2.0	14.4	46.0	34.0	512	1,024
785.0 - 792.2	7.2	14.5	31.6	49.6	354	2,548

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company		Fred C. Berckefeldt		Lease		Hanna		Well No.		2	
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	785.6	14.8	33	379	0	0	33	51	0	Imp.	-
2	786.7	15.2	28	330	2	24	26	71	166	2.17	15
3	787.6	14.8	26	299	3	34	23	67	100	1.17	15
4	788.6	14.5	21	236	0	0	21	70	216	2.67	15
5	789.5	14.7	21	239	0	0	21	73	138	3.19	15
6	790.5	14.2	43	474	0	0	43	35	0	Imp.	-
7	791.4	14.4	48	536	0	0	48	33	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.

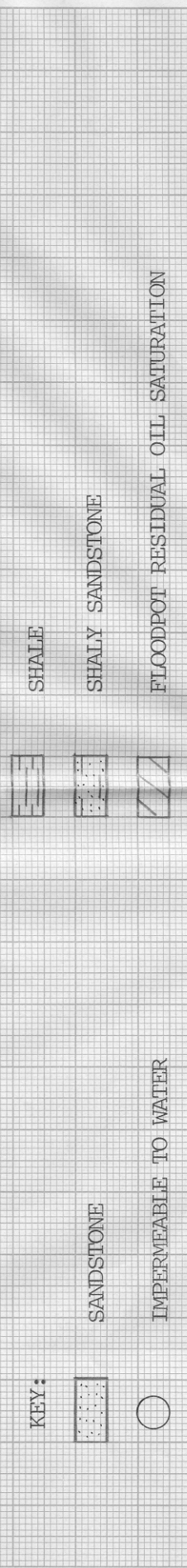
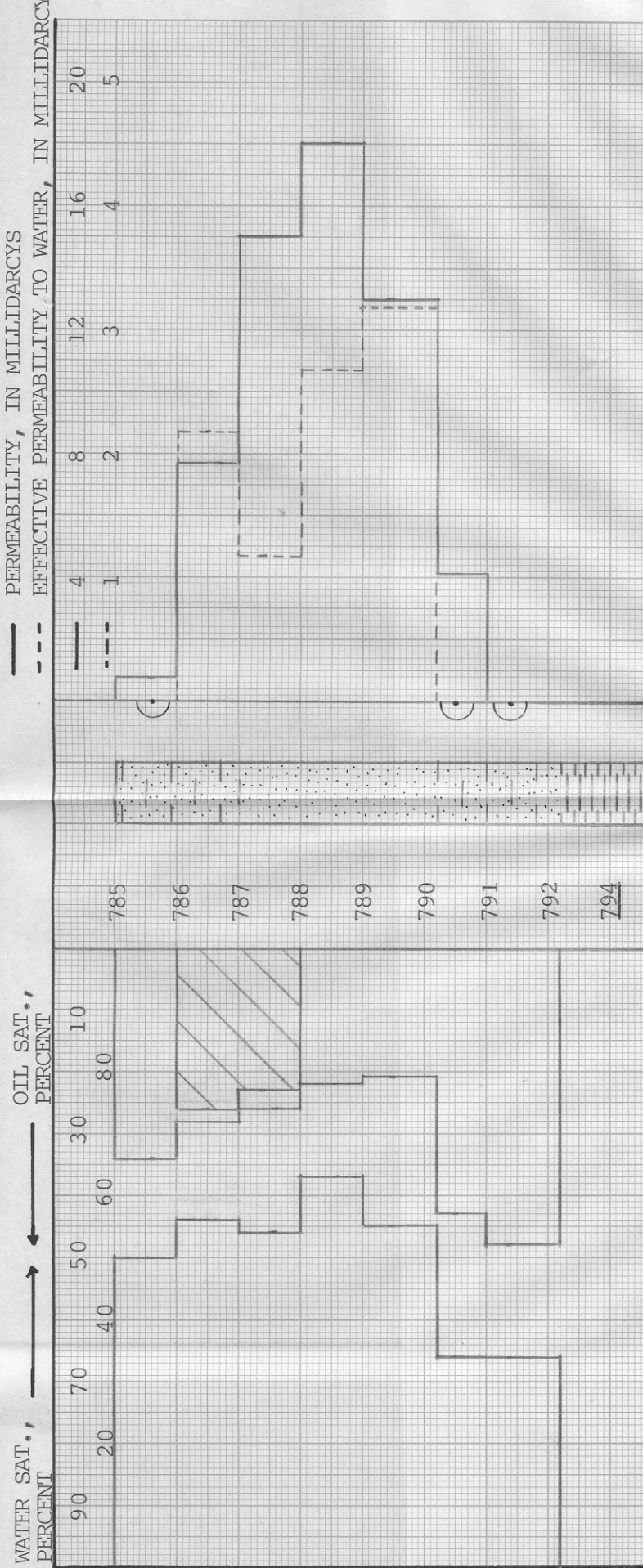
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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Fred C. Berckefeldt	Lease	Hanna	Well No.	2
Depth Interval, Feet	785.0 - 790.2				
Feet of Core Analyzed	2.0				
Average Percent Porosity	15.0				
Average Percent Original Oil Saturation	27.0				
Average Percent Oil Recovery	2.5				
Average Percent Residual Oil Saturation	24.5				
Average Percent Residual Water Saturation	69.0				
Average Percent Total Residual Fluid Saturation	93.5				
Average Original Oil Content, Bbls./A. Ft.	315.				
Average Oil Recovery, Bbls./A. Ft.	29.				
Average Residual Oil Content, Bbls./A. Ft.	286.				
Total Original Oil Content, Bbls./Acre	629.				
Total Oil Recovery, Bbls./Acre	58.				
Total Residual Oil Content, Bbls./Acre	571.				
Average Effective Permeability, Millidarcys	1.67				
Average Initial Fluid Production Pressure, p.s.i.	15.0				

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



FRED C. BERCKEFELDT

HANNA LEASE		WILSON COUNTY, KANSAS		WELL NO. 2		
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

FRED C. BERCKEFELDT

HANNA LEASE

WELL NO. 2

WILSON 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
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785.0 - 790.2

14.5

26.0

55.6

11.0

790.2 - 792.2

14.4

46.0

34.0

4.1

785.0 - 792.2

14.5

31.6

49.6

10.1

370
(PRIMARY AND
WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
APRIL, 1982

PDC