

CORE LABORATORIES, INC.  
*Petroleum Reservoir Engineering*  
DALLAS, TEXAS

CORE ANALYSIS REPORT

FOR

PENNZOIL COMPANY

YAWKEY-FREEMAN NO. 114 WELL  
YAWKEY-FREEMAN FIELD  
BOONE COUNTY, WEST VIRGINIA

CRDS  
4700501092  
0651092

7501 STEMMERS FUEL...  
CORE LABORATORIES, INC.



P. O. Box 131  
Mt. Pleasant, Mich. 48858  
July 6, 1978

File No. 3602-391

Pennzoil Company  
P. O. Drawer 1588  
Parkersburg, W. Va. 26101

Att: Mr. John Blomberg

Re: Core Analysis Report  
Berea Sandstone Formation  
Yawkey-Freeman No. 114 Well  
Yawkey-Freeman Field  
Boone Co., W. Va.

Gentlemen:

A diamond core from this well between the depths of 2145 feet and 2171 feet has been received in our Michigan laboratory for full diameter analyses. In addition to the routine porosity and permeability measurements, a cylindrical plug was drilled from seven of the full diameter samples horizontal to bedding for permeability determination. Results of these analyses are herein submitted in tabular and graphical form.

The core from this well is being returned to your office via motor freight. The opportunity to have been of service on this well is appreciated and please call if you have any questions.

Very truly yours,

CORE LABORATORIES, INC.

A handwritten signature in cursive script, appearing to read "Mabre Maness".

Mabre Maness  
District Manager

er  
encl.

CORE LABORATORIES, INC.  
Petroleum Reservoir Engineering  
DALLAS, TEXAS

PENNZOIL COMPANY  
YAWKEY-FREEMAN NO. 114 WELL  
YAWKEY-FREEMAN FIELD  
BOONE COUNTY, W. VA.

DATE: 6-21-78  
FORMATION: BEREA SANDSTONE  
DRLG. FLUID: FRESH WATER GEL  
LOCATION:

FILE NO: 3602-391  
ENGINEER: ANTWINE  
ELEVATION:

\* INDICATES PLUG PERM

S INDICATES PRESERVED SAMPLE

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	PLUG	POROSITY GEX. FLD.	FLUID SATS. OIL WTR.	GR. DEN.	DESCRIPTION
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FULL DIAMETER AND PLUG ANALYSIS

1	2145.0-46.0	<0.1	<0.1	<0.1	5.2		2.78	SD, PYRITE
2	2146.0-47.0	0.4	0.3		6.1		2.67	SD, PYRITE
3	2147.0-48.0	0.8	0.8		8.8		2.67	SD
4	2148.0-49.0	0.3	0.2		8.8		2.68	SD
5	2149.0-50.0	0.4	0.3	1.7	8.3		2.69	SD
6	2150.0-51.0	0.6	0.6		8.4		2.69	SD
7	2151.0-52.0	1.0	0.8		8.4	2151.1-2151.4	2.69	SD
8	2152.0-53.0	1.1	0.8		8.3		2.70	SD, LMY
9	2153.0-54.0	0.9	0.7	0.4	7.6		2.68	SD
10	2154.0-55.0	0.6	0.4		7.4	2154.2-2155.3	2.69	SD
11	2155.0-56.0	0.1	<0.1		5.0		2.65	SD
12	2156.0-57.0	0.2	0.1		5.8		2.66	SD
13	2157.0-58.0	0.1	0.1	0.2	5.2	2157.5-2158.3	2.66	SD
14	2158.0-59.0	0.2	0.1		6.7		2.69	SD
15	2159.0-60.0	0.2	0.2		7.1		2.69	SD
16	2160.0-61.0	0.1	<0.1		6.2		2.67	SD
17	2161.0-62.0	0.2	0.2	0.2	7.2		2.71	SD, LMY
18	2162.0-63.0	0.1	<0.1		5.6		2.69	SD
19	2163.0-64.0	<0.1	<0.1		5.7		2.67	SD
20	2164.0-65.0	<0.1	<0.1		6.1		2.68	SD
21	2165.0-66.0	<0.1	<0.1	<0.1	6.0		2.69	SD
22	2166.0-67.0	<0.1	<0.1		5.1		2.71	SD, LMY
23	2167.0-68.0	<0.1	<0.1		5.7		2.82	SD, PYRITE
24	2168.0-69.0	<0.1	<0.1		4.9		2.67	SD
25	2169.0-70.0	0.1	<0.1	<0.1	5.9		2.68	SD
26	2170.0-71.0	<0.1	<0.1		1.4		2.68	SD

PLUG PERMEABILITY IS HORIZONTAL

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations, as to the productivity, proper operations, or profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

**CORE LABORATORIES, INC.**  
*Petroleum Reservoir Engineering*  
 DALLAS, TEXAS

PERMEABILITY VS POROSITY

COMPANY: PENNZOIL COMPANY  
 FIELD : YAWKEY-FREEMAN FIELD

WELL : YAWKEY-FREEMAN NO. 114 WELL  
 COUNTY, STATE: BOONE COUNTY, W. VA.

AIR PERMEABILITY : MD - 90 DEGREE ( UNCORRECTED FOR SLIPPAGE )  
 POROSITY : PERCENT ( GAS EXPANSION )

DEPTH INTERVAL	RANGE & SYMBOL	PERMEABILITY		POROSITY		POROSITY AVERAGE	PERMEABILITY AVERAGES		
		MAXIMUM	MINIMUM	MAX.	MIN.		ARITHMETIC	HARMONIC	GEOMETRIC
2145.0 - 2170.0	1 (.)	10.0	0.10	10.0	5.0	7.4	0.40	0.22	0.30

EQUATION OF LINE RELATING PERMEABILITY TO POROSITY :  
 $\text{LOG } K = (\text{SLOPE})(\text{POROSITY}) + \text{LOG OF INTERCEPT}$   
 $K = \text{ANTILOG}((\text{SLOPE})(\text{POROSITY}) + \text{LOG OF INTERCEPT})$

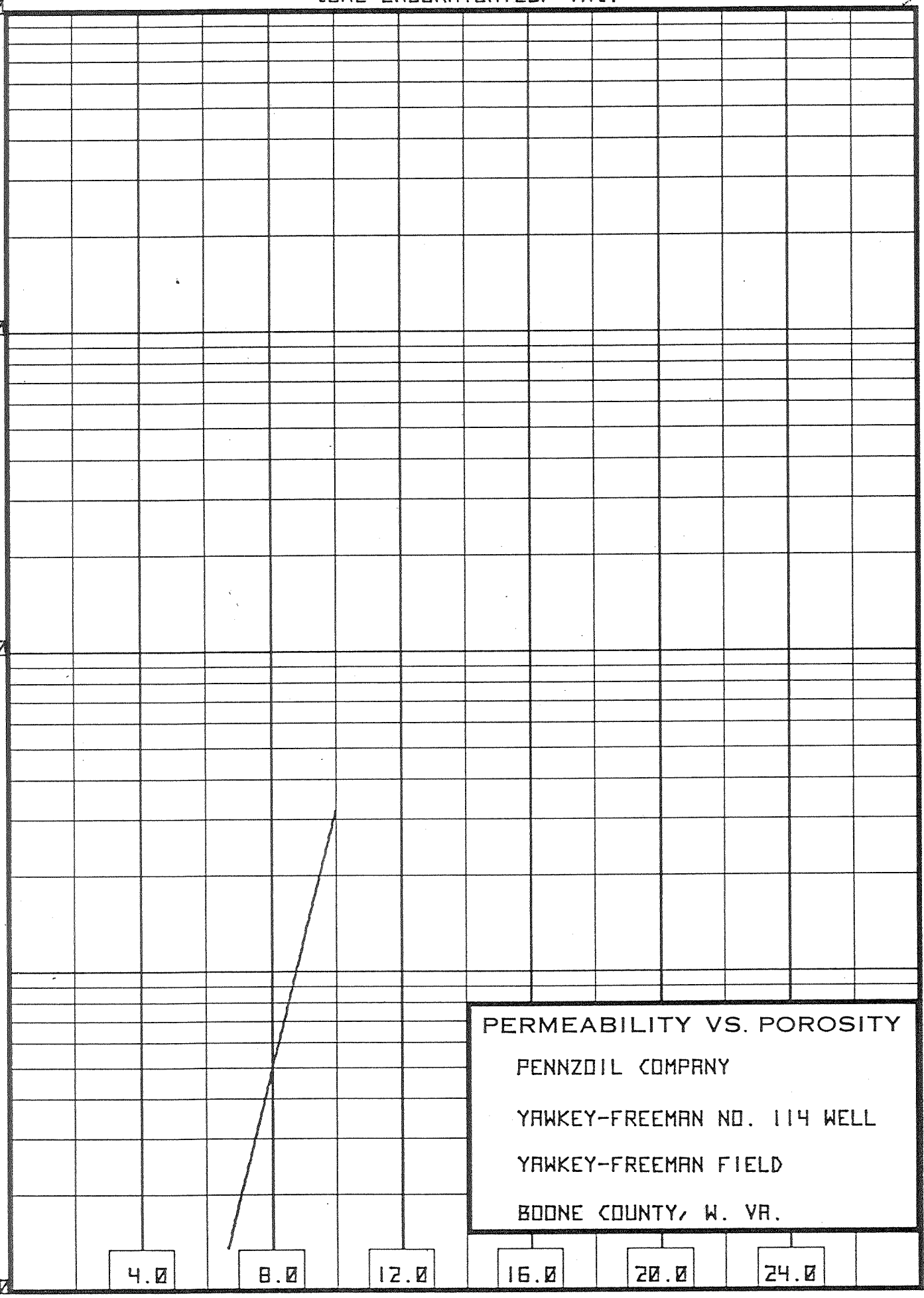
RANGE EQUATION OF THE LINE

POROSITY DEVIATION MINIMIZED FOR SELECTED PERMEABILITIES:  
 (SOLID LINE)

1  $\text{PERM} = \text{ANTILOG}(( 0.41023)(\text{POROSITY}) + -3.57535)$

PERMEABILITY: MILLIDARCIES

1000  
100  
10  
1.0  
0.10



PERMEABILITY VS. POROSITY  
PENNZOIL COMPANY  
YAWKEY-FREEMAN NO. 114 WELL  
YAWKEY-FREEMAN FIELD  
BOONE COUNTY, W. VA.

4.0 8.0 12.0 16.0 20.0 24.0

POROSITY : PERCENT

DISTRIBUTION OF FINAL REPORTS

5 Copies

Pennzoil Company  
P. O. Drawer 1588  
Parkersburg, W. Va. 26101  
Att: Mr. John Blomberg



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

COMPANY PENNSOIL COMPANY FIELD YAWBY-FREEMAN FILE 5072-1-1  
 WELL YAWBY-FREEMAN NO. 114 WELL COUNTY BOONE DATE 4-21-78  
 LOCATION \_\_\_\_\_ STATE WEST VIRGINIA ELEV. \_\_\_\_\_

# CORE-GAMMA CORRELATION

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VERTICAL SCALE: 5" = 100'

TOTAL WATER 0000  
 PERCENT PORE SPACE  
 80 60 40 20 0

GAMMA RAY  
 RADIATION INCREASE  
 →

PERMEABILITY 24.70  
 MILLIDARCYS

POROSITY 18.5  
 PERCENT

OIL SATURATION XXX  
 PERCENT PORE SPACE

100.0 10.0 1.0 0.1 30 20 10 0 0 20 40 60 80

