

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

CORE ANALYSIS REPORT

FOR

PENNZOIL COMPANY

A. L. REYNOLDS NO. 1 WELL
WOOD COUNTY, WEST VIRGINIA

107 1099

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 profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

CORE LABORATORIES, INC.



P.O. Box 131
Mt. Pleasant, MI 48858

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

File No. 3602-660
January 20, 1981

Att: Mr. Steven S. Holsclaw

Re: Core Analysis Report
Berea Sandstone Formation
A. L. Reynolds No. 1 Well
Murphytown-Dallison Area
Wood County, W. Va.

Gentlemen:

A diamond core from this well between the depths of 2345' and 2349' has been received in our Michigan laboratory. In accordance with your instructions of January 7, the following analyses have been performed:

1. Whole core porosity and permeability every foot.
2. Vertical permeability every foot.
3. Plug permeability every six inches.
4. Determination of grain density every foot.

Results of these analyses are herein submitted in tabular and graphical form.

This core is temporarily stored in our laboratory and will be shipped to your warehouse via motor freight.

The opportunity to be 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
 A. L. REYNOLDS NO. 1 WELL
 WOOD COUNTY, W. V.

DATE: 1-12-81
 FORMATION: BEREA SS
 DRLG. FLUID:
 LOCATION:

FILE NO: 3602-660
 ENGINEER: MCCLURE
 ELEVATION:

* INDICATES PLUG PERM

S INDICATES PRESERVED SAMPLE

SMP. NO.	DEPTH	PERM. TO AIR MD.			POROSITY GEX. FLD.	FLUID SATS.		GR. DEN.	DESCRIPTION
		MAXIMUM	90 DEG	VERT.		OIL	WTR.		
FULL DIAMETER ANALYSIS W/MEASURED GRAIN DENSITIES									
1	2345.0-45.5	0.5	0.1	0.2	7.9			2.66	SS
2	2345.5-46.0								
3	2346.0-46.5								
4	2346.5-47.0	0.6	0.5	0.4	7.4			2.72	SS
5	2347.0-47.5								
6	2347.5-48.0	0.8	0.8	0.6	6.7			2.66	SS
7	2348.0-48.5	1.2	1.0	0.4	6.3			2.67	SS

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S INDICATES PRESERVED SAMPLE

SMF. NO.	DEPTH	PERM. TO AIR MD.		POROSITY GEX. FLD.	FLUID SATS.		GR. DEN.	DESCRIPTION
		MAXIMUM	90 DEG VERT.		OIL	WTR.		
HORIZONTAL PLUG PERMEABILITIES								
1	2345.0-45.5	*	0.3					SS
2	2345.5-46.0	*	0.3					SS
3	2346.0-46.5	*	0.3					SS
4	2346.5-47.0	*	0.3					SS
5	2347.0-47.5	*	0.8					SS
6	2347.5-48.0	*	0.5					SS
7	2348.0-48.5	*	0.3					SS

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PERMEABILITY: MILLIDARCIES

100
10
1.0
0.10

4.0

8.0

12.0

16.0

20.0

24.0

POROSITY: PERCENT

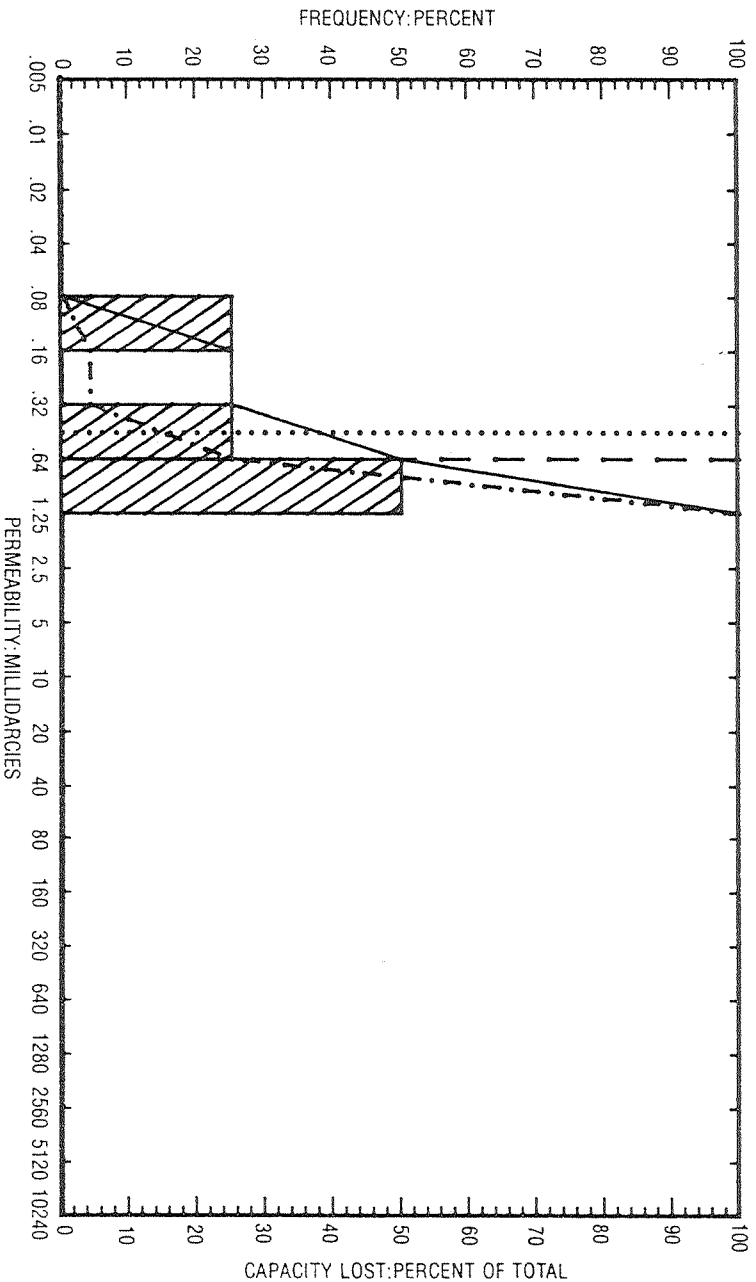
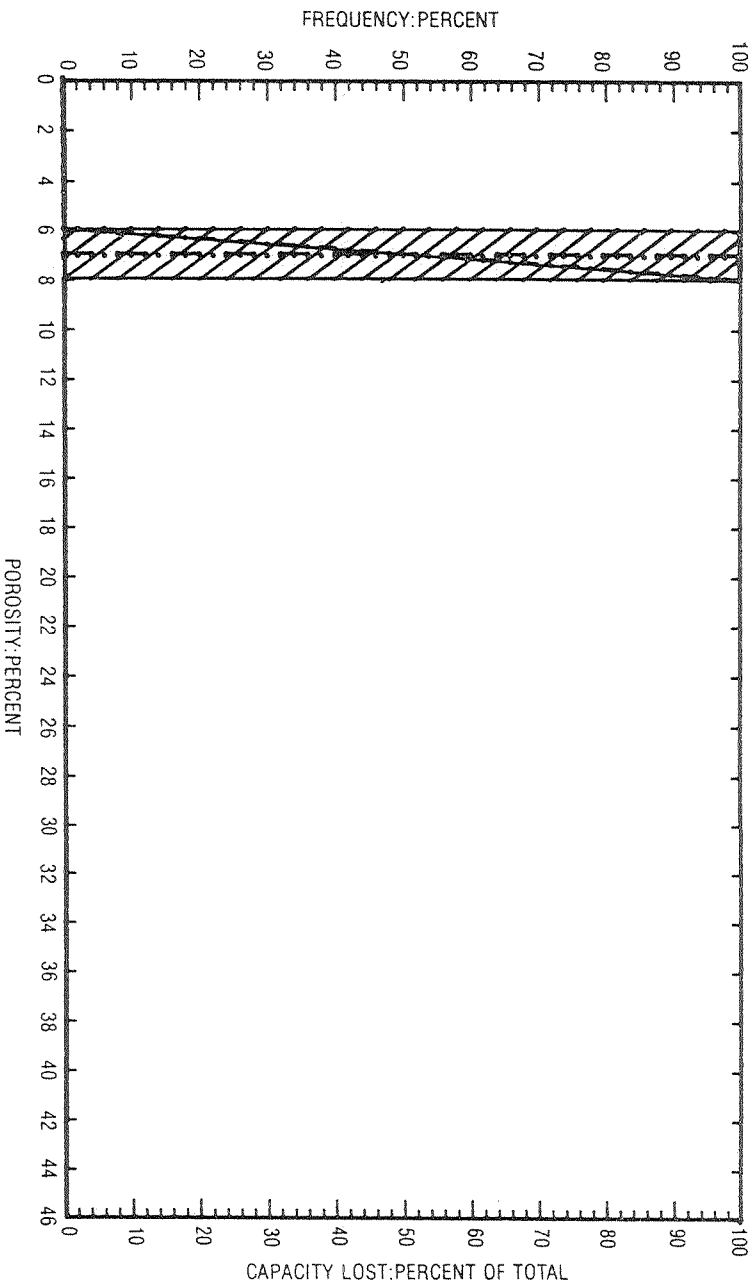
PERMEABILITY VS. POROSITY
PENNZOIL COMPANY
R. L. REYNOLDS NO. 1 WELL
WOOD COUNTY, W. V.

x

x

x

x



PENNZDIL COMPANY
R. L. REYNOLDS NO. 1 WELL
WOOD COUNTY, W. V.

PERMEABILITY AND POROSITY HISTOGRAMS

LEGEND

- ARITHMETIC MEAN POROSITY
- GEOMETRIC MEAN PERMEABILITY
- MEDIAN VALUE
- CUMULATIVE FREQUENCY
- CUMULATIVE CAPACITY LOST

STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

COMPANY: PENNZOIL COMPANY
FIELD :

WELL : A. L. REYNOLDS NO. 1 WELL
COUNTY, STATE: WOOD COUNTY, W. V.

AIR PERMEABILITY : MD. (90 DEGREE) RANGE USED 0.100 TO 1000
POROSITY : PERCENT (GAS EXPANSION) RANGE USED 0.0 TO 46.0

(PERMEABILITY UNCORRECTED FOR SLIPPAGE)

DEPTH LIMITS : 2345.0 - 2348.5 INTERVAL LENGTH : 3.5
FEET ANALYZED IN ZONE : 3.5 LITHOLOGY EXCLUDED : NONE

DATA SUMMARY

POROSITY AVERAGE	PERMEABILITY AVERAGES		
	ARITHMETIC	HARMONIC	GEOMETRIC
7.1	0.60	0.28	0.45

STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

COMPANY: PENNZOIL COMPANY
FIELD :

WELL : A. L. REYNOLDS NO. 1 WELL
COUNTY, STATE: WOOD COUNTY, W. V.

GROUPING BY POROSITY RANGES

POROSITY RANGE	FEET IN RANGE	AVERAGE POROSITY	AVERAGE PERM. (GEOM.)	AVERAGE PERM. (ARITH)	FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (%)
6.0 - 8.0	2.0	7.1	0.447	0.600	100.0	100.0
TOTAL NUMBER OF FEET =			2.0			

STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

COMPANY: PENNZOIL COMPANY
 FIELD :

WELL : A. L. REYNOLDS NO. 1 WELL
 COUNTY, STATE: WOOD COUNTY, W. V.

GROUPING BY PERMEABILITY RANGES

PERMEABILITY RANGE	FEET IN RANGE	AVERAGE PERM. (GEOM.)	AVERAGE PERM. (ARITH)	AVERAGE POROSITY	FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (%)
0.072 - 0.156	0.5	0.100	0.100	7.9	25.0	25.0
0.313 - 0.625	0.5	0.500	0.500	7.4	25.0	50.0
0.625 - 1.250	1.0	0.894	0.900	6.5	50.0	100.0

TOTAL NUMBER OF FEET = 2.0

STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

COMPANY: PENNZOIL COMPANY
 FIELD :

WELL : A. L. REYNOLDS NO. 1 WELL
 COUNTY, STATE: WOOD COUNTY, W. V.

POROSITY-FEET OF STORAGE CAPACITY LOST FOR SELECTED POROSITY CUT OFF

POROSITY CUT OFF	FEET LOST	CAPACITY LOST (%)	FEET REMAINING	CAPACITY REMAINING (%)	ARITH MEAN	MEDIAN
0.0	0.0	0.0	2.0	100.0	7.1	7.0
2.0	0.0	0.0	2.0	100.0	7.1	7.0
4.0	0.0	0.0	2.0	100.0	7.1	
6.0	0.0	0.0	2.0	100.0	7.1	
8.0	2.0	100.0	0.0	0.0		

TOTAL STORAGE CAPACITY IN POROSITY-FEET = 14.2

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STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

COMPANY: PENNZOIL COMPANY
 FIELD :

WELL : A. L. REYNOLDS NO. 1 WELL
 COUNTY, STATE: WOOD COUNTY, W. V.

MILLIDARCY-FEET OF FLOW CAPACITY LOST FOR SELECTED PERMEABILITY CUT OFF

PERMEABILITY CUT OFF	FEET LOST	CAPACITY LOST (%)	FEET REMAINING	CAPACITY REMAINING (%)	GEOM. MEAN	MEDIAN
-----	-----	-----	-----	-----	-----	-----
0.005	0.0	0.0	2.0	100.0	0.45	0.63
0.010	0.0	0.0	2.0	100.0	0.45	0.63
0.020	0.0	0.0	2.0	100.0	0.45	0.63
0.039	0.0	0.0	2.0	100.0	0.45	0.63
0.078	0.0	0.0	2.0	100.0	0.45	0.63
0.156	0.5	4.2	1.5	95.8	0.74	0.74
0.313	0.5	4.2	1.5	95.8	0.74	0.74
0.625	1.0	25.0	1.0	75.0	0.89	
1.250	2.0	100.0	0.0	0.0		

TOTAL FLOW CAPACITY IN MILLIDARCY-FEET (ARITHMETIC) = 1.20

DISTRIBUTION OF FINAL REPORTS

5 Copies

Mr. Steven S. Holsclaw
Pennzoil Exploration and
Production Company
P. O. Drawer 1588
Parkersburg, W. Va. 26101

CORE LABORATORIES, INC.



Petroleum Reservoir Engineering

COMPANY PENNZOIL COMPANY FILE NO. 3602-660
 WELL A. L. REYNOLDS NO. 1 DATE 1-12-81
 FIELD _____ FORMATION BEREA Ss ELEV. _____
 COUNTY WOOD STATE W. V. DRLG. F.L.D. _____ CORES _____
 LOCATION _____

CORRELATION COREGRAPH

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VERTICAL SCALE: 5" = 100'

Total Water _____
 PERCENT PORE SPACE
 100 80 60 40 20 0

Gamma Ray
 RADIATION INCREASE →

Permeability $K_a - 90^\circ$
 MILLIDARCIES

Porosity GEX
 PERCENT

Oil Saturation
 PERCENT PORE SPACE

