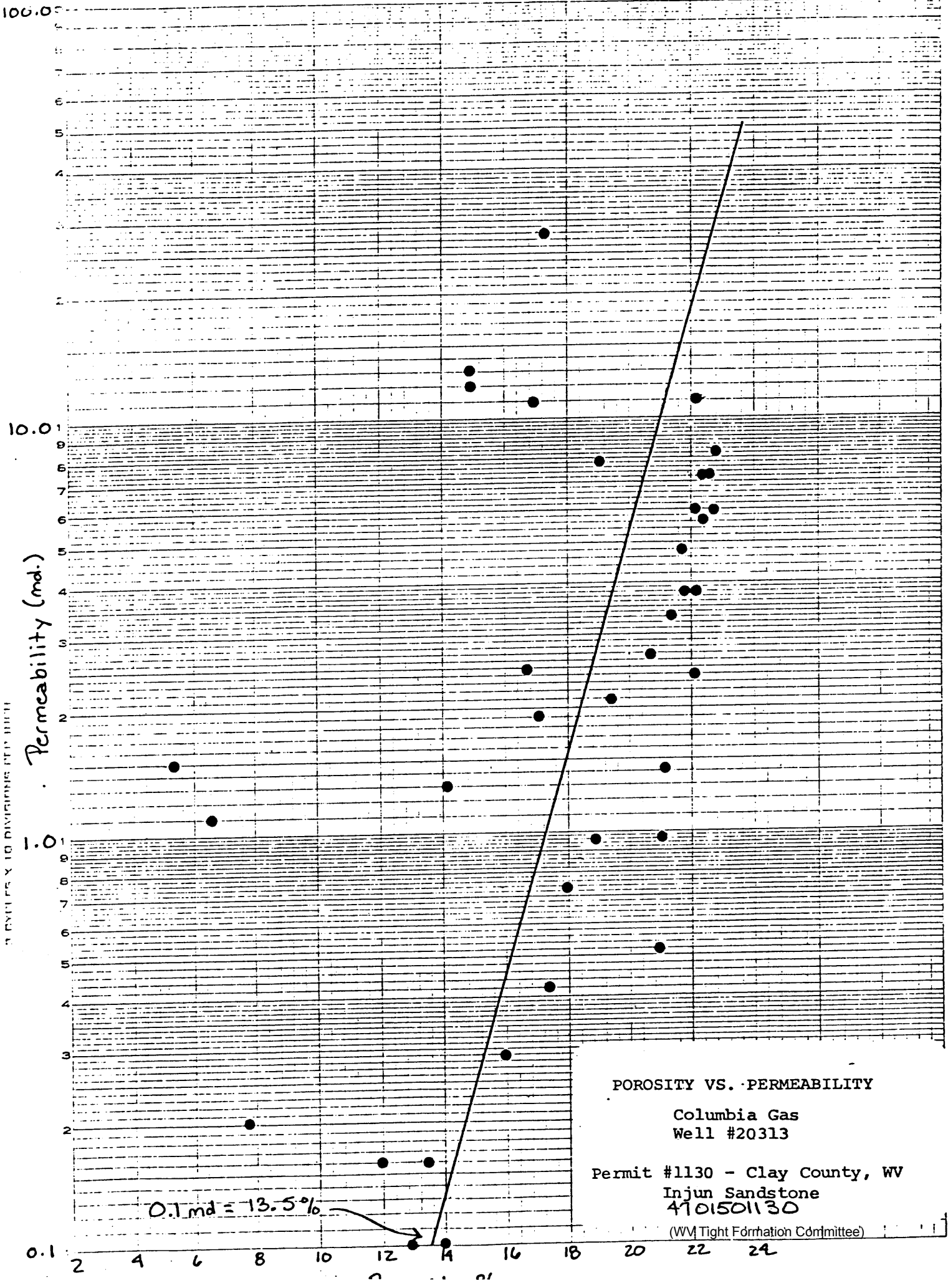


DIETZEN CORPORATION  
MADE IN U.S.A.

NO. 3000 L310 DIETZEN GRAPH PAPER  
SEMI-LOGARITHMIC  
3 CYCLES X 10 DIVISIONS PER CYCLE



POROSITY VS. PERMEABILITY

Columbia Gas  
Well #20313

Permit #1130 - Clay County, WV  
Injun Sandstone  
4101501130

(WV Tight Formation Committee)

42-54

Clay - 1130



# OILFIELD RESEARCH, INC.

## WHOLE CORE ANALYSIS REPORT

Company Columbia Gas Transmission Corp. Elevation 982.95 File No. 75012016  
 Lease \_\_\_\_\_ Well 20313 Formation See Below Date Cored 12/4/75  
 Field Grannys Creek Orig. Fluid FW Gel Date Report 12/11/75  
 County Clay State W. Va. Type Of Core Diamond Permit No. \_\_\_\_\_  
 Location (Waters) Summers Fork Remarks Sampled by OR-JCM

### LITHOLOGICAL ABBREVIATIONS

SAND-SU    DOLOMITE-DOL    ANHYDRITE-ANHY    SANDY-SDY    FINE-FN    CRYSTALLINE-XLN    BROWN-BRN    FRACTURED-FRAC    SLIGHTLY-SL/  
 SHALE-SH    CHERT-CH    CONGLOMERATE-CONG    SHALEY-SHY    MEDIUM-MED    GRAIN-GRN    GRAY-GY    LAMINATION-LAM    VERY-V/  
 LIMESTONE-LM    GYPSUM-GYP    FOSSILIFEROUS-FOSS    LIMY-LMY    COARSE-CSE    GRANULAR-GRNL    VUGGY-VGY    STYLOLITIC-STY    WITH-W/

| SAMPLE NUMBER | DEPTH FEET | PERMEABILITY MILLIDARCYS |     | POROSITY PERCENT | LITHOLOGY AND REMARKS |          |
|---------------|------------|--------------------------|-----|------------------|-----------------------|----------|
|               |            | HORIZONTAL               |     |                  |                       | VERTICAL |
|               |            | MAX                      | 90° |                  |                       |          |

|    |             |       |       |      | Percent Oil | Percent Water |
|----|-------------|-------|-------|------|-------------|---------------|
|    | INJUN       |       |       |      |             |               |
| 1  | 1862.5-63.5 | 0.42  | 0.16  | 17.5 | 40.3        | 42.7          |
| 2  | 1863.5-64.5 | <0.10 | <0.10 | 14.0 | 45.2        | 50.6          |
| 3  | 1864.5-65.8 | 0.16  | 0.16  | 12.0 | 10.4        | 58.7          |
| 4  | 1865.8-67.1 | 13.   | 11.   | 14.9 | 17.1        | 45.6          |
| 5  | 1867.1-68.2 | 11.   | 11.   | 17.0 | 20.7        | 45.4          |
| 6  | 1868.2-69.7 | 7.8   | 7.8   | 19.1 | 21.6        | 44.4          |
| 7  | 1869.7-71.2 | 0.16  | 0.16  | 13.6 | 29.1        | 42.3          |
| 8  | 1871.2-72.2 | 12.   | 11.   | 14.9 | 18.2        | 43.8          |
| 9  | 1872.2-73.6 | <0.10 | <0.10 | 12.9 | 20.9        | 49.2          |
| 10 | 1873.6-74.8 | 1.3   | 1.3   | 14.2 | 23.2        | 45.2          |
| 11 | 1874.8-76.0 | 1.1   | 1.0   | 6.5  | 19.5        | 51.0          |
| 12 | 1876.0-77.6 | 1.5   | 1.0   | 5.3  | 22.2        | 41.8          |
| 13 | 1877.6-79.0 | 0.20  | 0.16  | 7.8  | 20.5        | 46.8          |
| 14 | 1879.0-79.9 | 28.   | 25.   | 17.3 | 16.8        | 45.0          |
| 15 | 1879.9-81.3 | 0.73  | 0.73  | 18.0 | 22.6        | 54.8          |
| 16 | 1881.3-82.4 | 0.29  | 0.29  | 16.0 | 27.0        | 58.4          |
| 17 | 1882.4-84.0 | 2.1   | 2.1   | 19.5 | 22.8        | 57.0          |
| 18 | 1884.0-85.3 | 0.52  | 0.52  | 21.0 | 23.3        | 52.8          |
| 19 | 1885.3-86.7 | 4.8   | 4.8   | 21.8 | 20.8        | 52.6          |
| 20 | 1886.7-87.8 | 11.   | 11.   | 22.2 | 20.0        | 51.8          |
| 21 | 1887.8-88.8 | 2.5   | 2.5   | 16.7 | 18.3        | 54.9          |
| 22 | 1888.8-89.9 | 2.4   | 2.4   | 22.1 | 22.1        | 55.4          |
| 23 | 1889.9-91.3 | 3.7   | 3.5   | 20.8 | 21.0        | 55.7          |
| 24 | 1891.3-92.8 | 6.0   | 5.7   | 22.2 | 20.8        | 55.6          |
| 25 | 1892.8-93.9 | 6.0   | 5.7   | 22.8 | 20.9        | 53.2          |
| 26 | 1893.9-95.1 | 7.4   | 6.0   | 22.7 | 18.8        | 53.6          |
| 27 | 1895.1-96.4 | 5.7   | 5.7   | 22.4 | 19.9        | 52.5          |
| 28 | 1896.4-97.8 | 8.2   | 7.4   | 22.6 | 18.3        | 53.8          |

These analyses, opinions or interpretations are based on observations and material 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 Oilfield Research, Inc. (all errors and omissions excepted) but Oilfield Research, Inc. and its officers and employees, assume no responsibility and make no warranty or representations as to the productivity, proper operation, or profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

# WHOLE CORE ANALYSIS REPORT

Lease \_\_\_\_\_ Well No. 2031

| SAMPLE NUMBER | DEPTH FEET | PERMEABILITY MILLIDARCYS |     | POROSITY PERCENT | LITHOLOGY AND REMARKS |  |
|---------------|------------|--------------------------|-----|------------------|-----------------------|--|
|               |            | HORIZONTAL               |     |                  |                       |  |
|               |            | MAX.                     | 90° |                  |                       |  |

|    |             |      |      |      | Percent Oil | Percent Water |
|----|-------------|------|------|------|-------------|---------------|
| 29 | 1897.8-99.0 | 8.2  | 8.2  | 22.8 | 19.6        | 53.8          |
| 30 | 1899.0-00.3 | 3.3  | 3.3  | 21.5 | 21.0        | 54.1          |
| 31 | 1900.3-01.4 | 3.8  | 3.8  | 21.9 | 19.1        | 53.4          |
| 32 | 1901.4-02.8 | 3.8  | 3.8  | 22.2 | 16.7        | 53.8          |
| 33 | 1902.8-03.9 | 1.4  | 1.2  | 21.2 | 20.5        | 52.2          |
| 34 | 1903.9-05.0 | 0.96 | 0.76 | 21.1 | 20.4        | 52.5          |
| 35 | 1905.0-06.4 | 1.9  | 0.96 | 17.1 | 27.7        | 68.9          |
| 36 | 1906.4-07.4 | 0.96 | 0.96 | 18.9 | 19.3        | 58.2          |

**SQUAW**

|    |             |      |      |      |      |      |
|----|-------------|------|------|------|------|------|
| 37 | 1937.0-38.2 | 4.8  | 4.2  | 21.5 | 32.4 | 27.3 |
| 38 | 1938.2-39.3 | 1.1  | 0.76 | 21.1 | 38.2 | 21.5 |
| 39 | 1939.3-40.6 | 1.3  | 1.2  | 20.9 | 37.7 | 19.7 |
| 40 | 1940.6-42.0 | 0.96 | 0.76 | 20.5 | 35.3 | 23.6 |
| 41 | 1942.0-43.1 | 4.9  | 4.2  | 22.2 | 28.0 | 28.2 |
| 42 | 1943.1-44.1 | 4.7  | 4.7  | 21.7 | 28.4 | 31.2 |
| 43 | 1944.1-45.1 | 8.2  | 7.8  | 21.8 | 28.8 | 28.3 |
| 44 | 1945.1-46.0 | 0.16 | 0.16 | 13.7 | 33.2 | 15.9 |

**AVERAGES**

|               |      |      |      |      |                    |
|---------------|------|------|------|------|--------------------|
| 1862.5-1879.0 | 3.6  | 2.6  | 12.8 | 23.2 | 46.6 (16.5') INJUN |
| 1879.0-1907.4 | 4.7  | 4.4  | 20.7 | 20.9 | 54.7 (28.4') INJUN |
| 1937.0-1946.0 | 0.32 | 0.29 | 20.6 | 33.0 | 24.4 (9.0') SQUAW  |