



POROSITY VS. PERMEABILITY
Columbia Gas
Well #20309
Permit #1133-Clay County, WV
Injun Sandstone
4701501133
(WV Tight Formation Committee)

0.1md = 11.3%

42-55

Clay-1133



OILFIELD RESEARCH, INC.

WHOLE CORE ANALYSIS REPORT

Company Columbia Gas Transmission Corp. Elevation 1176.31 File No. 7601017
 Lease _____ Well 20309 Formation See Below Date Cored 1/2/76
 Field Grannys Fork Drig. Fluid FW Gel Date Report 1/13/76
 County Clay State W. Va. Type Of Core Diamond Permit No. _____
 Location (Waters) Summers Fork Remarks Sampled by client

LITHOLOGICAL ABBREVIATIONS

SAND-SD DOLONITE-DOX 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/
 LIME-LM GYPSUM-GYP FOSSILIFEROUS-FOSS LIMEY-LMY COARSE-CSE GRANULAR-GRNL VUGGY-VGY STYLOLITIC-STY WITH-W/

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

| INJUN | | | | | Percent Oil | Percent Water |
|-------|---------------|-------|-------|------|-------------|---------------|
| 1 | 2078.5 - 79.9 | <0.10 | <0.10 | 1.3 | 9.4 | 43.8 |
| 2 | 2079.9 - 81.0 | <0.10 | <0.10 | 2.6 | 0.0 | 75.0 |
| 3 | 2081.0 - 82.0 | <0.10 | <0.10 | 3.3 | 4.6 | 90.8 |
| 4 | 2082.0 - 83.3 | <0.10 | <0.10 | 2.3 | 9.6 | 74.9 |
| 5 | 2083.3 - 84.6 | 7.5 | 3.8 | 10.7 | 24.8 | 50.0 |
| 6 | 2084.6 - 86.0 | 0.70 | 0.58 | 15.7 | 27.4 | 47.6 |
| 7 | 2086.0 - 87.4 | 0.70 | 0.64 | 9.3 | 24.1 | 49.7 |
| 8 | 2087.4 - 88.7 | 4.7 | 4.7 | 21.9 | 22.4 | 50.5 |
| 9 | 2088.7 - 90.0 | 6.4 | 5.7 | 18.3 | 19.7 | 53.8 |
| 10 | 2090.0 - 91.0 | 12. | 12. | 15.7 | 20.6 | 53.6 |
| 11 | 2091.0 - 92.4 | 12. | 12. | 23.1 | 22.0 | 52.0 |
| 12 | 2092.4 - 93.8 | 10. | 8.9 | 23.1 | 21.5 | 51.9 |
| 13 | 2093.8 - 95.2 | 2.8 | 2.4 | 22.2 | 21.1 | 53.5 |
| 14 | 2095.2 - 96.6 | 7.4 | 6.7 | 22.1 | 20.4 | 54.1 |
| 15 | 2096.6 - 98.1 | 4.2 | 3.5 | 22.1 | 20.2 | 54.4 |
| 16 | 2098.1 - 99.3 | 7.1 | 7.1 | 22.6 | 19.7 | 54.5 |
| 17 | 2099.3 - 00.6 | 8.2 | 7.4 | 23.4 | 22.0 | 51.8 |
| 18 | 2100.6 - 02.0 | 7.4 | 7.4 | 23.7 | 23.8 | 50.0 |
| 19 | 2102.0 - 03.2 | 8.9 | 7.4 | 23.8 | 23.9 | 47.8 |
| 20 | 2103.2 - 04.7 | 6.7 | 6.7 | 23.3 | 23.4 | 49.7 |
| 21 | 2104.7 - 06.0 | 6.0 | 5.4 | 22.9 | 21.6 | 50.0 |
| 22 | 2106.0 - 07.4 | 3.3 | 3.3 | 21.9 | 20.9 | 53.0 |
| 23 | 2107.4 - 08.5 | 2.0 | 2.0 | 20.5 | 25.3 | 53.7 |
| 24 | 2108.5 - 09.9 | 1.5 | 1.5 | 19.2 | 24.1 | 57.5 |
| 25 | 2109.9 - 11.0 | 0.20 | 0.20 | 16.1 | 22.2 | 64.5 |
| 26 | 2111.0 - 12.2 | 1.0 | 1.0 | 16.8 | 8.9 | 77.0 |
| 27 | 2112.2 - 13.5 | 0.25 | 0.25 | 16.4 | 13.2 | 76.4 |
| 28 | 2113.5 - 14.9 | <0.10 | <0.10 | 15.2 | 7.6 | 87.9 |

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WHOLE CORE ANALYSIS REPORT

Lease _____ Well No. 20300

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

| | | | | | | Percent Oil | Percent Water |
|----|---------------|-------|-------|--|------|-------------|---------------|
| 29 | 2114.9 - 16.1 | <0.10 | <0.10 | | 15.4 | 14.7 | 79.6 |
| 30 | 2116.1 - 17.3 | <0.10 | <0.10 | | 15.4 | 8.3 | 72.2 |
| 31 | 2117.3 - 18.8 | <0.10 | <0.10 | | 17.8 | 16.4 | 73.5 |
| 32 | 2118.8 - 19.8 | <0.10 | <0.10 | | 17.6 | 15.8 | 69.0 |

SQUAW

| | | | | | | | |
|----|---------------|------|------|--|------|------|------|
| 33 | 2145.0 - 46.2 | 0.76 | 0.76 | | 18.9 | 39.6 | 23.5 |
| 34 | 2146.2 - 47.7 | 0.52 | 0.52 | | 19.7 | 39.0 | 19.9 |
| 35 | 2147.7 - 49.2 | 0.35 | 0.35 | | 20.1 | 35.4 | 23.8 |
| 36 | 2149.2 - 50.4 | 0.69 | 0.64 | | 21.4 | 37.7 | 21.2 |
| 37 | 2150.4 - 52.0 | 0.69 | 0.69 | | 18.4 | 35.6 | 23.0 |

AVERAGES

| | | | | | | | | |
|---------|-------------|------|------|--|------|------|------|-------|
| (4.1') | 2083.3-87.4 | 2.9 | 1.6 | | 11.9 | 25.4 | 49.1 | INJUN |
| (23.6') | 2087.4-11.0 | 6.1 | 5.8 | | 21.6 | 21.9 | 53.0 | INJUN |
| (8.8') | 2111.0-19.8 | 0.17 | 0.17 | | 16.4 | 12.1 | 76.8 | INJUN |
| (7.0') | 2145.0-52.0 | 0.59 | 0.58 | | 19.7 | 37.3 | 22.2 | SQUAW |