

Attachment "G"
Geologic Data on Injection and Confining Zones
Zelman #1 Injection Well

Formation tops and thickness data were projected utilizing data from offset wells 37-033-20333 and 37-033-20327. The wells are located approximately 1481 feet and 1380 feet north and south of the Zelman #1 well, respectively.

The injection zone is the Huntersville Chert-Oriskany formation. The Huntersville Chert is projected from 7306 to 7358 with a gross thickness of 52'. The Oriskany is projected from 7358 to 7387 with a gross thickness of 29' feet. Fracture Gradient for this formation has been calculated to be .9518 psi/ft. Please see attachment "I" for data and calculations.

The confining zones are the Onondaga Limestone (upper) and the Helderberg Limestone (lower) formations. The Onondaga is projected from 7292 to 7306 with a gross thickness of 14 feet. The top of the Helderberg is projected to be at 7387 to an unknown depth. Fracture data on the Onondaga and Helderberg is unavailable however confinement by these boundaries has been established by Gas Storage in the Oriskany pools throughout Pennsylvania.

Geologic sample logs were utilized from wells within the Penfield Quadrangle to provide the following lithologic descriptions:

7295-7306	Onondaga Limestone-	Dark gray to black, hard, argillaceous, micro crystalline.
7306-7358	Huntersville Chert –	Dark gray to olive, translucent, argillaceous, micro fractured, dense.
7358-7387	Oriskany Sandstone –	Light gray, fine grained, well cemented quartz sand. Inter-granular porosity with calcite and silica cement.
7387-?	Helderberg Limestone –	Dark gray, micro crystalline, hard, silty, argillaceous.

Published data by the Pennsylvania Geologic Survey on faulting in the area identifies (2) faults within the AOR. (Publication A74 cd -Geology of the Southern Half of the Penfield Quadrangle). Location of these faults are shown on the attached map. Our study confirms the location of the southern fault due to the Onondaga Limestone being displaced by a -397 between wells 37-033-20327 and 37-033-20325. However, we found no data to support the northern fault as shown. Subsurface data from well records from wells 37-033-20341, 20333, 20327, 20336 and 20328 indicate the Onondago ; Chert and Oriskany formations are in the same block dipping to Northwest. A tabulation of the sub-surface data and well records are attached.

There is substantial data available from the operation of existing storage and production wells drilled into the Huntersville Chert-Oriskany formation that establishes faulting through these formations as traps with definitive boundaries.

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