

Northeastern Section - 48th Annual Meeting (18–20 March 2013)

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CHARACTERIZATION OF A GAS-DRILLING IMPACTED FRACTURED ROCK AQUIFER IN WYALUSING, BRADFORD COUNTY, PA

Paper No. 4-1

Presentation Time: 10:55 AM

CHARACTERIZATION OF A GAS-DRILLING IMPACTED FRACTURED ROCK AQUIFER IN WYALUSING, BRADFORD COUNTY, PA

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Aquifer characterization is a necessary prerequisite for understanding groundwater flow and contaminant migration pathways associated with gas-drilling impacts. Currently, there is limited information in this regard with few published studies examining the fractured rock aquifer characteristics of NE Pennsylvania. To this end, geochemical and hydrologic studies have been underway at a gas-drilling impacted site in Wyalusing, Bradford County, PA to better understand the nature of the impact and aquifer characteristics. Specifically, this paper addresses the aquifer characterization of the fractured rock Catskill Formation underlying the site, including the synthesis of observed bedrock joint orientations, valley linear trends and aquifer parameterization derived from onsite aquifer testing.

Two major systematic vertical joint sets are observed in the site vicinity and consist of: (1) well-developed NNW-SSE and (2) lesser-developed W-E trends. The site lies within a valley which is topographically aligned with the well-developed NNW-SSE joints, implying joint-controlled development. Aquifer test data was evaluated using the methods proposed by Papadopoulos (1965) and Hsieh (1985), which are appropriate when evaluating non-steady flow within anisotropic aquifers. The storage coefficient for the anisotropic aquifer system is estimated at 1.6×10^{-5} . A polar plot of directional transmissivities (T_d) for the monitoring wells reveals an anisotropy ratio of 2.2:1 ($T_{ss}:T_{nn}$) at an angle of 162 degrees and corresponds with the well-developed NNW-SSE systematic joints observed in the site vicinity. T_{ss} and T_{nn} (major and minor components of the transmissivity tensor) are estimated at 5.9 m²/day and 2.6 m²/day, respectively. Two monitoring wells situated in the slope wall are hydrologically isolated from the others situated towards the valley floor and reveal bedrock heterogeneity between the valley and slope settings.

Session No. 4

T12. Unconventional Natural Gas Plays in the Eastern U.S. and Canada with Emphasis on the Marcellus Shale and Potential Impacts of Hydraulic Fracturing

Monday, 18 March 2013: 10:40 AM-12:00 PM

Omni Mount Washington Resort Gifford Room

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See more of: [Theme Sessions](#)