

Gas Injection Tests

Gonzalo Pulido, HydroQual, Inc; and Thomas P. Ballesterio, University of New Hampshire

Abstract

The gas injection test (GIT) is a field technique for the characterization of hydraulic connections in fracture networks. A GIT is conducted below the water table by gas pressurizing an isolated interval of a borehole completed in a fractured bedrock formation. During the test, a gas pressure in excess of the pressure for water removal from the interval is used: therefore the gas dewateres the interval by forcing water into the fractures that intersect the tested interval. After pressure release, the groundwater imbibes the gas phase until static conditions are restored. The pressure responses to the drainage and imbibition processes can be recorded in monitoring wells, allowing well interconnectivity to be described on a site wide scale. Three GITs conducted in a metamorphic fractured bedrock formation afforded the assessment of major flow paths, the extent of hydraulic connections within > 120 m of the tested wells, and estimated the depth of the hydraulically active fractures intersecting the tested intervals.

Topic:

Aquifer testing –well testing

Biographical sketches

Gonzalo Pulido, PhD, is a civil engineer with over 18 years of academic and consulting experience. He has been teaching several college courses related with hydraulic resources, in his home country (Colombia) over 6 years. As a groundwater consultant engineer he has been responsible for well drilling oversight, design, and installation, including hydraulic testing and pumps selection. He has a wide experience in mathematical modeling, including object-oriented programming, computer graphics, and groundwater software development. During his doctoral research he was responsible for the hydraulic characterization of a fractured bedrock aquifer. Currently, he is retained by HydroQual, Inc. and he is participating in several Superfund Sites involving fractured bedrock formations. *Email: gpulido@hydroqual.com. Phone: (201)529.5151 ext. 7148 Fax: (201)529.5728.*

Thomas P. Ballester, PhD, PE, PH, CGWP is an Associate Professor at the University of New Hampshire. He received his PhD in Hydrology and Water Resources Engineering from Colorado State University in 1981. Since 1983 he has taught courses water resources engineering at the University of New Hampshire. His general research interests involve the field measurement of hydrologic parameters and the subsequent use of the generated data (statistical inference, modeling, etc.). *Email: tom.ballester@unh.edu. Phone: (603)862.1405. Fax:(603).862.3967.*