Slug Test – Influence of purging the surrounding monitoring wells for groundwater sampling during the hydraulic conductivity test in a monitoring well.

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The hydraulic conductivity is an important parameter for modeling of groundwater flow and fate of contaminants in groundwater. Slug test is a common and reliable way of determining the lateral hydraulic conductivity of local and distinct geologic horizons under in-situ conditions. The objective of this communication is to point out a practice in environmental industry related to conducting of slug test that may result in obtaining misleading data.

The common technique used in slug test is a sudden removal of water from a monitoring well to create instantaneous drawdown of water table and then recording the recovery of water with respect to time. At the sites where a close network of monitoring well exists, a slug test conducted in a monitoring well while purging the monitoring wells in immediate vicinity for groundwater sampling, affects the recovery of water level in the test well.

During a summer season of pressing work load, a number of slug tests were conducted at various sites having close network of monitoring wells, using SolinstTM data logger. A team of technologists working on various sites followed a practice of conducting slug test while purging monitoring wells in the immediate vicinity of test well for sampling. The data of some of the tests indicated a trend contrary to expected, and such a distortion in the trend affected the reliable interpretation of the data as suggested by Hvorslev and Bouwer et al. The cause of distortion was assumed to be the purging of surrounding wells during the test.

To confirm this assumption, experimental slug tests were conducted in fine and coarse grained soils. Monitoring wells surrounding the test well were purged during the test. Data was recorded with intervals of 2, 5 and 10 seconds. Results indicated a continuing decrease in water level after instantaneous removal of water for some time instead of expected immediate recovery. Another test showed a delayed recovery, distorting the first leg of data that is helpful in interpreting the trend for picking range of hydraulic conductivity or average hydraulic conductivity. This study is a part of the reconstruction of subsequent experience in hydrogeology.

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Hafeez Chishti is a principal geoscientist and a key scientific/technical advisor within the Environmental Management Group of PHH ARC Environmental Ltd. based in Canada and United Kingdom. Dr. Chishti has received formal post graduate education in environmental sciences from Netherlands and England including his PhD from University of Leeds (UK) in 1999.

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