USING CROSS HOLE TESTING to UNDERSTAND FATE AND TRANSPORT MECHANISMS

When hydrophysical logging is applied in one well, while at the same time pumping a nearby well, the degree of hydraulic connection between the "observation" well and the pumping well can be evaluated. Identification of the specific flowing intervals associated with a pressure response allows for much more accurate hydraulic property evaluation. A direct calculation for a medium to large scale, interval specific transmissivity and hydraulic conductivity can be made by comparing flow rates or velocities for each conductive interval.

In this case study, hydrophysical logging, borehole imaging and cross-hole testing were conducted to determine design parameters at a proposed landfill site in Southern California (Ferriz, Pedler, 1996). The main objectives of the investigation were to characterize the bedrock in terms of fracture density and orientation, identify potential water yielding zones within the bedrock, characterize the geometry of the piezometric surface, assess the monitorability of the site, quantify potential inflow volumes into the excavation and assess whether a sub-drain could be designed to accommodate these inflow volumes.

As part of this study, three cross-hole aquifer tests were performed to assess the interconnectivity of the bedrock aquifer. The hydraulic connection between the pumping and observation wells is estimated by comparing the flow conditions in the observation well under ambient flow conditions and under cross hole pumping conditions. Those intervals which display the greatest change in flow between the two pressure conditions can be reasonably assumed to be hydraulically connected.