

Single-Day LNAPL Transmissivity Measurement through Improved Efficiency Baildown Testing

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Background/Objectives. LNAPL transmissivity is widely used and referenced in various state guidance documents. The ASTM Standard E2856-13 was developed understanding that this metric was relatively new and that the test needed to be fully conducted to provide redundancy in equilibrium fluid levels, ensuring filter pack volume did not skew the results as well as the vertical distribution of LNAPL. However it is now understood that the limit of LNAPL baildown tests involve running tests multiple weeks where changes in water-table fluctuation cause uncertainty in results and often disallow the redundancy of confirming equilibrium fluid levels. Therefore for these tests it is infeasible to accomplish two of the original goals in the ASTM methodology. Additionally, the level of testing is often unnecessary because the wells with the lowest recoverability require the highest level of effort in terms of time and water-table fluctuations. It is worthwhile to look for a screening approach to reduce the level of effort with low LNAPL transmissivity wells (i.e., less than 0.8 ft²/day).

Approach/Activities. A method using the Bower-Rice analytical approach, which is confirmed based on discharge versus drawdown plot behavior, was developed to provide at a minimum an upper bound for LNAPL transmissivity. Guidance is provided to minimize filter pack recharge and the additional two goals of ensuring equilibrium fluid levels and the vertical nature of LNAPL distribution are accomplished via alternative methods.

Results/Lessons Learned. A one-day test can be used to evaluate if a well exhibits an LNAPL LNAPL transmissivity value of less than 0.8 ft²/day. This will reduce uncertainty with water-table fluctuations interfering with analysis methods and test results and optimize field characterization efforts.