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LNAPL Transmissivity: Too Simple of a Metric in Complex Conditions?

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Background/Objectives. After decades of environmental regulation, environmental professionals are often still attempting to understand LNAPL impacted sites and the best remedial strategy to meet often vague cleanup standards which are frequently defined as “to the extent practicable”. Historically, remedial efforts were required to reduce the LNAPL thickness in wells to an arbitrary LNAPL thickness objective and/or meet some type of time based recovery rate metric. LNAPL thickness was also used as the primary metric to develop LNAPL conceptual site models (LCSMs), which frequently resulted in over simplification of subsurface conditions and poor understanding of LNAPL mobility and recoverability. Over simplified LCSMs led to remedial strategies that could not meet remedial objectives and did not address actual site risks.

Approach/Activities. The industry has recently shifted to using LNAPL transmissivity to determine “extent practicable” as it has shown promise as a metric to better understand LNAPL mobility and recoverability when developed within the context of a robust LCSM. Significant progress has been made in improving understanding of LNAPL transmissivity by the Interstate Technology & Regulatory Council (ITRC) (2009), ASTM (2011/13), and American Petroleum Institute (API) 2013. However, LNAPL transmissivity has also been also been termed “A Twisted Parameter” due to its variability with test conditions, variability over time, and variability with changing groundwater elevations. These variations have cast doubt and/or confusion on its use as the primary indicator of LNAPL mobility. While we believe LNAPL transmissivity will remain a key parameter used in the LCSM, a greater understanding of how and why this parameter can vary is critical to remedy selection.

Results/Lessons Learned. A discussion on the critical importance of vertical distribution of mobile LNAPL in the understanding how and why variability in LNAPL transmissivity can occur will be presented. Data from case studies will be used to illustrate the different approaches of LNAPL transmissivity quantification at complex sites where heterogeneous soil conditions and variable groundwater elevations can create variation in values over time. These methods and associated output will be discussed within the context of impacting remedial decision making.