

Nationwide (USA) Statistical Analysis of LNAPL Transmissivity

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Background/Objectives. LNAPL transmissivity is rapidly gaining acceptance as a preferred metric to measure the hydraulic recoverability of mobile light nonaqueous-phase liquid (LNAPL). However, to date no widespread collection or analysis of LNAPL transmissivity data on a large-scale geographic basis has been conducted. This study was designed to collect measured LNAPL transmissivity values across a range of facilities, geographies, geologies, and LNAPL types, and to statistically analyze the collected data to determine the distribution and dependent correlations among the data collected. In particular, the study was intended to capture a clear understanding of the statistical distribution of LNAPL transmissivity in order to provide a context for site evaluations, regulatory rulemaking, and remediation decisions dependent upon LNAPL transmissivity.

Approach/Activities. The approach consisted of the development of a standardized nationwide database for collection of LNAPL transmissivity and supporting data, dissemination of this database to a range of petroleum industry corporations and their environmental engineering and consulting contractors, collection and QA/QC of the databases from multiple companies, and statistical analysis of the combined datasets that resulted from this nationwide data collection effort. Critical data collected included LNAPL physical properties, geologic and hydrogeologic parameters of relevance, LNAPL transmissivity values, test and analytical methods, and geographic and temporal scales of measurement. Descriptive and inferential statistical analyses were performed to understand the distribution and dependent correlations of LNAPL transmissivity and related data.

Results/Lessons Learned. Results demonstrate that the distribution of LNAPL transmissivity across a broad range of facilities, geologies, measurement methods, and NAPL types is strongly right-skewed, approximating log normality. Detailed analyses of LNAPL transmissivity values by geology, permeability type, measurement method, analytical method, NAPL type, NAPL physical properties, and other relevant parameters were performed and will be presented. The results of this research project provide a broad understanding of LNAPL transmissivity occurrence nationwide and provide a context within which future LNAPL transmissivity values may be interpreted and evaluated to determine their significance.