

State of the Practice for Innovative and Optimized Delivery Methods for Liquid and Solid Amendments in A Variety of Lithologies

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Background/Objectives. Everyone agrees that contact of amendments with contaminants for a long enough period for complete destruction is critical to meeting remediation expectations. Based on over 15 years of injection and emplacement experience, Cascade has developed a matrix of site and amendment characteristics and innovative and optimized delivery approaches for various amendments and hydrological and lithological conditions.

Approach/Activities. Optimization of delivery approaches including direct push injection and innovative next generation manifolds for precise pressure and flow control at multiple locations, hydraulic and pneumatic fracturing will be discussed. These technologies will be aligned to site considerations related to amendment physical characteristics, lithology, and depth of target interval. Additionally, optimization parameters critical to contact through dosing include injection flow rates, pressures, injection volumes and concentrations, persistence and kinetics, radius of influence basis will be addressed in relation to site considerations as well.

Results/Lessons Learned. Results from hundreds of sites have been condensed into a matrix of optimized delivery applications, some which are innovative, versus site conditions and multiple amendments. Additionally, best practices will be shared, which should eliminate reinventing the wheel or going down the path of approaches that have already been proved to be non-optimal, in regards to delivery specification and design parameters resulting in better industry performance by avoiding the costs additional remediation.