Selection of Drilling Method for Effective Amendment Delivery

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Background/Objectives. During in situ remediation planning, the method of drilling selected in order to reach the contaminated soils and/or groundwater is generally limited to a pass or fail methodology for direct injection versus injection wells. Most of the research surrounding remedial amendments is limited to overall treatment efficacy, chemistry longevity, and contaminant breakdown processes with limited review of delivery methodology beyond rate of delivery. In order to inform future in situ remediation projects and improve overall treatment efficacy, various drilling methods were reviewed through various lithologic and reagent selections in order to provide an easy to use selection reference.

Approach/Activities. This study evaluates various lithologic strata, remedial amendment, and above grade limitations as it relates to overall delivery and subsequent contact of the remedial amendment to the desired contaminated media. Specifically, it evaluates a simplified decision matrix in order to support site evaluation, chemistry selection, and ultimately delivery methodology. Further, it outlines the pre-execution and post-execution logistical impacts of various methodologies which may impact overall project cost so that reasonable inferences regarding lifecycle cost can be made.

Results/Lessons Learned. The results of this study include that various lithologies present different challenges ranging from penetrability, stability, permeability, restraint of required pressures, and distribution of selected reagents. Subsequently, these limitations should be strongly considered prior to executing any level of remediation field efforts. There are also sites which may require multiple drilling methodologies in order to maintain overall efficiency levels, ensure that cross contamination does not occur, and to meet regulatory compliance requirements.