Treating and Pretreating Hard to Access Hydrocarbon Contamination in Underground Storage Tank Basins and Utility Corridors with Colloidal Activated Carbon

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Background/Objectives. Treating or controlling contaminant mass flux at all mass storage locations dictates remedial success. Some areas are overlooked or hard to reach and can cause persistent contamination and prevention of hitting treatment goals, for example, the accumulation of contamination in underground storage tank (UST) basins either from acute or chronic releases acts as a long-term source. Ironically, many remedial injections focus on injections around tank basins while leaving treatment in the tank basin limited to periodic extraction events. Furthermore, transfer pipes leading from and to tank basins or nearby utility corridors also act as conduits.

Colloidal activated carbon (CAC) is a liquid material that is non-hazardous and non-corrosive and is most typically applied using low-pressure injection or flooding. This easy-to-apply material has resulted in many creative applications including the use in excavation backfill amendments and inland in situ emergency response after truck rollovers. However, targeting storage areas of contamination around active infrastructure in utility corridors is an entirely unique application. This has been performed on several sites across the US and the world both as a remediation approach or as a preventative approach in the case of future releases. It can be highly effective at remediating contamination in areas where oxidants or other remedial chemicals could not be injected.

Approach/Activities. Comparable to “black ink,” the remedial fluid can be applied through a variety of forms including vertical percolation, tank basin edge injections, and inject/extract approaches. Each site evaluated was approached differently and had various levels of distribution success. Data collected from several tank basin and utility corridor floods including injection layouts, injection approaches, volumes, contaminant concentrations changes were used to evaluate the success of various flooding approaches.

Results/Lessons Learned. For hard to access tank basins and infrastructure the most ideal application thus far has been direct vertical percolation with low pressure over tank basin infrastructure versus other approaches such as “push/pull” or edge injection into the tank basin. A case study of a UST basin treatment in Colorado will be reviewed in detail. In this situation, the infrastructure and native bedrock soils around the tank basin complicated direct push injection near the tank basin and elevated fears of breaking existing fuel lines if direct injections were performed. Instead, multiple short vertical vadose wells were installed safely above the top of the tanks and used to effectively inject material throughout the entire tank basin, resulting in the reduction of concentrations of BTEX of 6.6 mg/L and TVPH of 30.5 mg/L to below detection limits for two consecutive years.