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A State-Led Combined Remedy Approach for Elimination of Chlorinated Solvent Exposure under a Residential Neighborhood

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Background/Objectives. In 2009, the Michigan Department of Environmental Quality (MDEQ) began state-funded activities at an industrial plating facility in southwest Michigan to determine the nature and extent of contamination. The results of the investigation identified CVOC-impacted groundwater in a ¼ mile long shallow plume ranging from 2-5 feet in depth migrating from the site and through a residential area. Further investigation of the residences identified contaminated groundwater within many of the basements and sumps. Additionally, assessment of the nearby storm water system indicated infiltration of contaminated groundwater which was discharging into the East Branch of the Paw Paw River.

Approach/Activities. To address these concerns, the MDEQ instituted a combined remedy approach. For direct contact and vapor intrusion concerns, the basement sumps were capped and vented and a vapor intrusion protection coating was applied to the floor and walls. For the groundwater plume, a multi-phase injection approach including electron donor, bioaugmentation and liquid activated carbon (LAC) substrates was implemented. The design challenges of a fast moving aquifer (1 ft/day) migrating through a residential neighborhood required a unique design approach consisting of treatment lines spaced approximately 200’ apart between residential properties.

Results/Lessons Learned. Through implementation of this strategy, a portion of the electron donor was observed to be moving at approximately 1/3 the speed of groundwater with total organic carbon (TOC) increases detected 120 ft downgradient after 300 days. In addition, electron donor longevity exceeded 2 years. The data to be presented will show TOC sweeping under the neighborhood with corresponding contaminant reduction. As a final polishing step, sorption-enhanced ERD with LAC was utilized, resulting in essential elimination of the plume within the targeted treatment area.