Long-Term Monitoring Following a Phased Approach to Address CVOCs Using In Situ Chemical Reduction (ISCR) in a Historically Stalled Shallow Aquifer

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Background/Objectives. The site is an operating light manufacturing facility in New York where historic operations have resulted in shallow groundwater being impacted by chlorinated volatile organic compounds (cVOCs). The source of contamination is suspected to be a historical drain within the facility where CVOCs were primarily discharged. The contamination is expected to have spread to other rooms within the current facility where manufacturing operations are in progress. Historically, the main constituents of interest (COIs) are PCE and cis-1,2 DCE that exceed the NYSDEC groundwater cleanup standards. The molar concentrations of daughter product (cis 1,2 DCE) are three to five times the concentrations of parent compounds (PCE and TCE) within the treatment zones. The site geology is comprised primarily of silty clay with intermittent layers of sand. The saturated zone impacts ranges between 3 and 13 ft bgs.

Approach/Activities. In situ chemical reduction (ISCR) is the combined effect of stimulated biological oxygen consumption (via “fermentation” of complex organic carbon sources), direct chemical reduction with reduced metals, and the corresponding enhanced decomposition reactions that are realized at the lowered redox (E_h) conditions.

In situ remediation commenced in 2011 through a field-scale pilot using an ISCR substrate followed by phased full-scale injections in 2011 and 2013 to avoid minimal disruption to the ongoing manufacturing process. ISCR injections were supplemented with *Dehalococcoides* (DHC) culture to enhance the microbial activity. Post-injection monitoring continued until 60 months post injections. CVOCs were reduced by over 98% in most treatment areas. Long-term geochemical monitoring indicated that average ORP was close to -150 mV over a period of 60 months with complete reduction of sulfate.

Results/Lessons Learned. The analysis of data will focus on trends in molar concentrations of CVOCs over a period of 60 months followed by long-term contaminant and geochemical monitoring steering the site towards no further action.