Spatial and Temporal Application of Two Remedial Technologies at an Active Industrial Site Help Manage the Environmental Risks

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Background/Objectives. Combined Remedies Initiative (CRI) has been adopted in the last decade for accelerated site remediation at many sites. Using innovative site characterization tools, practitioners are able to foresee the point of diminishing returns and switch over to the next phase of their treatment train approach to meet end goals. In situ treatment technologies in particular can be engineered to provide multiple treatment pathways (chemical, biological and biogeochemical), and applied both spatially and temporally at sites involving chlorinated compounds as they can be treated with both oxidative and reductive mechanisms.
This presentation will focus on an industrial site where clear identification of remedial objectives and metrics were used to establish technology transition points, and thereby promoting a synergistic remediation pathway to improve performance, save time, money and resources for the client.

Approach/Activities. The investigation and remediation of an historic manufacturing site in northern New Jersey impacted by chlorinated volatile compounds (CVOCs) is ongoing. Previous remedial efforts included installation and operation of a groundwater pump and treat/air stripper system and injection of zero valent iron (ZVI) to mitigate high CVOC concentrations in groundwater emanating from the source pit. In 2019, an Intermediate Remedial Measure (IRM) resulted in direct excavation of the source area, but significant soil residuals and groundwater impacts remain. Site conditions demanded a kinetically aggressive in situ approach to target the source mass. Accordingly, in situ chemical oxidation (ISCO) using activated persulfate was selected keeping the CRI in mind that residuals from ISCO chemistry (mainly sulfate) could potentially be used to transition into engineered biological and biogeochemical reduction mechanisms, and ultimately resulting in accelerated monitored natural attenuation (MNA).

Results/Lessons Learned. Comprehensive evaluation of the phased approach to address the contaminants will be presented. Key points of focus include:

- Efficacy of ISCO reagents in reducing the source mass
- Challenges and lessons learned in injecting large volumes of reagents using direct push technologies
- Determination of transition points between ISCO and biogeochemical reduction
- Determining the end point once biogeochemical reduction mechanisms are in place for long-term MNA.