



Project Summary:

The subject site is a former gasoline terminal located outside of Erie, Pennsylvania. The site has historically had groundwater and soil contamination with free product present due to historic petroleum spills. The site was contaminated with BTEX and varying levels of free product. The in-situ injection program targeted these compounds as well as the free product with advanced chemical oxidation technologies including a combination of sodium persulfate and hydrogen peroxide, activated by zero valent iron. A total of 70 injection points were utilized to treat a total of 10,775 square feet from 8-17 feet bgs. The geology at the site is primarily silty clay with some gravel, sand, and shale fragments.

Remediation Plan

The remedial approach taken at the site utilizes both free radical chemistry, oxidation chemistry and facultative biological oxidation in such a way as to extend the oxidant and free radical residuals while enhancing the in-situ environment such that it is suitable for biologically based attenuation. IET applied three remedial materials to the subsurface via a patented injection process and apparatus (United States Patent # 7,044,152) such that the activation processes occur in a controlled manner in-situ. In a unique application of zero-valent iron metal, IET activated both the persulfate and the peroxide species in-situ, affecting the oxidation and biological remedial processes in a single injection process. The first phase, oxidation, oxidizes the majority of dissolved and sorbed targeted compounds. The second phase, biological attenuation, polishes and maintains the achieved treatment goals.

Results

The remedial goal at the site was to achieve site specific groundwater concentrations and remove free product. Six months after the injection event, all of the groundwater concentrations were not only below their site specific health standards but also below their statewide health standards. No free product is present at the site. The initial increases in benzene concentrations due to the homogenization of the subsurface have decreased to baseline sampling event results or below with the most heavily contaminated monitoring well, MW-7, currently having no analyzed petroleum compounds above their laboratory detection limits. The site has reached closure less than 9 months after the injection event.

