

# **Electron Acceptor Selection for Enhanced Bioremediation of Non-chlorinated Hydrocarbons**

Brad Elkins, P.G. and Bilgen Yuncu, P.E., Ph.D.

EOS Remediation, LLC, Raleigh NC, USA

Replenishment of electron acceptors in the subsurface is a common method to stimulate biodegradation of non-chlorinated hydrocarbons in groundwater. Two widely used products are calcium-based peroxides for aerobic degradation and sulfate-based salts for anaerobic degradation. What design parameters should a consultant consider in selecting from multiple electron acceptors?

A small consulting firm was responsible for addressing BTEX (benzene, toluene, ethylbenzene, and xylenes) contamination at a former gas station site. The challenge was to select the appropriate electron acceptor that could cost-effectively stimulate bioactivity and reduce contaminant concentrations that had remained above the state MCL for over a decade. Of the electron acceptors considered, EAS™ (Electron Acceptor Solution) was selected to enhance anaerobic biodegradation of BTEX under established sulfate-reducing conditions. During the pilot study, 52.5 gallons of EAS™ was introduced into the former UST pit area (via a single injection well) and samples were collected at several downgradient monitoring wells.

After 6 months, concentrations of toluene and xylenes decreased by 98% and 87%, respectively; benzene and ethylbenzene concentrations decreased to a lesser extent (<34%). Sulfate levels remained elevated up to 5ft from the injection point. Results from the pilot study will be used in designing the upcoming full-scale application.