

Application of Enhanced Anaerobic Biostimulation and Bioaugmentation Produces Conditions Suitable for Reductive Dechlorination

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A site contaminated with Trichloroethene (TCE) required treatment and, in turn, an enhanced anaerobic biostimulation program was developed and implemented. The initial remediation approach was designed using the direct-injection of a controlled-release electron donor to provide an optimized source of hydrogen and stimulate the naturally occurring reductive dechlorination process. Sampling one month after the injection indicated that the electron donor was successful in creating anaerobic conditions within the aquifer as indicated by the following parameters: dissolved oxygen (DO) declined to below 0.5 milligrams per liter (mg/L) and the oxidation-reduction potential (ORP) was sustained around -50 to -75 mV. However, reductive dechlorination was not apparent as the expected contaminant degradation was not occurring ten months after the application. In light of these results it seemed plausible that the appropriate dechlorinating microbial consortium could be absent and may require augmentation to facilitate the desired contaminant reduction. Less than a year after the initial injection, a new electron donor application was undertaken and this time with the addition of a dechlorinating bioaugmentation culture, principally the microbe *dehalococcoides*. Sampling results two months after the injection revealed that the new electron donor enhanced the pre-existing anaerobic conditions (continued reductions in sulfate and ORP) and microbial activity was also observed as chlorinated solvents were reduced in all wells within the treatment area. TCE was reduced from a high of 330 to <1.0 ug/L in well AW08 and an increase in vinyl chloride in all wells provided ample evidence of reductive dechlorination. Monitoring results 5 months post-injection indicate a strong trend of continued contaminant reduction. This presentation will discuss the evidence that led to the two different electron donor applications and bioaugmentation, treatment results and the most current data trends.