

ENHANCED IN SITU BIOREMEDIATION OF TCE USING ACTIVE RECIRCULATION

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ABSTRACT: A full-scale enhanced in situ bioremediation system has been design and implemented at Beale Air Force Base Environmental Restoration Program Site 10 (Site 10). Enhanced in situ bioremediation was selected in the *Draft Final Record of Decision for Site 10 (ROD)* for remediation of chlorinated solvents within the source area. The treatment area, approximately 12 acres, is defined as the extent of groundwater where the trichloroethene (TCE) concentrations exceed 500 µg/L. Enhanced in situ bioremediation is being used to accelerate reductive dechlorination of chlorinated VOCs through biostimulation using an electron donor (sodium lactate) and bioaugmentation with the dehalorespiring microbial consortium KB-1™ (SiREM). This presentation describes the design and approach for implementation, evaluates the data from 2 years of operation, and provides the remedial process optimization strategies employed.

Great progress has been made over the course of two years in terms of EISB implementation and cleanup. The full-scale EISB system began construction in 2004. The system was built out in three separate phases. Phase 1 began operation in January 2005. Phase 1 has successfully treated approximately 3 acres of the high concentration area. Phase 1 has degraded about 50% of the solvent mass within the treatment area. Phase 2 of the EISB system was installed in August 2006 and will treat an additional 3 acres and about 25% of the mass of solvent within the treatment area. Phase 3 was installed in October 2006 and will treat the remaining mass of solvent within the treatment area. The EISB system is continuously optimized by using tracer tests and computer models to predict system efficiency.

Some innovative design aspects of this full-scale application of in situ bioremediation include:

- Modular design allows for easy modifications to account for heterogeneous subsurface
- Active recirculation within a perched aquifer
- Bioaugmentation
- Biofouling controls
- Use of controllerless, pneumatic pumps

This presentation is intended for the Emerging Technologies Session. The intended audience for this presentation is project managers for sites with TCE in groundwater. I will need a datashow projector connected to a computer with Microsoft PowerPoint.