BioStryke Remediation

Project Highlights

- **ERD**ENHANCED™ innovative Green remedial formulation proven to destroy cVOC source mass contaminants
- **ERD**ENHANCED™ decreased TCE saturated soil and groundwater concentrations to below RIDEM Objectives
- **ERD**ENHANCED™ proven sustainable by destroying dissolved, sorbed, and residual source mass over time with no evidence of rebound
- **ERD**ENHANCED™ provides Sustainability over multiple years.
- **ERD**ENHANCED™ is cost-effective minimizing Site, remediation, and long-term monitoring costs.

DNAPL Source Zone Green Remediation

Proposed Middle School Development Site

cVOC Soil and Groundwater Contamination, Woonsocket, RI

Plant Products Co. Ltd. (PPCL) manufactures and distributes innovative and Green remediation products designed to cost-effectively enhance bioremediation strategies. PPCLs BioStryke® products leverage the momentum Mother Nature provides and biostimulates native microbial populations in order to expedite contaminant destruction. BioStryke **ERD**ENHANCED™ is an *in-situ* formulation proven to passive-aggressively destroy chlorinated volatile organic compounds (cVOC). The following documents the cost-effective use of **ERD**ENHANCED™. The case study demonstrates the ability of our formulations to cost-effectively remediate dissolved, sorbed, and residual source mass cVOCs in groundwater and saturated soils.

As part of a design build project, a Rode Island Public School District proposed the construction of two Middle School buildings on property challenged environmentally. The Districts environmental consultant determined the use of **ERD**ENHANCED™ the most cost cost-effective and construction friendly strategy to remediate cVOC soil and groundwater contaminants. Tetrachloroethene (PCE), a common cVOC, had been identified in soil and groundwater, between the two proposed Middle School buildings, creating a ≈4.5 x 10^6 cubic foot sand and gravel aquifer treatment zone.

A permit to implement an **ERD**ENHANCED™ injection program using Direct Push Technology (DPT) was applied for with the Rhode Island Department of Environmental Management (RIDEM) Underground Injection Control Program. The permit was approved and the DPT program was implemented, injecting **ERD**ENHANCED™, the slurry-phase organic carbon and complex carbohydrate additive containing a specifically designed and formulated micro-macro inorganic supplement. **ERD**ENHANCED™ stimulates the development of anaerobic conditions, enhancing reductive dechlorination (ERD), expediting site compliance.

Specific objectives of the Project Scope of Work included:

- Wash and drive drilling techniques for eight (8) shallow monitoring wells, each to ≈25-35 feet below ground surface (bgs); and, two (2) deep wells to ≈65 feet bgs.
- Development of groundwater monitoring wells.
- 28 DPT injection nodes within the source area, and 26 DPT injection nodes advanced hydraulically downgradient of the source, all to ≈70 feet bgs.
- Injection of the beta **ERD**ENHANCED™ slurry with a food-grade dye tracer to rapidly Effectively evaluate the treatment zone area of influence (AOI).
- Review of groundwater monitoring and analytical testing results and annual plume migration pattern evaluation to determine project efficacy.

One year after the single injection of **ERD**ENHANCED™, project goals were met. **ERD**ENHANCED™ is sustainable, with groundwater geochemical conditions continuing to support ERD while minimizing environmental impacts and costs by reducing excavation, off-site disposal, on-site operational needs, and long-term project management liabilities.

BioStryke Remediation

BioStryke **ERD**ENHANCED™ stimulates the ability of the native microflora to scavenge competing terminal electron acceptors (TEAs) such as oxygen, nitrate, oxidized iron/manganese, and sulfate which can limit cVOC dechlorination.

ERDENHANCED™ leverages the momentum generated by Mother Nature, enhancing the chemically reducing environment, resulting in increased rates of reductive dechlorination and expedited contaminant destruction, lowering costs to the client.

ERDENHANCED™ provides a proprietary blend of superior organic carbon sources, complex-carbohydrates, and a designer formulation of micro-macro inorganic supplements, proven to facilitate native microflora fermentation and the yielding of volatile fatty acids, molecular hydrocarbon, expediting rates of dehalorespiration and reductive dechlorination.

ERDENHANCED™ expedites the degradation of dissolved contaminants, creating large concentration gradients between groundwater and sorbed/residual source mass, effectively expediting contaminant flux and increasing contaminant bioavailability.

ERDENHANCED™ expedites desorption of source mass contaminants by transforming parent cVOCs (TCE/PCE) to less-chlorinated daughter products (DCE, VC, and ethene), each with significantly lower sorption coefficients and greater degradation rates, supporting the transition to MNA for long-term plume management.

ERDENHANCED™ expedites contaminant dissolution by enhancing microbial generation of fatty acids which serve as co-solvents, increasing contaminant bioavailability, and increasing rates of dechlorination and contaminant biotransformation.

Our products demonstrate that by enhancing existing conditions and working with Mother Nature not against Her, one can expedite site compliance, increase site redevelopment, and enhance reuse of existing infrastructure; all with less impact to the environment, and less cost to the client, representing a smart sustainable strategy to manage your environmental liabilities.