



Project Highlights

- ERDENHANCED™ Pilot Study >98% total [cVOC] reduction in 4-month evaluation period.
- ERDENHANCED™ Proven **Green Cost-Effective** Source Mass Destruction Strategy
- ERDENHANCED™ Proven **Sustainable** in-situ Remediation Strategy
- ERDENHANCED™ evaluation performed under Ministry of Environment (MOE) approval
- ERDENHANCED™ Performance Demonstrated Contaminant Reductions in 8-months:
 - >82% PCE
 - >93% TCE
 - >81% cis-DCE
- ERDENHANCED™ Reduces Site Time, Operational Costs
- ERDENHANCED™ Provides Long-Term Complete cVOC Biotransformation
- ERDENHANCED™ Maximum Solubility Providing Multiple Deployment Options with Minimal Water Usage



Former Dry Cleaner Facility Redevelopment Opportunity DNAPL Source Zone ERDENHANCED™ In-Situ Remediation Pilot Study Andover, Massachusetts

BioStryke® Remediation Products, LLC, provide innovative and cost-effective amendment formulations designed to biostimulate treatment zone conditions and enhance the in-situ destruction of Site contaminants. BioStryke® ERDENHANCED™ leverages existing conditions facilitating passive-aggressive destruction of cVOC dissolved, sorbed, residual source mass while minimizing remedial impacts and costs. ERDENHANCED™ is proven effective in terms of cost and performance, allowing Site compliance with less environmental impact, working with Mother Nature not against.

To identify a sustainable in-situ remedial strategy the property Owner, with Massachusetts Department of Environmental Protection (MADEP) approval, implemented a PRS based Pilot Study to evaluate the efficacy of ERDENHANCED™ under actual Site conditions; 4-months into the evaluation, total cVOC concentrations within the treatment zone **decreased by > 98%**.

The Pilot Study was implemented to evaluate the efficacy of ERDENHANCED™ and another to facilitate *in-situ* PCE biodegradation. Using two test-wells (TW1/TW2) installed proximate to source zone contaminants, a classic carbon donor was deployed in TW1 and the innovative ERDENHANCED™ was deployed in TW2. Both additives were introduced to the groundwater using Passive Release Sock (PRS) deployment units which are designed to provide a low-cost low-risk process to evaluate amendment efficacy using existing 2-inch monitoring wells.

ERDENHANCED™ amended groundwater realized a >98% decrease in total [cVOC] in 4-months; whereas, the other monitoring well (TW1) realized a < 62% reduction in total cVOCs. Specifically, ERDENHANCED™ amended groundwater [PCE] decreased from 250,000 µg/l to 3,600 µg/l. As a result of the Pilot Study, ERDENHANCED™ was fully deployed via sub-slab infiltration galleries designed to impact source zone contaminants. Within 6-months [PCE] of deployment groundwater 30-feet downgradient from Source Zone 1 decreased 63% and >99% downgradient to Source Zone 2; from 3,800 µg/l to 1,400 µg/l, and 770 µg/l to <1 µg/l, areas 1 and 2 respectively. In both source areas post deployment concentrations of [cis-1,2-DCE] decreased >50% while remaining daughter products were recorded at <1 µg/l.

BioStryke® amendments are suitable for any type of deployment due to enhanced solubility.

BioStryke® amendments provide easy of handling, require less water, displacing less pore space requiring less site time and less overall remedial costs.

BioStryke® amendments maximize project margins while minimizing project impacts.

BioStryke® amendment Pilot Study provides Owner/Generator(s), Practitioners, and Regulators alike a low-cost low-risk efficacy evaluation process prior to committing to full-scale remedial strategy. Pilot Study groundwater was amended using Passive Release Sock (PRS) deployment units filled with ERDENHANCED™.

PRS units fit within existing 2-inch groundwater monitoring well. PRS units remain suspended within the screened interval of the test well, undisturbed, passive-aggressively amending a vertical column with an area-of-influence (AOI) of < 3-ft. Groundwater sample/analytical testing events are performed at the start, and at regular intervals throughout the evaluation, to include replacement of PRS deployment units. PRS Pilot Study provides a low-cost, low-risk process for Owner(s), Regulators, and Practitioners to evaluate amendments ability prior to full-scale remedial commitment. In summary:

- **ERDENHANCED™** expedites the degradation of dissolved contaminants creating a massive concentration gradient between groundwater and sorbed/residual source mass, effectively expediting contaminant flux.
- **ERDENHANCED™** expedites contaminant bioavailability and the biotransformation of parent cVOCs (TCE/PCE) to less-chlorinated daughter products (DCE, VC, and ethene), each with significantly lower sorption coefficients and greater degradation rates helping to support MNA for long-term plume management.
- **ERDENHANCED™** expedites contaminant dissolution and bioavailability supporting microbial volatile fatty acid (VFA) production and co-solvent 'surfactant-effects' increasing contaminant bioavailability and rates of dechlorination.

The graph below summarizes the expedited performance data collected during Pilot Study operations.

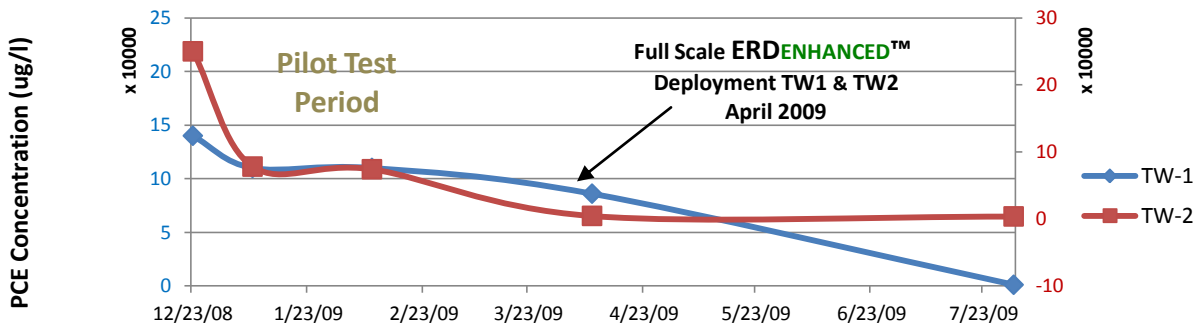


Table One below demonstrates the results of groundwater performance monitoring and analytical testing.

Table One

DATE	Test Well 1 Concentrations (µg/l)					Test Well 2 Concentrations (µg/l)				
	PCE	TCE	1,1-DCE	1,2-DCE	VC	PCE	TCE	1,1-DCE	1,2-DCE	VC
Baseline Results										
12/23/2008	140,000	<1,000	<1,000	<1,000	<1,000	250,000	<1,000	<1,000	<1,000	<1,000
Pilot Study Results										
1/8/2009	110,000	<1,000	<1,000	<1,000	<1,000	78,000	<1,000	<1,000	<1,000	<1,000
2/9/2009	110,000	<1,000	<1,000	<1,000	<1,000	74,000	<1,000	<1,000	<1,000	<1,000
Remediation Program Results – Post Full Scale ERDENHANCED Deployment										
4/9/2009	86,000	1,200	<100	1,200	<100	4,400	890	3	1,212	3
7/31/2009	1,000	21	<10	74	<10	3,600	86	13	66	13
Percent Reduction From Highest Recoded Concentration										
% Reduction	(99.3)	(98.3)	NC	(93.8)	NC	(98.6)	(90.3)	333	(94.6)	333